

**DEVELOPMENT OF REGIONAL IMPACT  
(DRI #2636)  
TRAFFIC STUDY  
FOR  
LONGACRE INDUSTRIAL DEVELOPMENT  
BUFORD, GEORGIA**



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## EXECUTIVE SUMMARY

Traffic impacts were evaluated for the added traffic from the proposed Longacre industrial development located on Roy Carlson Boulevard between SR 13 (Buford Highway) and I-985 in Buford, Georgia. The development will consist of:

- Warehousing: 947,520 square feet
- Industrial Park: 455,600 square feet
- Shopping Center: 40,000 square feet

The development proposes access via Roy Carlson Boulevard, and, for the purpose of this analysis, an additional right-in/right-out/left-out access point on Thompson Mill Road between Bryant Road and I-985. Existing and future operations after completion of the project were analyzed at the intersections of:

- SR 347 (Friendship Road) at I-985 Northbound Ramps
- SR 347 (Friendship Road) at I-985 Southbound Ramps
- SR 347 (Friendship Road) at SR 13 (Atlanta Highway)
- SR 13 (Buford Highway) at Roy Carlson Boulevard
- SR 13 (Buford Highway) at Thompson Mill Road
- SR 13 (Buford Highway) at S. Hill Street/Hamilton Mill Road
- Thompson Mill Road at Bryant Road
- Thompson Mill Road at N. Bogan Road

The analysis included the evaluation of Future operations for “No-Build” and “Build” conditions, both of which account for increases in annual growth of through traffic. The results of the analysis are listed below:

## System Recommendations and Improvements

Improvements that are identified as “System Improvements” address deficiencies that are found within the existing road network prior to any impacts from the proposed development’s added traffic. A summary of the system improvements, which address deficiencies that are found within the existing road network for the “No-Build” conditions, is provided below with more detailed information on each intersection in the following narratives.

### **Summary of Recommended System Improvements**

- Construct a dedicated channelized right turn lane on the northbound, southbound, and eastbound approaches to the intersection of Thompson Mill Road at N. Bogan Road.

#### **Thompson Mill Road at N. Bogan Road**

Several approaches to the intersection of Thompson Mill Road at N. Bogan Road will begin to operate at a level-of-service “E” or “F” in the “No-Build” conditions. As traffic will increase over the next ten years, it is recommended that a dedicated right turn lane be installed per local standards on the northbound, southbound, and eastbound approaches.

## Site Access Configuration

The following access configuration was utilized when modeling the proposed site driveway intersection.

- Site Driveway #1: Truck and employee access via Roy Carlson Boulevard
  - This intersection will be upgraded as part of GDOT project PI #132950 to include signalization as well as the relocation of Thunder Road to align with Roy Carlson Boulevard.
  - As access to SR 13 (Buford Highway) via Thunder Road and Bryant Road will be eliminated, the existing traffic at the intersection was shifted to the proposed signal at Roy Carlson Boulevard as part of the “No-Build” and “Build” analyses.
  - This driveway will consist of two entering lanes and two exiting lanes. The westbound (driveway) approach is assumed to operate with a dedicated left turn lane and shared through/right turn lane.
  - Entering left turn movements will be made from a dedicated southbound left turn lane. It is recommended the signal include a southbound protected + permissive phase for entering left turns (See Appendix).
  - Entering right turn movements will be made from a dedicated northbound right turn lane.
- Site Driveway #2: Right-in/right-out/left-out access on Thompson Mill Road
  - For the purpose of this study, this driveway will only be used by employee/car traffic. Truck traffic will be able to use this access only in emergency situations.
  - As this access geometry was agreed upon by Gwinnett County DOT for the purpose of this study, further discussions will need to take place on the final layout of the driveway.
  - This driveway will consist of one entering lane and one exiting lane.
  - Entering right turn movements will be made from a dedicated westbound right turn lane.
  - The intersection will be unsignalized with a STOP sign on the southbound approach.

## Site Mitigation Recommendations and Improvements

Improvements that are identified as site mitigation improvements address deficiencies that are caused by site traffic and can be identified as related to the proposed development. A summary of the site mitigation improvements is provided below, with more detailed information in the following narrative.

### Summary of Recommended Site Mitigation Improvements

- It is recommended a second westbound left turn lane be constructed using the existing striping at the intersection of SR 347 (Friendship Road) at SR 13 (Atlanta Highway).

#### SR 347 (Friendship Road) at SR 13 (Atlanta Highway)

After the addition of site traffic, the intersection of SR 347 (Friendship Road) at SR 13 (Atlanta Highway) will begin to operate at an overall level-of-service “E” during the AM and PM peak hours. Due to the added amount of westbound left turns at the intersection, it is recommended a second westbound left turn lane be installed using the existing striping and given protected signal phasing. With this improvement, the intersection will begin to operate at a level-of-service “D” in the AM and PM peak hours.

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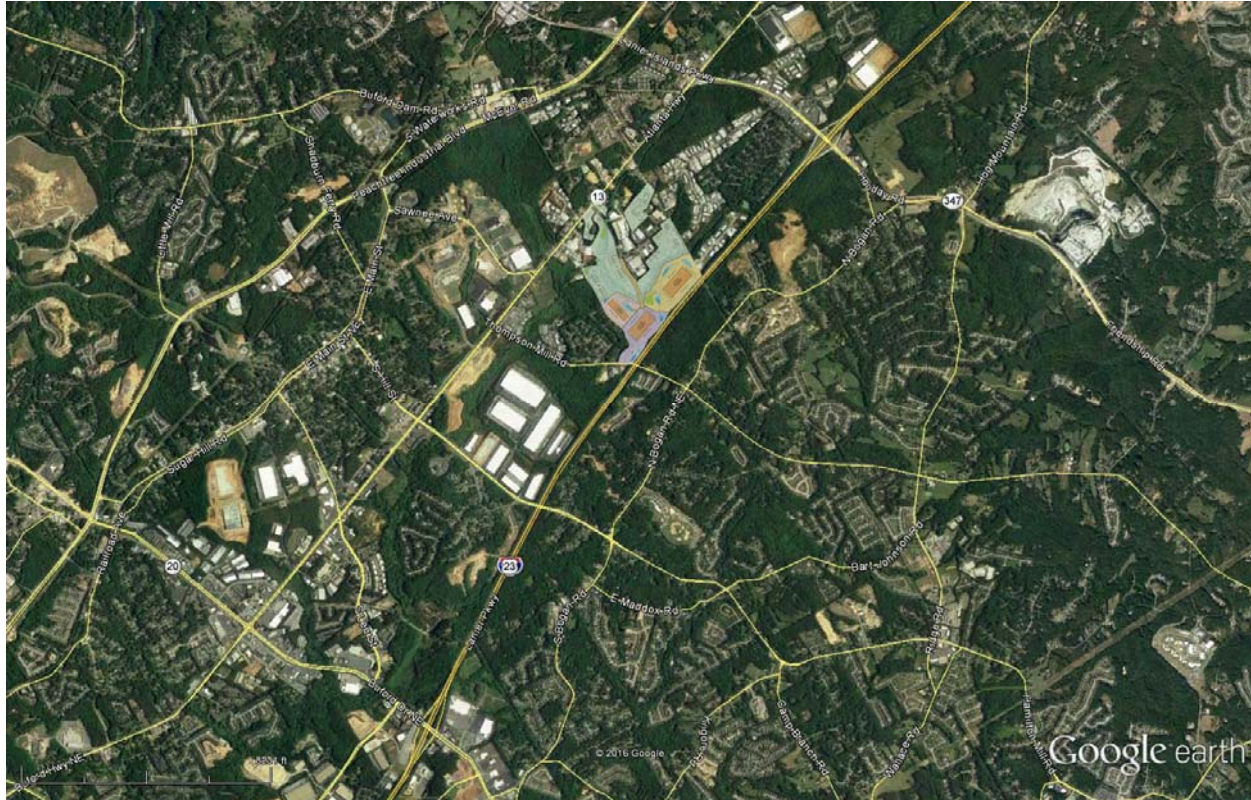
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# INTRODUCTION

The purpose of this study is to determine the traffic impact that will result from the proposed Longacre industrial development located on Roy Carlson Boulevard between SR 13 (Buford Highway) and I-985 in Buford, Georgia. The development will consist of:

- Warehousing: 947,520 square feet
- Industrial Park: 455,600 square feet
- Shopping Center: 40,000 square feet



The development proposes access via Roy Carlson Boulevard, and, for the purpose of this analysis, an additional right-in/right-out/left-out access point on Thompson Mill Road between Bryant Road and I-985. The AM and PM peak hours have been analyzed in this study. In addition to the site access point on Thompson Mill Road, this study includes the evaluation of traffic operations at the intersections of:

1. SR 347 (Friendship Road) at I-985 NB Ramps
2. SR 347 (Friendship Road) at I-985 SB Ramps
3. SR 347 (Friendship Road) at SR 13 (Atlanta Highway)
4. SR 13 (Buford Highway) at Roy Carlson Boulevard
5. SR 13 (Buford Highway) at Thompson Mill Road
6. SR 13 (Buford Highway) at S. Hill Street/Hamilton Mill Road
7. Thompson Mill Road at Bryant Road
8. Thompson Mill Road at N. Bogan Road

Recommendations to improve traffic operations have been identified as appropriate and are discussed in detail in the following sections of the report.

## STUDY NETWORK DETERMINATION

The study network was determined by evaluating the amount of traffic that the proposed development will add to each roadway segment in the area. According to GRTA requirements, a roadway segment carries a “significant” amount of traffic if the project contributes 7% or more trips to the two-way daily service volumes of the roadway at the appropriate level of service standard. Upon agreement with GRTA a level of service standard of “D” was used for determining the study area network.

The traffic generated by the proposed project was then assigned to the area roadways using the trip distribution to determine the site-generated traffic on each roadway segment. The boundaries of the study network extend to the most distant intersections where at least 7% of the service volumes on the segment are attributed to project traffic. The following study intersections fell within the 7% rule and/or have been selected as being suitable for evaluation in discussions with GRTA, GDOT, Gwinnett County and the City of Buford:

1. SR 347 (Friendship Road) at I-985 NB Ramps
2. SR 347 (Friendship Road) at I-985 SB Ramps
3. SR 347 (Friendship Road) at SR 13 (Atlanta Highway)
4. SR 13 (Buford Highway) at Roy Carlson Boulevard
5. SR 13 (Buford Highway) at Thompson Mill Road
6. SR 13 (Buford Highway) at S. Hill Street / Hamilton Mill Road
7. Thompson Mill Road at Bryant Road
8. Thompson Mill Road at N. Bogan Road

The location of the development and the surrounding study network is shown in Figure 1. Other intersections within this corridor, such as unsignalized side streets, right-in/right-out driveways or private driveways have not been included in the study network.

### Existing Roadway Facilities

The following is a brief description of each of the roadway facilities located in proximity to the site:

#### ***Interstate 985***

Interstate 985 (I-985) is a north-south, four-lane, median-divided roadway with a posted speed limit of 70 mph in the vicinity of the site. GDOT traffic counts (Station IDs 1390407 & 1350269) indicate that the daily traffic volume on I-985 is 61,700 vehicles per day south of SR 347 (Friendship Road) and 61,700 vehicles per day north of Hamilton Mill Road.

#### ***SR 347 (Friendship Road)***

SR 347 (Friendship Road) is an east-west, four-lane, median-divided roadway with a posted speed limit of 45 mph in the vicinity of the site. GDOT traffic counts (Station IDs 1390403, 1390405 & 1390487) indicate that the daily traffic volume on SR 347 (Friendship Road) is 16,300 vehicles per day west of SR 13 (Atlanta Highway), 19,200 vehicles per day west of I-985, and 14,900 vehicles per day east of I-985. GDOT classifies SR 347 (Friendship Road) as a Minor Arterial.

### ***SR 13 (Buford Highway/Atlanta Highway)***

SR 13 is a north-south roadway known as Atlanta Highway in Hall County and as Buford Highway in Gwinnett County. Atlanta Highway is a two-lane, undivided roadway with a posted speed limit of 45 mph in the vicinity of the site. Buford Highway is a two-lane, undivided roadway to the north of Sawnee Avenue and a four-lane, median-divided roadway to the south of Sawnee Avenue. Buford Highway has a posted speed limit of 45 mph to the north of Roy Carlson Boulevard and 50 mph to the south of Roy Carlson Boulevard.

GDOT traffic counts (Station IDs 1390165 & 1390163) indicate that the daily traffic volume on SR 13 (Atlanta Highway) is 10,600 vehicles per day north of SR 347 (Friendship Road) and 10,700 vehicles per day south of SR 347 (Friendship Road). GDOT traffic counts (Station IDs 1350101, 1350098 & 1350096) indicate that the daily traffic volume on SR 13 (Buford Highway) is 12,500 vehicles per day south of Thunder Road/Bryant Road, 20,100 vehicles per day north of Hamilton Mill Road, and 27,400 vehicles per day south of Hamilton Mill Road. GDOT classifies SR 13 (Buford Highway/Atlanta Highway) as a Minor Arterial roadway.

There is a planned GDOT project PI #132950 that will widen SR 13 (Buford Highway) from Sawnee Avenue in Gwinnett County to SR 347 (Friendship Road) in Hall County. The length of the project is approximately 1.53 miles and will widen SR 13 (Buford Highway) to a 4-lane urban facility with a 20-foot raised median, 4-foot bike lanes, curb and gutter and a 5-foot sidewalk on both sides. As this project is slated to be completed before buildout of the proposed Longacre development, the updates to the road network have been analyzed in the “No-Build” and “Build” conditions.

### ***Roy Carlson Boulevard***

Roy Carlson Boulevard is an east-west, four-lane, median-divided roadway with a posted speed limit of 25 mph in the vicinity of the site. GDOT traffic counts (Station ID 1358227) indicate that the daily traffic volume on Roy Carlson Boulevard is 1,670 vehicles per day east of SR 13 (Buford Highway). GDOT classifies Roy Carlson Boulevard as a Local roadway.

### ***Thunder Road***

Thunder Road is an east-west, two-lane, undivided roadway with a posted speed limit of 25 mph in the vicinity of the site. GDOT project PI #132950 will cul-de-sac the existing Thunder Road and relocate it to align with Roy Carlson Boulevard. Moreover, a traffic signal will be installed at the intersection and dedicated left and right turn lanes will be constructed on SR 13 (Buford Highway).

### ***Thompson Mill Road***

Thompson Mill Road is an east-west, two-lane, undivided roadway with a posted speed limit of 45 mph in the vicinity of the site. GDOT traffic counts (Station ID 1350474) indicate that the daily traffic volume on Thompson Mill Road is 7,580 vehicles per day east of SR 13 (Buford Highway). GDOT classifies Thompson Mill Road as a Major Collector roadway.



### ***Hamilton Mill Road***

Hamilton Mill Road is an east-west, four-lane, median-divided roadway with a posted speed limit of 45 mph in the vicinity of the site. GDOT traffic counts (Station ID 1350481) indicate that the daily traffic volume on Hamilton Mill Road is 20,600 vehicles per day east of SR 13 (Buford Highway). GDOT classifies Hamilton Mill Road as a Major Collector roadway.

### ***S. Hill Street***

S. Hill Street is an east-west, two-lane, undivided roadway with a posted speed limit of 25 mph in the vicinity of the site. GDOT traffic counts (Station ID 1350695) indicate that the daily traffic volume on S. Hill Street is 4,470 vehicles per day west of SR 13 (Buford Highway). GDOT classifies S. Hill Street as a Major Collector roadway.

### ***N. Bogan Road***

N. Bogan Road is a north-south, two-lane, undivided roadway with a posted speed limit of 40 mph in the vicinity of the site. GDOT traffic counts (Station IDs 1350492 & 1350489) indicate that the daily traffic volume on N. Bogan Road is 2,820 vehicles per day north of Thompson Mill Road and 10,700 vehicles per day south of Hamilton Mill Road. GDOT classifies N. Bogan Road as a Major Collector roadway.

## **Existing Bicycle and Pedestrian Facilities**

The following is a brief description of each of the bicycle and pedestrian facilities located in proximity to the site:

### ***Nearby local or regional trails***

There is no trail located near the study area.

### ***Bicycle paths or sidewalks***

Sidewalks and pedestrian facilities are present along the following roadways in the study network:

- SR 13 (Atlanta Highway/Buford Highway): various points along the east and west sides of the road between S. Lee Street and SR 347 (Friendship Road).
- SR 347 (Friendship Road): north and south sides of the road between McEver Road and I-985.

Bike paths are present along the following roadways in the study network:

- SR 13 (Atlanta Highway/Buford Highway): GDOT Project PI #132950 plans to construct a 4-foot bike lane along SR 13 from Sawnee Avenue to SR 347 (Friendship Road).

## **Existing Transit Facilities**

There is no public transit service near the site.



LOCATION MAP AND STUDY INTERSECTIONS

FIGURE 1

## STUDY METHODOLOGY

In this study, the methodology used for evaluating traffic operations at each of the subject intersections is based on the criteria set forth in the Transportation Research Board's Highway Capacity Manual, 2000 edition (HCM 2000). Synchro software, which utilizes the HCM 2000 methodology, was used for the analysis. The following is a description of the methodology employed for the analysis of unsignalized and signalized intersections.

### Unsignalized Intersections

For unsignalized intersections at which the side street or minor street is controlled by a stop sign, the criteria for evaluating traffic operations are the level-of-service (LOS) for the turning movements at the intersection and the level-of-service for the overall intersection. Level-of-service is based on the average controlled delay incurred at the intersection. Controlled delay for unsignalized intersections includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Several factors affect the controlled delay for unsignalized intersections, such as the availability and distribution of gaps in the conflicting traffic stream, critical gaps, and follow-up time for a vehicle in the queue.

Level-of-service is assigned a letter designation from "A" through "F". Level-of-service "A" indicates excellent operations with little delay to motorists, while level-of-service "F" exists when there are insufficient gaps of acceptable size to allow vehicles on the side street to cross safely, resulting in extremely long total delays and long queues. The level-of-service criteria for two-way stop-controlled and all-way stop-controlled (unsignalized) intersections are given in Table 1.

| TABLE 1 — LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS |                      |
|--------------------------------------------------------------------|----------------------|
| Level-of-service                                                   | Average Delay (sec)  |
| A                                                                  | $\leq 10$            |
| B                                                                  | $> 10$ and $\leq 15$ |
| C                                                                  | $> 15$ and $\leq 25$ |
| D                                                                  | $> 25$ and $\leq 35$ |
| E                                                                  | $> 35$ and $\leq 50$ |
| F                                                                  | $> 50$               |

Source: 2000 Highway Capacity Manual

### Signalized Intersections

For signalized intersections, it is necessary to evaluate both capacity and level-of-service in order to evaluate the overall operation of the intersection. The capacity analysis of an intersection is performed by comparing the volume of traffic using the various lane groups at the intersection to the capacity of those lane groups. This results in a volume/capacity (v/c) ratio for each lane group. A v/c ratio greater than 1.0 indicates that the volume of traffic has exceeded the capacity available, resulting in a temporary excess of demand. Although the capacity of the entire intersection is not defined, a composite v/c ratio for the sum of the critical lane groups within the intersection is computed. This composite v/c ratio is an indication of the overall intersection sufficiency.

Level-of-service for a signalized intersection is defined in terms of average controlled delay per vehicle, which is composed of initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The level-of-service criteria for signalized intersections, based on average controlled delay, are shown in Table 2. Level-of-service “A” indicates operations with very low controlled delay, while level-of-service “F” describes operations with extremely high average controlled delay. Level-of-service “E” is typically considered to be the limit of acceptable delay, and level-of-service “F” is considered unacceptable by most drivers.

| TABLE 2 — LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS |                             |
|------------------------------------------------------------------|-----------------------------|
| Level-of-service                                                 | Average Control Delay (sec) |
| A                                                                | $\leq 10$                   |
| B                                                                | $> 10 \text{ and } \leq 20$ |
| C                                                                | $> 20 \text{ and } \leq 35$ |
| D                                                                | $> 35 \text{ and } \leq 55$ |
| E                                                                | $> 55 \text{ and } \leq 80$ |
| F                                                                | $> 80$                      |

Source: 2000 Highway Capacity Manual

## EXISTING TRAFFIC ANALYSIS

Existing traffic counts and intersection geometric data were obtained at the following study intersections:

1. SR 347 (Friendship Road) at I-985 NB Ramps
2. SR 347 (Friendship Road) at I-985 SB Ramps
3. SR 347 (Friendship Road) at SR 13 (Atlanta Highway)
4. SR 13 (Buford Highway) at Roy Carlson Boulevard
5. SR 13 (Buford Highway) at Thompson Mill Road
6. SR 13 (Buford Highway) at S. Hill Street/Hamilton Mill Road
7. Thompson Mill Road at Bryant Road
8. Thompson Mill Road at N. Bogan Road
9. SR 13 (Buford Highway) at Bryant Road/Thunder Road\*

Turning movement counts for cars and trucks were collected on Wednesday, October 19, 2016. All turning movement counts were recorded during the AM and PM peak hours between 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m., respectively. The four consecutive 15-minute interval volumes that summed to produce the highest volume at the intersections were then determined. These volumes make up the peak hour traffic volumes for the intersections counted and are shown in Figure 2.

\*It should be noted that turning movement counts were collected at this intersection in order to shift the existing traffic to the intersection of SR 13 (Buford Highway) at Roy Carlson Boulevard after completion of GDOT project PI #132950 that will realign Thunder Road across from Roy Carlson Boulevard. This intersection was not modeled in the analysis.

### Existing Traffic Operations

Existing traffic operations were analyzed at the study intersections in accordance with the HCM methodology. A queue length analysis was also performed. The results of the analyses are shown in Tables 3 and 4. The existing traffic control and lane geometry for the intersections are shown in Figure 3.

**TABLE 3 — EXISTING INTERSECTION OPERATIONS**

| Intersection |                                                                                                                                                 | Traffic Control                       | AM Peak Hour                                                           |                                        | PM Peak Hour                                                           |                                        | LOS Standard                          |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------------------------------|----------------------------------------|------------------------------------------------------------------------|----------------------------------------|---------------------------------------|
|              |                                                                                                                                                 |                                       | LOS (Delay)                                                            | v/c ratio                              | LOS (Delay)                                                            | v/c ratio                              | AM/PM                                 |
| <b>1</b>     | <b><u>SR 347 @ I-985 NB Ramps</u></b><br>-Eastbound Approach<br>-Westbound Approach<br>-Northbound Approach                                     | Signalized                            | <b><u>C (27.7)</u></b><br>C (20.7)<br>C (24.4)<br>D (52.4)             | <b><u>0.68</u></b><br>-<br>-<br>-      | <b><u>C (32.1)</u></b><br>C (21.1)<br>D (43.7)<br>D (45.4)             | <b><u>0.87</u></b><br>-<br>-<br>-      | <b><u>D/D</u></b><br>-<br>-<br>-      |
| <b>2</b>     | <b><u>SR 347 @ I-985 SB Ramps</u></b><br>-Eastbound Approach<br>-Westbound Approach<br>-Southbound Approach                                     | Signalized                            | <b><u>C (22.5)</u></b><br>C (20.9)<br>B (16.3)<br>D (42.9)             | <b><u>0.77</u></b><br>-<br>-<br>-      | <b><u>B (19.2)</u></b><br>B (10.3)<br>B (18.4)<br>D (41.9)             | <b><u>0.63</u></b><br>-<br>-<br>-      | <b><u>D/D</u></b><br>-<br>-<br>-      |
| <b>3</b>     | <b><u>SR 347 @ SR 13</u></b><br>-Eastbound Approach<br>-Westbound Approach<br>-Northbound Approach<br>-Southbound Approach                      | Signalized                            | <b><u>C (28.7)</u></b><br>C (27.2)<br>B (13.9)<br>D (46.0)<br>D (45.2) | <b><u>0.76</u></b><br>-<br>-<br>-<br>- | <b><u>C (33.3)</u></b><br>C (34.9)<br>C (26.7)<br>C (30.7)<br>D (52.1) | <b><u>0.93</u></b><br>-<br>-<br>-<br>- | <b><u>D/D</u></b><br>-<br>-<br>-<br>- |
| <b>4</b>     | <b><u>SR 13 @ Roy Carlson Blvd</u></b><br>-Westbound Approach<br>-Southbound Through/Left                                                       | Stop Controlled on WB Approach        | C (22.7)<br>A (1.6)                                                    | -<br>-                                 | E (40.9)<br>A (0.3)                                                    | -<br>-                                 | D/E<br>D/D                            |
| <b>5</b>     | <b><u>SR 13 @ Thompson Mill Rd</u></b><br>-Eastbound Approach<br>-Westbound Approach<br>-Northbound Approach<br>-Southbound Approach            | Signalized                            | <b><u>C (20.6)</u></b><br>C (20.7)<br>C (32.6)<br>B (18.4)<br>B (12.5) | <b><u>0.55</u></b><br>-<br>-<br>-<br>- | <b><u>B (18.2)</u></b><br>C (31.1)<br>D (45.9)<br>B (10.3)<br>B (11.9) | <b><u>0.60</u></b><br>-<br>-<br>-<br>- | <b><u>D/D</u></b><br>-<br>-<br>-<br>- |
| <b>6</b>     | <b><u>SR 13 @ S. Hill St/Hamilton Mill Rd</u></b><br>-Eastbound Approach<br>-Westbound Approach<br>-Northbound Approach<br>-Southbound Approach | Signalized                            | <b><u>C (29.6)</u></b><br>D (46.4)<br>D (49.9)<br>B (14.7)<br>B (17.2) | <b><u>0.76</u></b><br>-<br>-<br>-<br>- | <b><u>C (32.5)</u></b><br>D (44.2)<br>E (62.6)<br>B (17.0)<br>C (28.6) | <b><u>0.90</u></b><br>-<br>-<br>-<br>- | <b><u>D/D</u></b><br>-<br>-<br>-<br>- |
| <b>7</b>     | <b><u>Thompson Mill Rd @ Bryant Rd</u></b><br>-Eastbound Approach<br>-Westbound Approach<br>-Northbound Approach<br>-Southbound Approach        | Stop Controlled on NB & SB Approaches | A (0.5)<br>A (0.0)<br>A (0.0)<br>C (18.7)                              | -<br>-<br>-<br>-                       | A (0.4)<br>A (0.0)<br>A (0.0)<br>C (20.6)                              | -<br>-<br>-<br>-                       | D/D<br>D/D<br>D/D<br>D/D              |
| <b>8</b>     | <b><u>Thompson Mill Rd @ N. Bogan Rd</u></b><br>-Eastbound Approach<br>-Westbound Approach<br>-Northbound Approach<br>-Southbound Approach      | All-Way Stop Controlled               | C (19.0)<br>E (43.1)<br>C (18.6)<br>C (17.8)                           | -<br>-<br>-<br>-                       | F (118.1)<br>C (21.4)<br>D (30.5)<br>C (22.5)                          | -<br>-<br>-<br>-                       | D/E<br>E/D<br>D/D<br>D/D              |

\*v/c ratio is not calculated for unsignalized intersections

**TABLE 4 — EXISTING INTERSECTION 95<sup>TH</sup> PERCENTILE QUEUES**

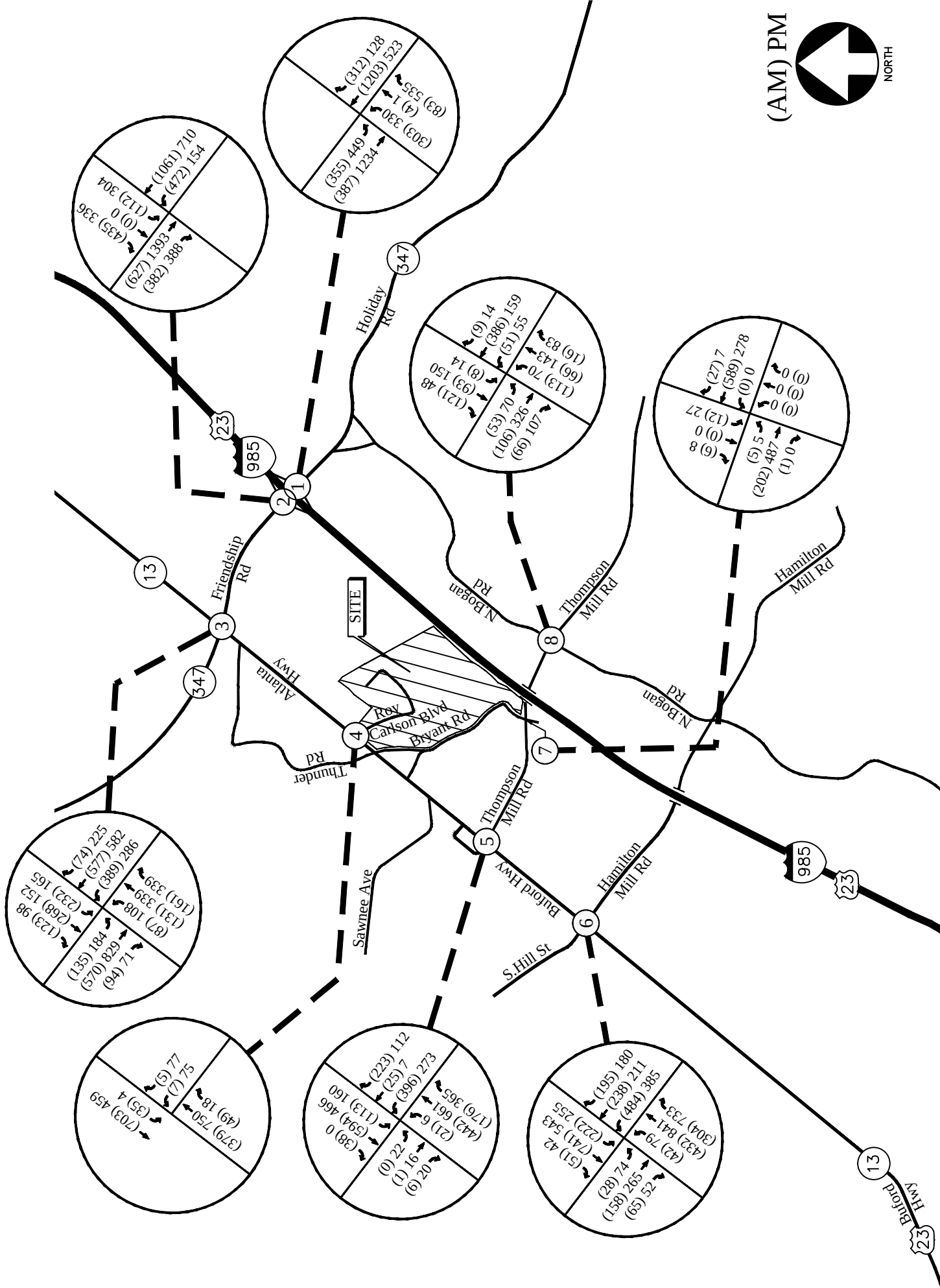
| Intersection                    |                                        | Available Storage | AM Peak: feet | PM Peak: feet |
|---------------------------------|----------------------------------------|-------------------|---------------|---------------|
| <b>1</b>                        | <b><u>SR 347 @ I-985 NB Ramps</u></b>  |                   |               |               |
|                                 | -Eastbound Left                        | -                 | 401           | 435           |
|                                 | -Eastbound Through                     | -                 | 147           | 506           |
|                                 | -Westbound Through                     | -                 | 368           | 184           |
|                                 | -Westbound Right                       | 840'              | 23            | 37            |
|                                 | -Northbound Left                       | -                 | 207           | 165           |
|                                 | -Northbound Through/Left               | -                 | 112           | 43            |
|                                 | -Northbound Right                      | 510'              | 25            | 598           |
| <b>2</b>                        | <b><u>SR 347 @ I-985 SB Ramps</u></b>  |                   |               |               |
|                                 | -Eastbound Through                     | -                 | 117           | 188           |
|                                 | -Eastbound Right                       | 375'              | 37            | 1             |
|                                 | -Westbound Left                        | 380'              | 184           | 85            |
|                                 | -Westbound Through                     | -                 | 427           | 376           |
|                                 | -Southbound Left                       | -                 | 101           | 281           |
|                                 | -Southbound Right                      | -                 | 371           | 207           |
| <b>3</b>                        | <b><u>SR 347 @ SR 13</u></b>           |                   |               |               |
|                                 | -Eastbound Left                        | 250'              | 89            | 126           |
|                                 | -Eastbound Through                     | -                 | 275           | 412           |
|                                 | -Eastbound Right                       | 370'              | 0             | 3             |
|                                 | -Westbound Left                        | 300'              | 258           | 341           |
|                                 | -Westbound Through                     | -                 | 141           | 203           |
|                                 | -Westbound Right                       | 310'              | 0             | 13            |
|                                 | -Northbound Left                       | 240'              | 85            | 73            |
|                                 | -Northbound Through                    | -                 | 150           | 208           |
|                                 | -Northbound Right                      | 250'              | 96            | 68            |
|                                 | -Southbound Left                       | 300'              | 200           | 185           |
|                                 | -Southbound Through                    | -                 | 284           | 155           |
|                                 | -Southbound Right                      | 215'              | 12            | 22            |
| <b>4</b>                        | <b><u>SR 13 @ Roy Carlson Blvd</u></b> |                   |               |               |
|                                 | -Westbound Left                        | -                 | 9             | 91            |
|                                 | -Westbound Right                       | -                 | 1             | 42            |
|                                 | -Southbound Approach                   | -                 | 5             | 1             |
| <b>5</b>                        | <b><u>SR 13 @ Thompson Mill Rd</u></b> |                   |               |               |
|                                 | -Eastbound Through/Left                | -                 | 2             | 30            |
|                                 | -Eastbound Right                       | 105'              | 0             | 5             |
|                                 | -Westbound Through/Left                | -                 | 243           | 123           |
|                                 | -Westbound Right                       | 250'              | 42            | 30            |
|                                 | -Northbound Left                       | 230'              | 30            | 7             |
|                                 | -Northbound Through                    | -                 | 194           | 190           |
|                                 | -Northbound Right                      | 230'              | 98            | 41            |
|                                 | -Southbound Left                       | 200'              | 92            | 138           |
|                                 | -Southbound Through                    | -                 | 199           | 164           |
|                                 | -Southbound Right                      | 185'              | 11            | 0             |
| Table Continued on Next Page... |                                        |                   |               |               |

| Intersection |                                                   | Available Storage | AM Peak: feet | PM Peak: feet |
|--------------|---------------------------------------------------|-------------------|---------------|---------------|
| 6            | <b><u>SR 13 @ S. Hill St/Hamilton Mill Rd</u></b> |                   |               |               |
|              | -Eastbound Left                                   | 180'              | 40            | 96            |
|              | -Eastbound Through                                | -                 | 164           | 259           |
|              | -Eastbound Right                                  | 300'              | 0             | 0             |
|              | -Westbound Left                                   | 250'              | 306           | 268           |
|              | -Westbound Through/Right                          | -                 | 349           | 316           |
|              | -Northbound Left                                  | 240'              | 39            | 58            |
|              | -Northbound Through                               | -                 | 197           | 404           |
|              | -Northbound Right                                 | 1,000'            | 0             | 0             |
|              | -Southbound Left                                  | 400'              | 125           | 277           |
|              | -Southbound Through                               | -                 | 215           | 218           |
|              | -Southbound Right                                 | 280'              | 0             | 0             |
| 7            | <b><u>Thompson Mill Rd @ Bryant Rd</u></b>        |                   |               |               |
|              | -Eastbound Approach                               | -                 | 1             | 1             |
|              | -Westbound Approach                               | -                 | 0             | 0             |
|              | -Northbound Approach                              | -                 | 0             | 0             |
|              | -Southbound Approach                              | -                 | 8             | 18            |
| 8            | <b><u>Thompson Mill Rd @ N. Bogan Rd*</u></b>     |                   |               |               |
|              | -Eastbound Approach                               | -                 | 101           | 191           |
|              | -Westbound Approach                               | -                 | 193           | 102           |
|              | -Northbound Approach                              | -                 | 61            | 76            |
|              | -Southbound Approach                              | -                 | 71            | 75            |

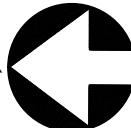
*\*95<sup>th</sup> percentile queue generated from SimTraffic model*

The results of existing traffic operations analysis indicate that the side-street approaches to the intersection of Thompson Mill Road at N. Bogan Road are currently operating at a level-of-service "E" or "F" during the AM and PM peak hours. These areas are addressed in the Future Traffic Operations section.



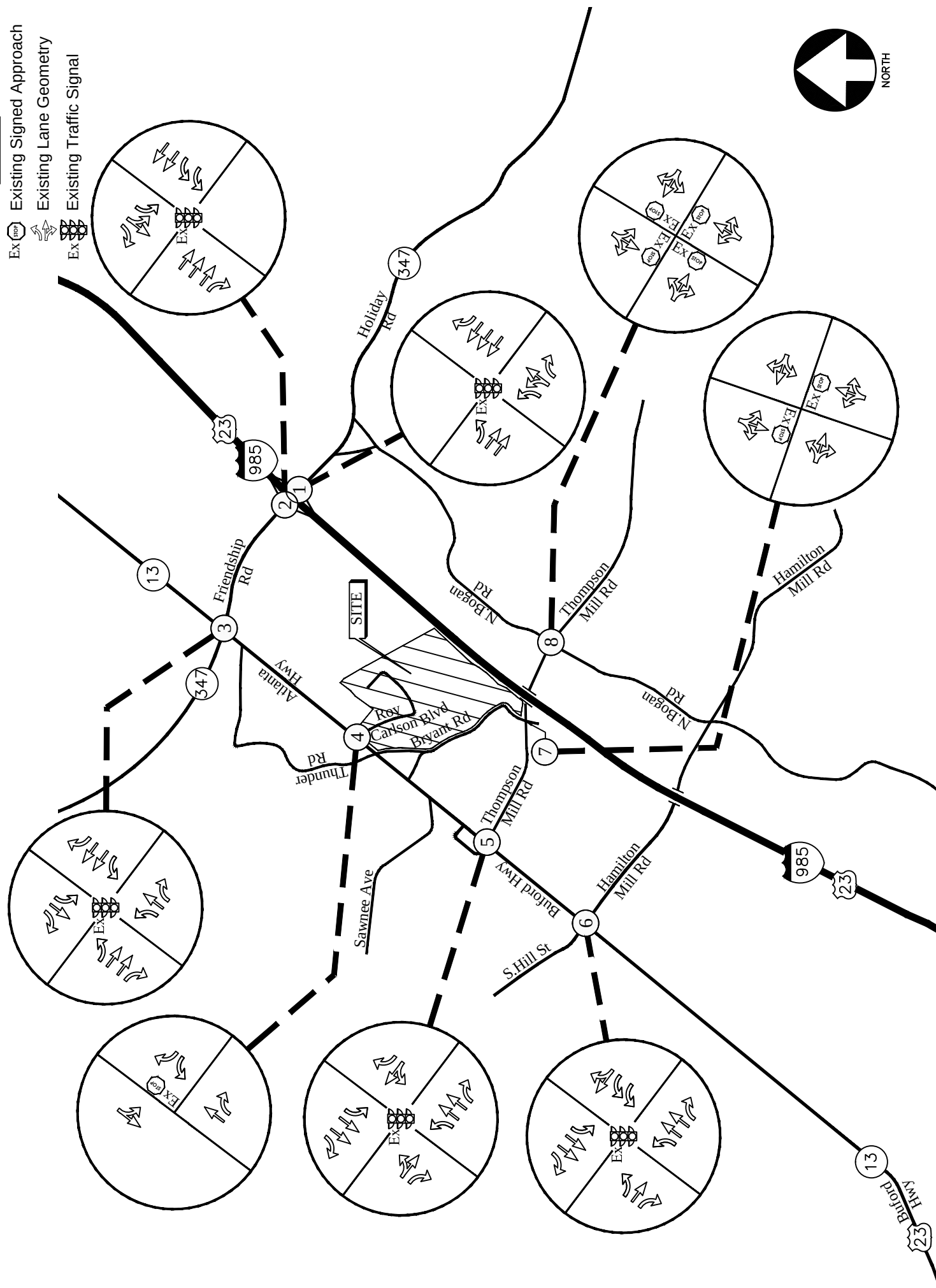


(AM) PM

 NORTH

LEGEND

- Ex (top) Existing Signed Approach
- Existing Lane Geometry
- Existing Traffic Signal



EXISTING TRAFFIC CONTROL AND LANE GEOMETRY

## PROJECT DESCRIPTION

The proposed site will be located on Roy Carlson Boulevard between SR 13 (Buford Highway) and I-985 in Buford, Georgia. The development will consist of:

- Warehousing: 947,520 square feet
- Industrial Park: 455,600 square feet
- Shopping Center: 40,000 square feet

The development proposes access via Roy Carlson Boulevard, and, for the purpose of this analysis, an additional right-in/right-out/left-out access point on Thompson Mill Road between Bryant Road and I-985.

### Site Plan

A site plan is shown in Figure 4. A larger size drawing and a digital copy of the site plan are also provided with this report.

#### ***Planned Bicycle and Pedestrian Facilities***

The on and/or off-site provisions for non-motorized travel included in the planned construction of the proposed development are as follows:

- The convenience and flexibility of the site benefit from public access to adjacent streets and internal connectivity between some of the parcels.

#### ***Planned Transit Facilities***

There is no public transit service near the site.

### Consistency with Adopted Comprehensive Plan

The following is an explanation as to how the proposed DRI relates to the local government's Comprehensive Plan in particular the transportation and capital improvements element, and any transportation improvements listed in the Short-Term Work Program(s) within the vicinity of the DRI. The City of Buford 2030 Comprehensive Plan lists the project area not within the City of Rest Haven as an Industrial Commercial Area in their Future Development Map.

### Project Phasing

For the purpose of this analysis, the project has been evaluated for the complete build-out of the development in 2026.

### Trip Generation

Trip generation estimates for the project were based on the rates and equations published in the 9th edition of the Institute of Transportation Engineers (ITE) Trip Generation report. This reference contains traffic volume count data collected at similar facilities nationwide. The trip generation was based on the following ITE Land Uses: 130 – *Industrial Park*, 150 – *Warehousing* and 820 – *Shopping Center*. Due to

the nature of the development, pass-by and mixed-use reductions have been applied per ITE standards. The calculated total trip generation for the proposed development is shown in Table 5.

| TABLE 5 — TRIP GENERATION                   |            |              |            |            |              |            |            |              |
|---------------------------------------------|------------|--------------|------------|------------|--------------|------------|------------|--------------|
| Land Use                                    | Size       | AM Peak Hour |            |            | PM Peak Hour |            |            | 24-Hour      |
|                                             |            | Enter        | Exit       | Total      | Enter        | Exit       | Total      | Two-way      |
| ITE 150 – Warehousing                       | 947,520 sf | 225          | 59         | 284        | 63           | 188        | 251        | 3,409        |
| <i>Mixed-Use Reduction</i>                  |            | -1           | -1         | -2         | -3           | -2         | -5         | -70          |
| ITE 130 – Industrial Park                   | 455,600 sf | 257          | 56         | 313        | 81           | 305        | 386        | 2,952        |
| <i>Mixed-Use Reduction</i>                  |            | 0            | 0          | 0          | -2           | -1         | -3         | -61          |
| ITE 820 – Shopping Center                   | 40,000 sf  | 55           | 34         | 89         | 156          | 168        | 324        | 3,743        |
| <i>Mixed-Use Reduction</i>                  |            | -1           | -1         | -2         | -3           | -5         | -8         | -131         |
| <i>Pass-by Trips (0%) 34%</i>               |            | 0            | 0          | 0          | -52          | -55        | -107       | -1,070       |
| Total Trips (without Reductions)            |            | 537          | 149        | 686        | 300          | 661        | 961        | 10,104       |
| <b>New External Trips (with Reductions)</b> |            | <b>535</b>   | <b>147</b> | <b>682</b> | <b>240</b>   | <b>598</b> | <b>838</b> | <b>8,772</b> |

*\*pass-by trips (AM) PM; 24 Hour pass-by trips estimated by considering PM pass-by as 10% of daily*

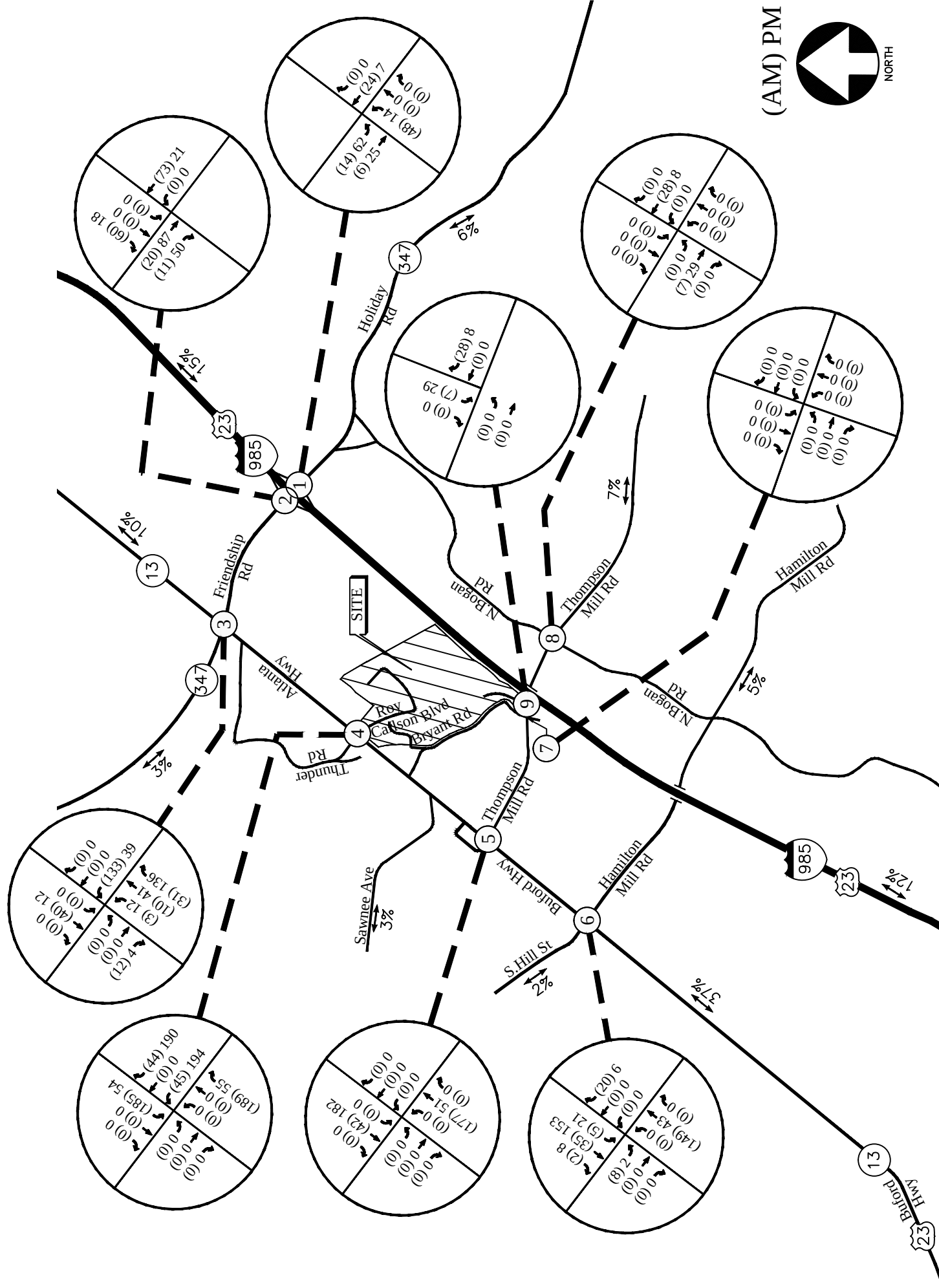
Per ITE manual it was assumed that 20% of Land Use 150 trips would be trucks, and 13% of Land Use 130 trips would be trucks. The distribution of the new external trips separated into vehicular trips and truck trips is shown below in Table 6.

| TABLE 6 — NEW EXTERNAL TRIPS DISTRIBUTED INTO CARS AND TRUCKS |              |           |            |              |            |            |              |
|---------------------------------------------------------------|--------------|-----------|------------|--------------|------------|------------|--------------|
| Trip Type                                                     | AM Peak Hour |           |            | PM Peak Hour |            |            | 24-Hour      |
|                                                               | Enter        | Exit      | Total      | Enter        | Exit       | Total      | Two-way      |
| Warehousing Cars                                              | 179          | 46        | 225        | 48           | 149        | 197        | 2,671        |
| Warehousing Trucks (20%)                                      | 45           | 12        | 57         | 12           | 37         | 49         | 668          |
| Industrial Park Cars                                          | 224          | 49        | 273        | 69           | 264        | 333        | 2,515        |
| Industrial Park Trucks (13%)                                  | 33           | 7         | 40         | 10           | 40         | 50         | 376          |
| Shopping Center Cars                                          | 54           | 33        | 87         | 101          | 108        | 209        | 2,542        |
| <b>Industrial Cars</b>                                        | <b>403</b>   | <b>95</b> | <b>498</b> | <b>117</b>   | <b>413</b> | <b>530</b> | <b>5,186</b> |
| <b>Industrial Trucks</b>                                      | <b>78</b>    | <b>19</b> | <b>97</b>  | <b>22</b>    | <b>77</b>  | <b>99</b>  | <b>1,044</b> |
| <b>Retail Cars</b>                                            | <b>54</b>    | <b>33</b> | <b>87</b>  | <b>101</b>   | <b>108</b> | <b>209</b> | <b>2,542</b> |

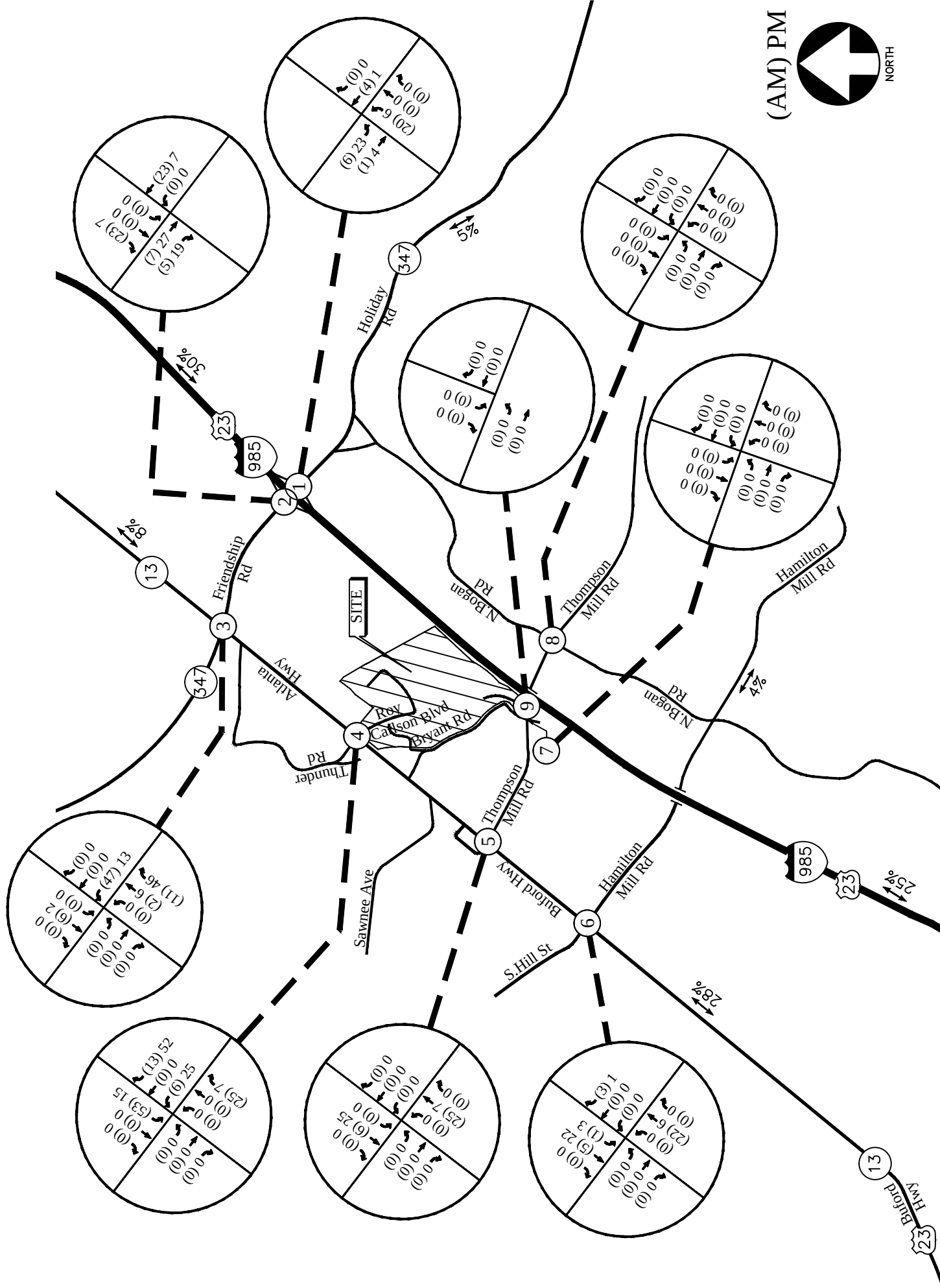
## Trip Distribution

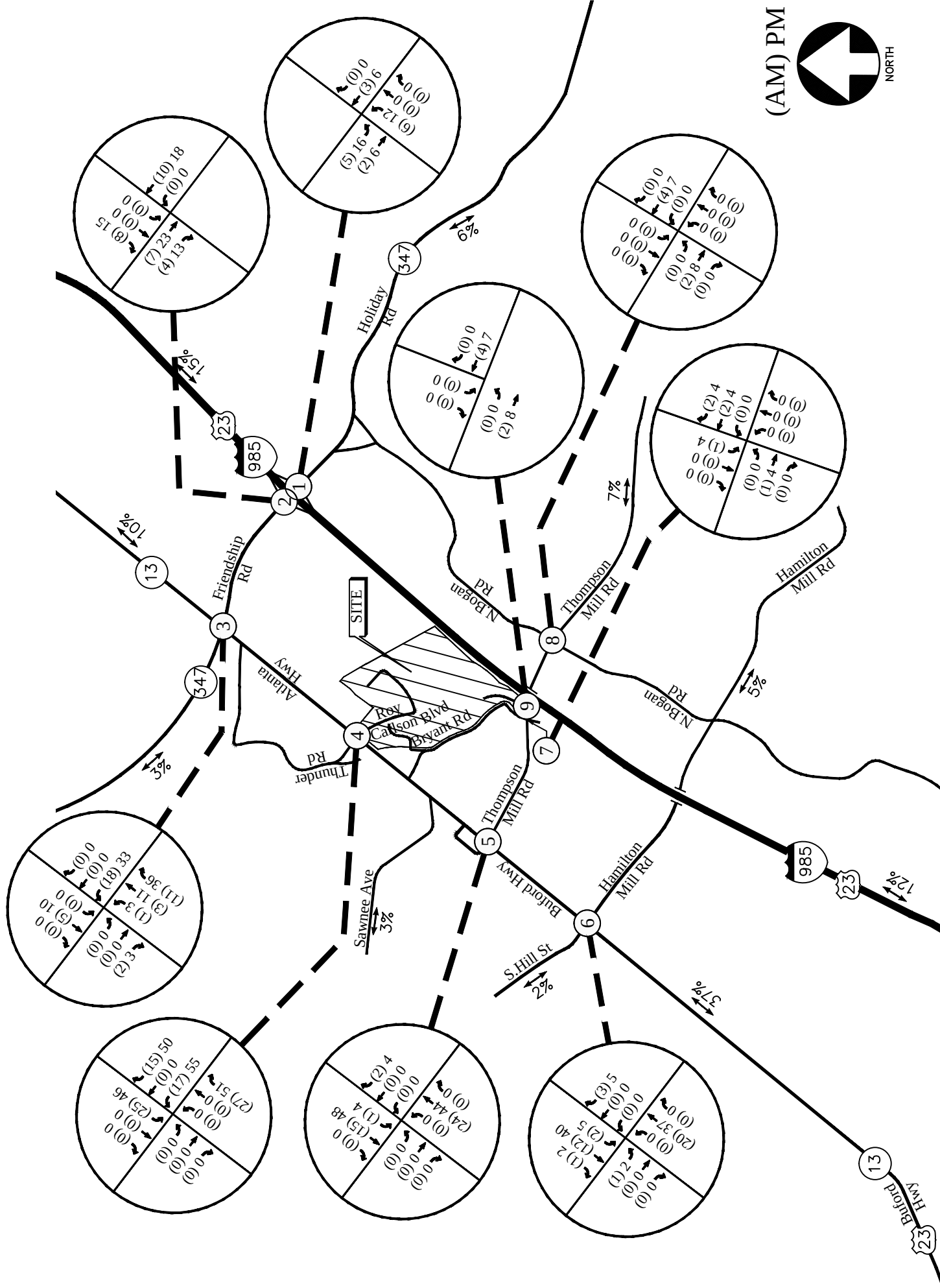
The trip distribution describes how traffic arrives and departs from the site. An overall trip distribution was developed for the site based on a review of the existing travel patterns in the area and the locations of major roadways and highways that will serve the development. Separate trip distributions were developed for car and truck traffic. The site-generated peak hour traffic volumes, shown in Table 5, were assigned to the study area intersections based on these separate distributions. The outer-leg distribution and AM and PM peak hour new traffic generated by the site are shown in Figure 5 (Industrial Vehicular Traffic), Figure 6 (Industrial Truck Traffic) and Figure 7 (Retail Vehicular Traffic).





OUTER LEG TRIP DISTRIBUTION AND SITE-GENERATED PEAK HOUR VOLUMES  
(INDUSTRIAL CARS)





(AM) PM

 NORTH



## **FUTURE TRAFFIC ANALYSIS**

The future traffic operations are analyzed for the “Build” and “No-Build” conditions. This provides a basis of reference for determining both the contribution of the site to overall traffic conditions and the additional improvements needed to provide sufficient site access and capacity for passing traffic. Note that survey and construction drawings would be needed to verify the feasibility and extent of additional right-of-way required for any recommended improvements.

Improvements that are identified as “System Improvements” address deficiencies that are found within the existing road network prior to any impacts from the proposed development’s added traffic. Improvements that are identified as “Site Mitigation Improvements” address further impacts that are a result of the proposed development’s added traffic.

### **Future “No-Build” Conditions**

The “No-Build” (or background) conditions provide an assessment of how traffic will operate in the study horizon year without the study site being developed as proposed, with projected increases in through traffic volumes due to normal annual growth. AS GDOT Project PI #132950 will be completed before construction of the proposed development, shifts in traffic from the intersection of SR 13 (Buford Highway) at Thunder Road/Bryant Road to the intersection of SR 13 (Buford Highway) at Roy Carlson Boulevard were included in the Future “No-Build” volumes. The Future “No-Build” volumes consist of the existing traffic volumes (Figure 2) plus increases for annual growth of through traffic and shifts in existing traffic due to the GDOT project on SR 13 (Buford Highway).

### **Annual Traffic Growth**

In order to evaluate future traffic operations in this area, a projection of normal traffic growth was applied to the existing volumes. The Georgia Department of Transportation recorded average daily traffic volumes at several locations in the vicinity of the site. Reviewing the growth over the last five years at four count locations revealed growth of approximately 0.5% in the area. This growth factor was applied to the existing traffic volumes between collector and arterial roadways in order to estimate the future year traffic volumes prior to the addition of site-generated traffic. The resulting Future “No-Build” volumes on the roadway are shown in Figure 8.

### ***Planned and Programmed Improvements in Study Area***

The following improvements have been identified in the Regional Transportation Plan (Plan 2040), GDOT GeoPI, and/or the local comprehensive transportation plan. These improvements are within the vicinity of the proposed development.

TABLE 7 — PLANNED AND PROGRAMMED IMPROVEMENTS

| ARC#/GDOT#/<br>County#       | Project                                                            | Type of<br>Improvement            | Network<br>Year | Source |
|------------------------------|--------------------------------------------------------------------|-----------------------------------|-----------------|--------|
| <b>132950/<br/>GW-099C</b>   | Widening of SR 13 from Sawnee Avenue to Friendship Road.           | Reconstruction/<br>Rehabilitation | 2020            | GDOT   |
| <b>M005567</b>               | Bridge Rehabilitation of Thompson Mill Road over I-985             | Bridges                           | 2019            | GDOT   |
| <b>0010242/<br/>GW-356</b>   | Sidewalk/Streetscape Improvements from S. Lee St to W. Moreno St   | Enhancement                       | 2018            | GDOT   |
| <b>0004430/<br/>GW-020A1</b> | Widening of SR 20 from W. Mountain Ridge Rd to Peachtree Ind. Blvd | Reconstruction/<br>Rehabilitation | 2017            | GDOT   |
| <b>M005451</b>               | Restriping of I-985                                                | Maintenance                       | 2017            | GDOT   |

Projects included in the model for the Future conditions include:

**GDOT Project PI #132950:** This project will widen SR 13 (Buford Highway) from Sawnee Avenue in Gwinnett County to SR 347 (Friendship Road) in Hall County. The length of the project is approximately 1.53 miles. The proposed project will widen SR 13 (Buford Highway) to a four-lane urban facility with a twenty foot raised median, four-foot bike lanes, curb and gutter and a five-foot sidewalk on both sides. Construction of the project is slated to open in the year 2020.

## Recommendations for System Improvements

Improvements that are identified as “System Improvements” address deficiencies that are found within the existing road network prior to any impacts from the proposed development’s added traffic. A summary of the system improvements, which address deficiencies that are found within the existing road network for the “No-Build” conditions, is provided below with more detailed information on each intersection in the following narratives.

### Summary of Recommended System Improvements

- Construct a dedicated channelized right turn lane on the northbound, southbound, and eastbound approaches to the intersection of Thompson Mill Road at N. Bogan Road.

#### Thompson Mill Road at N. Bogan Road

Several approaches to the intersection of Thompson Mill Road at N. Bogan Road will begin to operate at a level-of-service “E” or “F” in the “No-Build” conditions. As traffic will increase over the next ten years, it is recommended that a dedicated right turn lane be installed per local standards on the northbound, southbound, and eastbound approaches.

## Future “No-Build” Traffic Operations

The future “No-Build” traffic operations were analyzed using the volumes in Figure 8 and the results are shown in Tables 8 and 9 below. The results of the analyses including the recommendations for system improvements are discussed in the next section.

**TABLE 8 — FUTURE “NO-BUILD” INTERSECTION OPERATIONS**

|          | Intersection                                      | Traffic Control                       | No-Build 2026          |                         | No-Build 2026 Improved |                        | LOS STD           |
|----------|---------------------------------------------------|---------------------------------------|------------------------|-------------------------|------------------------|------------------------|-------------------|
|          |                                                   |                                       | AM Peak                | PM Peak                 | AM Peak                | PM Peak                | AM/PM             |
| <b>1</b> | <b><u>SR 347 @ I-985 NB Ramps</u></b>             | Signalized                            | <b><u>C (31.3)</u></b> | <b><u>D (38.8)</u></b>  | <b><u>C (31.3)</u></b> | <b><u>D (38.8)</u></b> | <b><u>D/D</u></b> |
|          | -Eastbound Approach                               |                                       | C (22.2)               | C (27.1)                | C (22.2)               | C (27.1)               | -                 |
|          | -Westbound Approach                               |                                       | C (28.1)               | D (51.1)                | C (28.1)               | D (51.1)               | -                 |
|          | -Northbound Approach                              |                                       | E (58.9)               | D (53.0)                | E (58.9)               | D (53.0)               | -                 |
| <b>2</b> | <b><u>SR 347 @ I-985 SB Ramps</u></b>             | Signalized                            | <b><u>C (25.3)</u></b> | <b><u>C (21.7)</u></b>  | <b><u>C (25.3)</u></b> | <b><u>C (21.7)</u></b> | <b><u>D/D</u></b> |
|          | -Eastbound Approach                               |                                       | C (23.1)               | B (12.8)                | C (23.1)               | B (12.7)               | -                 |
|          | -Westbound Approach                               |                                       | B (18.6)               | B (18.7)                | B (18.6)               | B (18.7)               | -                 |
|          | -Southbound Approach                              |                                       | D (48.5)               | D (47.0)                | D (48.5)               | D (47.0)               | -                 |
| <b>3</b> | <b><u>SR 347 @ SR 13</u></b>                      | Signalized                            | <b><u>C (33.2)</u></b> | <b><u>D (47.3)</u></b>  | <b><u>C (33.2)</u></b> | <b><u>D (47.1)</u></b> | <b><u>D/D</u></b> |
|          | -Eastbound Approach                               |                                       | C (31.5)               | D (42.4)                | C (31.5)               | D (42.4)               | -                 |
|          | -Westbound Approach                               |                                       | C (20.8)               | D (44.0)                | C (20.8)               | D (44.0)               | -                 |
|          | -Northbound Approach                              |                                       | D (42.2)               | D (44.8)                | D (42.2)               | D (44.0)               | -                 |
|          | -Southbound Approach                              |                                       | D (51.3)               | E (75.6)                | D (51.3)               | E (75.6)               | -                 |
| <b>4</b> | <b><u>SR 13 @ Roy Carlson Blvd</u></b>            | Signalized                            | <b><u>A (6.7)</u></b>  | <b><u>B (11.2)</u></b>  | <b><u>A (6.7)</u></b>  | <b><u>B (11.2)</u></b> | <b><u>D/D</u></b> |
|          | -Eastbound Approach                               |                                       | E (55.4)               | D (46.9)                | E (55.4)               | D (46.9)               | -                 |
|          | -Westbound Approach                               |                                       | E (55.2)               | D (51.4)                | E (55.2)               | D (51.4)               | -                 |
|          | -Northbound Approach                              |                                       | A (1.0)                | A (0.8)                 | A (1.0)                | A (0.8)                | -                 |
|          | -Southbound Approach                              |                                       | A (2.4)                | A (5.1)                 | A (2.4)                | A (5.1)                | -                 |
| <b>5</b> | <b><u>SR 13 @ Thompson Mill Rd</u></b>            | Signalized                            | <b><u>C (23.0)</u></b> | <b><u>B (15.2)</u></b>  | <b><u>C (23.0)</u></b> | <b><u>B (15.3)</u></b> | <b><u>D/D</u></b> |
|          | -Eastbound Approach                               |                                       | C (20.9)               | C (31.6)                | C (20.9)               | C (31.6)               | -                 |
|          | -Westbound Approach                               |                                       | D (35.6)               | D (51.3)                | D (35.6)               | D (51.3)               | -                 |
|          | -Northbound Approach                              |                                       | C (21.8)               | A (4.4)                 | C (21.8)               | A (4.3)                | -                 |
|          | -Southbound Approach                              |                                       | B (13.6)               | A (8.2)                 | B (13.6)               | A (8.6)                | -                 |
| <b>6</b> | <b><u>SR 13 @ S. Hill St/Hamilton Mill Rd</u></b> | Signalized                            | <b><u>D (37.2)</u></b> | <b><u>D (41.6)</u></b>  | <b><u>D (37.2)</u></b> | <b><u>D (41.6)</u></b> | <b><u>D/D</u></b> |
|          | -Eastbound Approach                               |                                       | D (49.8)               | D (50.3)                | D (49.8)               | D (50.3)               | -                 |
|          | -Westbound Approach                               |                                       | E (70.1)               | E (68.2)                | E (70.1)               | E (68.2)               | -                 |
|          | -Northbound Approach                              |                                       | B (16.2)               | C (21.8)                | B (16.2)               | C (21.8)               | -                 |
|          | -Southbound Approach                              |                                       | B (19.4)               | D (49.8)                | B (19.4)               | D (49.8)               | -                 |
| <b>7</b> | <b><u>Thompson Mill Rd @ Bryant Rd</u></b>        | Stop Controlled on NB & SB Approaches | A (0.5)                | A (0.4)                 | A (0.5)                | A (0.4)                | D/D               |
|          | -Eastbound Approach                               |                                       | A (0.0)                | A (0.0)                 | A (0.0)                | A (0.0)                | D/D               |
|          | -Westbound Approach                               |                                       | A (0.0)                | A (0.0)                 | A (0.0)                | A (0.0)                | D/D               |
|          | -Northbound Approach                              |                                       | A (0.0)                | A (0.0)                 | A (0.0)                | A (0.0)                | D/D               |
|          | -Southbound Approach                              |                                       | C (20.0)               | C (22.3)                | C (20.0)               | C (22.3)               | D/D               |
| <b>8</b> | <b><u>Thompson Mill Rd @ N. Bogan Rd</u></b>      | All-Way Stop Controlled               | C (22.9)               | <b><u>F (166.2)</u></b> | B (10.8)               | D (28.8)               | D/E               |
|          | -Eastbound Approach                               |                                       | <b><u>F (65.5)</u></b> | C (24.3)                | D (26.0)               | C (17.4)               | E/D               |
|          | -Westbound Approach                               |                                       | C (21.8)               | <b><u>E (37.0)</u></b>  | B (13.7)               | B (14.6)               | D/D               |
|          | -Northbound Approach                              |                                       | C (21.1)               | D (25.7)                | A (8.8)                | B (14.3)               | D/D               |
|          | -Southbound Approach                              |                                       |                        |                         |                        |                        |                   |

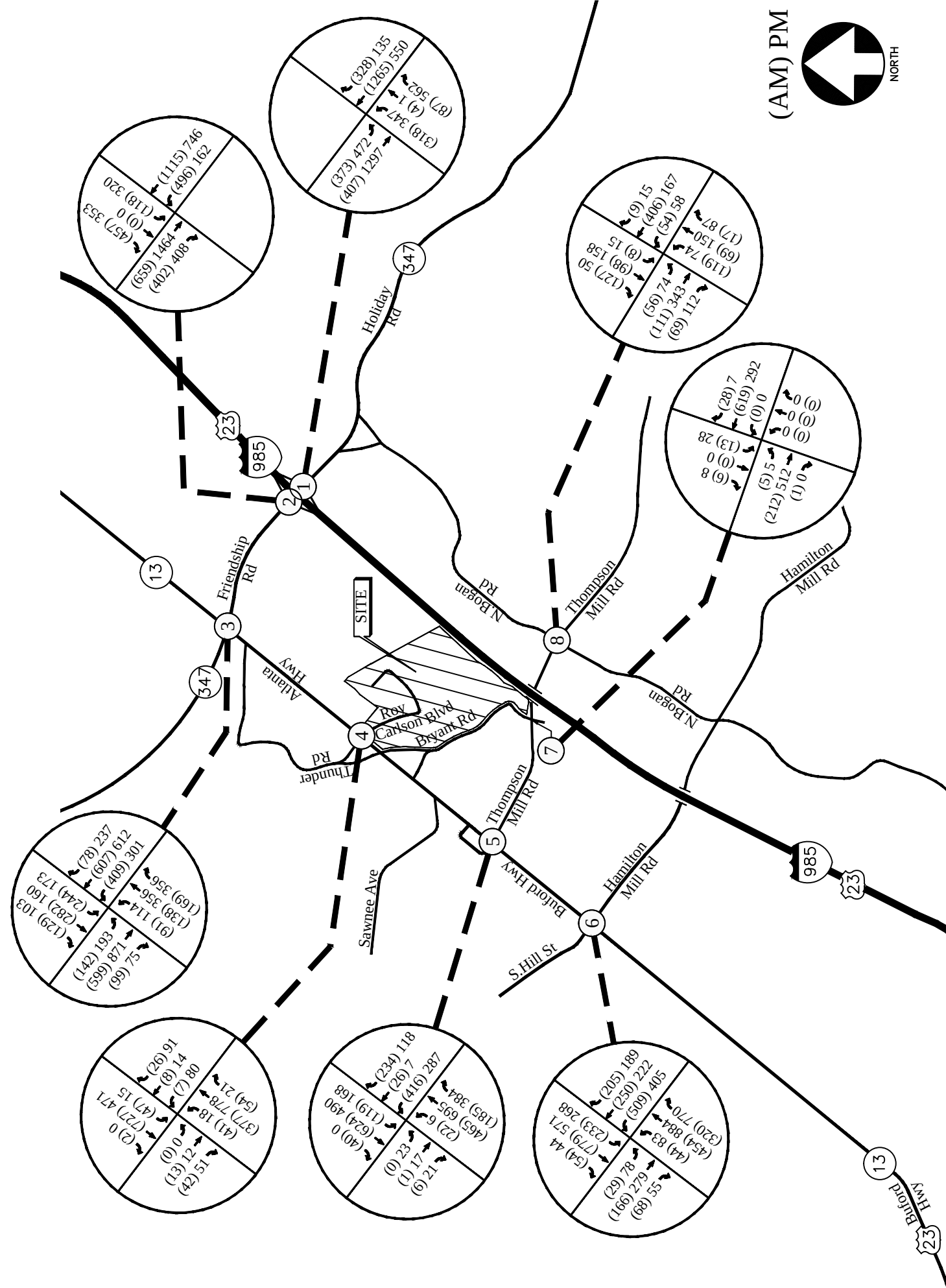
**TABLE 9 – FUTURE “NO-BUILD” INTERSECTION 95<sup>TH</sup> PERCENTILE QUEUES**

| Intersection |                                        | Available Storage | No-Build 2026 |         | No-Build 2026 Improved |         |
|--------------|----------------------------------------|-------------------|---------------|---------|------------------------|---------|
|              |                                        |                   | AM Peak       | PM Peak | AM Peak                | PM Peak |
| <b>1</b>     | <b><u>SR 347 @ I-985 NB Ramps</u></b>  |                   |               |         |                        |         |
|              | -Eastbound Left                        | -                 | 421           | 565     | 421                    | 565     |
|              | -Eastbound Through                     | -                 | 166           | 617     | 166                    | 617     |
|              | -Westbound Through                     | -                 | 409           | 199     | 409                    | 199     |
|              | -Westbound Right                       | 840'              | 23            | 38      | 23                     | 38      |
|              | -Northbound Left                       | -                 | 220           | 174     | 220                    | 174     |
|              | -Northbound Through/Left               | -                 | 118           | 47      | 118                    | 47      |
|              | -Northbound Right                      | 510'              | 25            | 673     | 25                     | 673     |
| <b>2</b>     | <b><u>SR 347 @ I-985 SB Ramps</u></b>  |                   |               |         |                        |         |
|              | -Eastbound Through                     | -                 | 136           | 201     | 136                    | 201     |
|              | -Eastbound Right                       | 375'              | 34            | 1       | 34                     | 1       |
|              | -Westbound Left                        | 380'              | 206           | 91      | 206                    | 91      |
|              | -Westbound Through                     | -                 | 478           | 394     | 478                    | 394     |
|              | -Southbound Left                       | -                 | 108           | 310     | 108                    | 310     |
|              | -Southbound Right                      | -                 | 412           | 252     | 412                    | 252     |
| <b>3</b>     | <b><u>SR 347 @ SR 13</u></b>           |                   |               |         |                        |         |
|              | -Eastbound Left                        | 250'              | 101           | 141     | 101                    | 141     |
|              | -Eastbound Through                     | -                 | 310           | 451     | 310                    | 451     |
|              | -Eastbound Right                       | 370'              | 0             | 5       | 0                      | 5       |
|              | -Westbound Left                        | 300'              | 405           | 419     | 405                    | 419     |
|              | -Westbound Through                     | -                 | 181           | 303     | 181                    | 303     |
|              | -Westbound Right                       | 310'              | 1             | 23      | 1                      | 23      |
|              | -Northbound Left                       | 240'              | 54            | 88      | 54                     | 88      |
|              | -Northbound Through                    | -                 | 168           | 405     | 168                    | 405     |
|              | -Northbound Right                      | 250'              | 103           | 254     | 103                    | 252     |
|              | -Southbound Left                       | 300'              | 212           | 230     | 212                    | 230     |
|              | -Southbound Through                    | -                 | 300           | 168     | 300                    | 168     |
|              | -Southbound Right                      | 215'              | 17            | 27      | 17                     | 27      |
| <b>4</b>     | <b><u>SR 13 @ Roy Carlson Blvd</u></b> |                   |               |         |                        |         |
|              | -Eastbound Approach                    | -                 | 53            | 49      | 53                     | 49      |
|              | -Westbound Through/Left                | -                 | 17            | 112     | 17                     | 112     |
|              | -Westbound Right                       | -                 | 52            | 73      | 52                     | 73      |
|              | -Northbound Left                       | 375'              | 4             | 2       | 4                      | 2       |
|              | -Northbound Through                    | -                 | 12            | 18      | 12                     | 19      |
|              | -Northbound Right                      | 375'              | 0             | 0       | 0                      | 0       |
|              | -Southbound Left                       | 200'              | 14            | 8       | 14                     | 8       |
|              | -Southbound Through                    | -                 | 81            | 84      | 81                     | 84      |
|              | -Southbound Left                       | 200'              | 0             | 0       | 0                      | 0       |

*Table Continued on Next Page...*

| Intersection |                                                   | Available Storage | No-Build 2026 |         | No-Build 2026 Improved |         |
|--------------|---------------------------------------------------|-------------------|---------------|---------|------------------------|---------|
|              |                                                   |                   | AM Peak       | PM Peak | AM Peak                | PM Peak |
| 5            | <b><u>SR 13 @ Thompson Mill Rd</u></b>            |                   |               |         |                        |         |
|              | -Eastbound Through/Left                           | -                 | 2             | 33      | 2                      | 33      |
|              | -Eastbound Right                                  | 105'              | 0             | 4       | 0                      | 4       |
|              | -Westbound Through/Left                           | -                 | 262           | 131     | 262                    | 131     |
|              | -Westbound Right                                  | 250'              | 63            | 31      | 63                     | 31      |
|              | -Northbound Left                                  | 230'              | 34            | 2       | 34                     | 2       |
|              | -Northbound Through                               | -                 | 218           | 68      | 218                    | 65      |
|              | -Northbound Right                                 | 230'              | 109           | 4       | 109                    | 4       |
|              | -Southbound Left                                  | 200'              | 119           | 216     | 119                    | 216     |
|              | -Southbound Through                               | -                 | 224           | 74      | 224                    | 73      |
|              | -Southbound Right                                 | 185'              | 6             | 0       | 6                      | 0       |
| 6            | <b><u>SR 13 @ S. Hill St/Hamilton Mill Rd</u></b> |                   |               |         |                        |         |
|              | -Eastbound Left                                   | 180'              | 41            | 105     | 41                     | 105     |
|              | -Eastbound Through                                | -                 | 173           | 290     | 173                    | 290     |
|              | -Eastbound Right                                  | 300'              | 0             | 0       | 0                      | 0       |
|              | -Westbound Left                                   | 250'              | 353           | 292     | 353                    | 292     |
|              | -Westbound Through/Right                          | -                 | 380           | 350     | 380                    | 350     |
|              | -Northbound Left                                  | 240'              | 44            | 69      | 44                     | 69      |
|              | -Northbound Through                               | -                 | 218           | 525     | 218                    | 525     |
|              | -Northbound Right                                 | 1,000'            | 0             | 0       | 0                      | 0       |
|              | -Southbound Left                                  | 400'              | 158           | 365     | 158                    | 365     |
|              | -Southbound Through                               | -                 | 216           | 295     | 216                    | 295     |
|              | -Southbound Right                                 | 280'              | 0             | 7       | 0                      | 5       |
| 7            | <b><u>Thompson Mill Rd @ Bryant Rd</u></b>        |                   |               |         |                        |         |
|              | -Eastbound Approach                               | -                 | 1             | 1       | 1                      | 1       |
|              | -Westbound Approach                               | -                 | 0             | 0       | 0                      | 0       |
|              | -Northbound Approach                              | -                 | 0             | 0       | 0                      | 0       |
|              | -Southbound Approach                              | -                 | 9             | 20      | 9                      | 20      |
| 8            | <b><u>Thompson Mill Rd @ N. Bogan Rd*</u></b>     |                   |               |         |                        |         |
|              | -Eastbound Approach                               | -                 | 48            | 171     | 78                     | 96      |
|              | -Westbound Approach                               | -                 | 281           | 82      | 146                    | 75      |
|              | -Northbound Approach                              | -                 | 67            | 125     | 62                     | 64      |
|              | -Southbound Approach                              | -                 | 77            | 76      | 49                     | 55      |

\*95<sup>th</sup> percentile queue generated from SimTraffic model



(AM) PM

FUTURE (NO-BUILD) PEAK HOUR VOLUMES

## Future “Build” Conditions

The “Build” or development conditions include the estimated background traffic from the “No-Build” conditions plus the added traffic from the proposed development. In order to evaluate future traffic operations in this area, the additional traffic volumes from the site (Figures 5, 6, and 7) were added to base traffic volumes (Figure 8) to calculate the future traffic volumes after the construction of the development. These total future traffic volumes (Figure 9) were used to evaluate the “Build” condition, which includes the projected site traffic. The results of the “Build” operations analyses with the assumed site access configuration are shown in Tables 10 and 11.

## Site Access Configuration

The following access configuration was utilized when modeling the proposed site driveway intersection.

- Site Driveway #1: Truck and employee access via Roy Carlson Boulevard
  - This intersection will be upgraded as part of GDOT project PI #132950 to include signalization as well as the relocation of Thunder Road to align with Roy Carlson Boulevard.
  - As access to SR 13 (Buford Highway) via Thunder Road and Bryant Road will be eliminated, the existing traffic at the intersection was shifted to the proposed signal at Roy Carlson Boulevard as part of the “No-Build” and “Build” analyses.
  - This driveway will consist of two entering lanes and two exiting lanes. The westbound (driveway) approach is assumed to operate with a dedicated left turn lane and shared through/right turn lane.
  - Entering left turn movements will be made from a dedicated southbound left turn lane. It is recommended the signal include a southbound protected + permissive phase for entering left turns (See Appendix).
  - Entering right turn movements will be made from a dedicated northbound right turn lane.
- Site Driveway #2: Right-in/right-out/left-out access on Thompson Mill Road
  - For the purpose of this study, this driveway will only be used by employee/car traffic. Truck traffic will be able to use this access only in emergency situations.
  - As this access geometry was agreed upon by Gwinnett County DOT for the purpose of this study, further discussions will need to take place on the final layout of the driveway.
  - This driveway will consist of one entering lane and one exiting lane.
  - Entering right turn movements will be made from a dedicated westbound right turn lane.
  - The intersection will be unsignalized with a STOP sign on the southbound approach.

## Future “Build” Traffic Operations

The “Build” conditions are evaluated to determine effectiveness of the recommended system and site mitigation improvements. Recommendations on traffic control and lane geometry are shown graphically in Figure 10.

**TABLE 10 – FUTURE “BUILD” INTERSECTION OPERATIONS**

| Intersection |                                                                                                                                                 | Traffic Control                                | Build 2026<br>No Improvements                                           |                                                                           | Build 2026<br>Improved                                                 |                                                                        | LOS<br>STD                            |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------|
|              |                                                                                                                                                 |                                                | AM Peak                                                                 | PM Peak                                                                   | AM Peak                                                                | PM Peak                                                                | AM/PM                                 |
| <b>1</b>     | <b><u>SR 347 @ I-985 NB Ramps</u></b><br>-Eastbound Approach<br>-Westbound Approach<br>-Northbound Approach                                     | Signalized                                     | <b><u>D (35.8)</u></b><br>C (25.9)<br>C (33.1)<br>E (60.6)              | <b><u>D (49.4)</u></b><br>C (31.4)<br>D (51.2)<br>F (84.9)                | <b><u>D (35.9)</u></b><br>C (26.0)<br>C (33.1)<br>E (60.6)             | <b><u>D (48.8)</u></b><br>C (30.4)<br>D (51.2)<br>F (84.9)             | <b><u>D/D</u></b><br>-<br>-<br>-      |
| <b>2</b>     | <b><u>SR 347 @ I-985 SB Ramps</u></b><br>-Eastbound Approach<br>-Westbound Approach<br>-Southbound Approach                                     | Signalized                                     | <b><u>D (37.0)</u></b><br>D (48.1)<br>C (24.6)<br>D (51.4)              | <b><u>C (23.9)</u></b><br>B (13.4)<br>C (23.1)<br>D (51.5)                | <b><u>D (36.3)</u></b><br>D (45.9)<br>C (24.6)<br>D (51.4)             | <b><u>C (24.2)</u></b><br>B (13.7)<br>C (24.0)<br>D (51.5)             | <b><u>D/D</u></b><br>-<br>-<br>-      |
| <b>3</b>     | <b><u>SR 347 @ SR 13</u></b><br>-Eastbound Approach<br>-Westbound Approach<br>-Northbound Approach<br>-Southbound Approach                      | Signalized                                     | <b><u>E (71.6)</u></b><br>C (34.4)<br>F (113.1)<br>E (58.5)<br>D (49.7) | <b><u>E (66.5)</u></b><br>E (72.9)<br>E (57.2)<br>D (53.7)<br>F (108.4)   | <b><u>D (46.1)</u></b><br>C (34.4)<br>D (46.0)<br>E (62.2)<br>D (49.7) | <b><u>D (49.6)</u></b><br>E (58.7)<br>D (44.0)<br>D (47.0)<br>D (47.5) | <b><u>D/D</u></b><br>-<br>-<br>-<br>- |
| <b>4</b>     | <b><u>SR 13 @ Roy Carlson Blvd</u></b><br>-Eastbound Approach<br>-Westbound Approach<br>-Northbound Approach<br>-Southbound Approach            | Signalized                                     | <b><u>B (10.9)</u></b><br>D (48.3)<br>D (52.3)<br>B (11.9)<br>A (1.4)   | <b><u>C (24.5)</u></b><br>C (23.4)<br>D (40.9)<br>B (19.3)<br>B (12.5)    | <b><u>B (13.1)</u></b><br>D (48.3)<br>D (52.3)<br>B (17.7)<br>A (1.7)  | <b><u>C (25.4)</u></b><br>C (23.4)<br>D (40.9)<br>C (22.4)<br>B (11.1) | <b><u>D/D</u></b><br>-<br>-<br>-<br>- |
| <b>5</b>     | <b><u>SR 13 @ Thompson Mill Rd</u></b><br>-Eastbound Approach<br>-Westbound Approach<br>-Northbound Approach<br>-Southbound Approach            | Signalized                                     | <b><u>C (20.7)</u></b><br>C (22.6)<br>D (42.1)<br>B (11.3)<br>B (13.6)  | <b><u>B (15.2)</u></b><br>C (32.3)<br>E (55.1)<br>A (4.2)<br>A (9.6)      | <b><u>B (18.6)</u></b><br>C (22.6)<br>D (42.1)<br>B (11.1)<br>A (8.0)  | <b><u>B (14.4)</u></b><br>C (32.3)<br>E (55.1)<br>A (4.2)<br>A (7.4)   | <b><u>D/D</u></b><br>-<br>-<br>-<br>- |
| <b>6</b>     | <b><u>SR 13 @ S. Hill St/Hamilton Mill Rd</u></b><br>-Eastbound Approach<br>-Westbound Approach<br>-Northbound Approach<br>-Southbound Approach | Signalized                                     | <b><u>D (48.5)</u></b><br>D (48.7)<br>F (93.9)<br>C (20.9)<br>C (33.1)  | <b><u>D (49.9)</u></b><br>D (51.8)<br>D (52.3)<br>C (25.6)<br>F (84.2)    | <b><u>D (48.1)</u></b><br>D (48.7)<br>F (93.9)<br>C (20.9)<br>C (31.7) | <b><u>D (49.8)</u></b><br>D (51.8)<br>D (52.3)<br>C (25.6)<br>F (83.8) | <b><u>D/D</u></b><br>-<br>-<br>-<br>- |
| <b>7</b>     | <b><u>Thompson Mill Rd @ Bryant Rd</u></b><br>-Eastbound Approach<br>-Westbound Approach<br>-Northbound Approach<br>-Southbound Approach        | Stop<br>Controlled<br>on NB & SB<br>Approaches | A (0.5)<br>A (0.0)<br>A (0.0)<br>C (20.2)                               | A (0.4)<br>A (0.0)<br>A (0.0)<br>C (23.6)                                 | A (0.5)<br>A (0.0)<br>A (0.0)<br>C (20.2)                              | A (0.4)<br>A (0.0)<br>A (0.0)<br>C (23.6)                              | D/D<br>D/D<br>D/D<br>D/D              |
| <b>8</b>     | <b><u>Thompson Mill Rd @ N. Bogan Rd</u></b><br>-Eastbound Approach<br>-Westbound Approach<br>-Northbound Approach<br>-Southbound Approach      | All-Way<br>Stop<br>Controlled                  | C (23.1)<br><b><u>F (84.7)</u></b><br>C (21.2)<br>C (20.6)              | <b><u>F (213.4)</u></b><br>D (27.0)<br><b><u>E (39.0)</u></b><br>D (26.8) | B (11.3)<br>D (32.3)<br>B (14.2)<br>A (8.9)                            | E (42.2)<br>C (19.8)<br>C (15.6)<br>C (15.3)                           | D/E<br>E/D<br>D/D<br>D/D              |
| <b>9</b>     | <b><u>Thompson Mill Rd @ Site Drwy 2</u></b><br>-Westbound Right<br>-Southbound Approach                                                        | Stop<br>Controlled<br>on SB                    | A (0.0)<br>C (18.0)                                                     | A (0.0)<br>C (20.3)                                                       | A (0.0)<br>C (18.0)                                                    | A (0.0)<br>C (20.3)                                                    | D/D<br>D/D                            |



**TABLE 1 1 – FUTURE “BUILD” INTERSECTION 95<sup>TH</sup> PERCENTILE QUEUES**

| Intersection |                                        | Available Storage | Build 2026 |         | Build 2026 Improved |         |
|--------------|----------------------------------------|-------------------|------------|---------|---------------------|---------|
|              |                                        |                   | AM Peak    | PM Peak | AM Peak             | PM Peak |
| <b>1</b>     | <b><u>SR 347 @ I-985 NB Ramps</u></b>  |                   |            |         |                     |         |
|              | -Eastbound Left                        | -                 | 471        | 702     | 471                 | 699     |
|              | -Eastbound Through                     | -                 | 213        | 300     | 213                 | 103     |
|              | -Westbound Through                     | -                 | 430        | 201     | 430                 | 201     |
|              | -Westbound Right                       | 840'              | 24         | 38      | 24                  | 38      |
|              | -Northbound Left                       | -                 | 277        | 207     | 277                 | 207     |
|              | -Northbound Through/Left               | -                 | 137        | 54      | 137                 | 54      |
|              | -Northbound Right                      | 510'              | 24         | 733     | 24                  | 733     |
| <b>2</b>     | <b><u>SR 347 @ I-985 SB Ramps</u></b>  |                   |            |         |                     |         |
|              | -Eastbound Through                     | -                 | 198        | 258     | 193                 | 230     |
|              | -Eastbound Right                       | 375'              | 135        | 0       | 124                 | 1       |
|              | -Westbound Left                        | 380'              | 258        | 97      | 258                 | 97      |
|              | -Westbound Through                     | -                 | 541        | 440     | 541                 | 443     |
|              | -Southbound Left                       | -                 | 101        | 310     | 101                 | 310     |
|              | -Southbound Right                      | -                 | 582        | 320     | 582                 | 320     |
| <b>3</b>     | <b><u>SR 347 @ SR 13</u></b>           |                   |            |         |                     |         |
|              | -Eastbound Left                        | 250'              | 103        | 138     | 103                 | 146     |
|              | -Eastbound Through                     | -                 | 314        | 507     | 314                 | 482     |
|              | -Eastbound Right                       | 370'              | 3          | 12      | 3                   | 0       |
|              | -Westbound Left                        | 300'              | 754        | 566     | 347                 | 267     |
|              | -Westbound Through                     | -                 | 202        | 130     | 202                 | 297     |
|              | -Westbound Right                       | 310'              | 2          | 19      | 1                   | 26      |
|              | -Northbound Left                       | 240'              | 46         | 55      | 44                  | 57      |
|              | -Northbound Through                    | -                 | 193        | 482     | 184                 | 388     |
|              | -Northbound Right                      | 250'              | 181        | 517     | 170                 | 151     |
|              | -Southbound Left                       | 300'              | 208        | 288     | 208                 | 232     |
|              | -Southbound Through                    | -                 | 357        | 191     | 357                 | 191     |
|              | -Southbound Right                      | 215'              | 17         | 27      | 17                  | 27      |
| <b>4</b>     | <b><u>SR 13 @ Roy Carlson Blvd</u></b> |                   |            |         |                     |         |
|              | -Eastbound Approach                    | -                 | 49         | 33      | 49                  | 33      |
|              | -Westbound Through/Left                | -                 | 110        | 437     | 110                 | 437     |
|              | -Westbound Right                       | -                 | 60         | 210     | 60                  | 210     |
|              | -Northbound Left                       | 375'              | 51         | 15      | 54                  | 18      |
|              | -Northbound Through                    | -                 | 155        | 378     | 163                 | 396     |
|              | -Northbound Right                      | 375'              | 182        | 20      | 210                 | 38      |
|              | -Southbound Left                       | 200'              | 28         | 58      | 64                  | 83      |
|              | -Southbound Through                    | -                 | 32         | 88      | 21                  | 90      |
|              | -Southbound Left                       | 200'              | 0          | 0       | 0                   | 0       |

*Table Continued on Next Page...*

| Intersection |                                                   | Available Storage | Build 2026 |         | Build 2026 Improved |         |
|--------------|---------------------------------------------------|-------------------|------------|---------|---------------------|---------|
|              |                                                   |                   | AM Peak    | PM Peak | AM Peak             | PM Peak |
| 5            | <b><u>SR 13 @ Thompson Mill Rd</u></b>            |                   |            |         |                     |         |
|              | -Eastbound Through/Left                           | -                 | 3          | 34      | 3                   | 34      |
|              | -Eastbound Right                                  | 105'              | 0          | 4       | 0                   | 4       |
|              | -Westbound Through/Left                           | -                 | 300        | 138     | 300                 | 138     |
|              | -Westbound Right                                  | 250'              | 122        | 49      | 122                 | 49      |
|              | -Northbound Left                                  | 230'              | 13         | 2       | 13                  | 2       |
|              | -Northbound Through                               | -                 | 107        | 101     | 110                 | 101     |
|              | -Northbound Right                                 | 230'              | 8          | 0       | 8                   | 0       |
|              | -Southbound Left                                  | 200'              | 94         | 219     | 75                  | 123     |
|              | -Southbound Through                               | -                 | 215        | 138     | 151                 | 106     |
|              | -Southbound Right                                 | 185'              | 11         | 0       | 5                   | 0       |
| 6            | <b><u>SR 13 @ S. Hill St/Hamilton Mill Rd</u></b> |                   |            |         |                     |         |
|              | -Eastbound Left                                   | 180'              | 51         | 112     | 51                  | 112     |
|              | -Eastbound Through                                | -                 | 164        | 296     | 164                 | 296     |
|              | -Eastbound Right                                  | 300'              | 0          | 0       | 0                   | 0       |
|              | -Westbound Left                                   | 250'              | 376        | 270     | 376                 | 270     |
|              | -Westbound Through/Right                          | -                 | 396        | 366     | 396                 | 366     |
|              | -Northbound Left                                  | 240'              | 45         | 69      | 45                  | 69      |
|              | -Northbound Through                               | -                 | 335        | 596     | 335                 | 596     |
|              | -Northbound Right                                 | 1,000'            | 0          | 0       | 0                   | 0       |
|              | -Southbound Left                                  | 400'              | 232        | 462     | 230                 | 462     |
|              | -Southbound Through                               | -                 | 425        | 418     | 364                 | 406     |
|              | -Southbound Right                                 | 280'              | 3          | 7       | 4                   | 5       |
| 7            | <b><u>Thompson Mill Rd @ Bryant Rd</u></b>        |                   |            |         |                     |         |
|              | -Eastbound Approach                               | -                 | 1          | 1       | 1                   | 1       |
|              | -Westbound Approach                               | -                 | 0          | 0       | 0                   | 0       |
|              | -Northbound Approach                              | -                 | 0          | 0       | 0                   | 0       |
|              | -Southbound Approach                              | -                 | 10         | 24      | 10                  | 24      |
| 8            | <b><u>Thompson Mill Rd @ N. Bogan Rd*</u></b>     |                   |            |         |                     |         |
|              | -Eastbound Approach                               | -                 | 121        | 201     | 59                  | 210     |
|              | -Westbound Approach                               | -                 | 200        | 107     | 143                 | 83      |
|              | -Northbound Approach                              | -                 | 62         | 85      | 31                  | 78      |
|              | -Southbound Approach                              | -                 | 75         | 73      | 58                  | 82      |
| 9            | <b><u>Thompson Mill Rd @ Site Drwy 2</u></b>      |                   |            |         |                     |         |
|              | -Westbound Right                                  | 150'              | 0          | 0       | 0                   | 0       |
|              | -Southbound Approach                              | -                 | 2          | 10      | 2                   | 10      |

\*95<sup>th</sup> percentile queue generated from SimTraffic model

## **Recommendations for Site Mitigation Improvements**

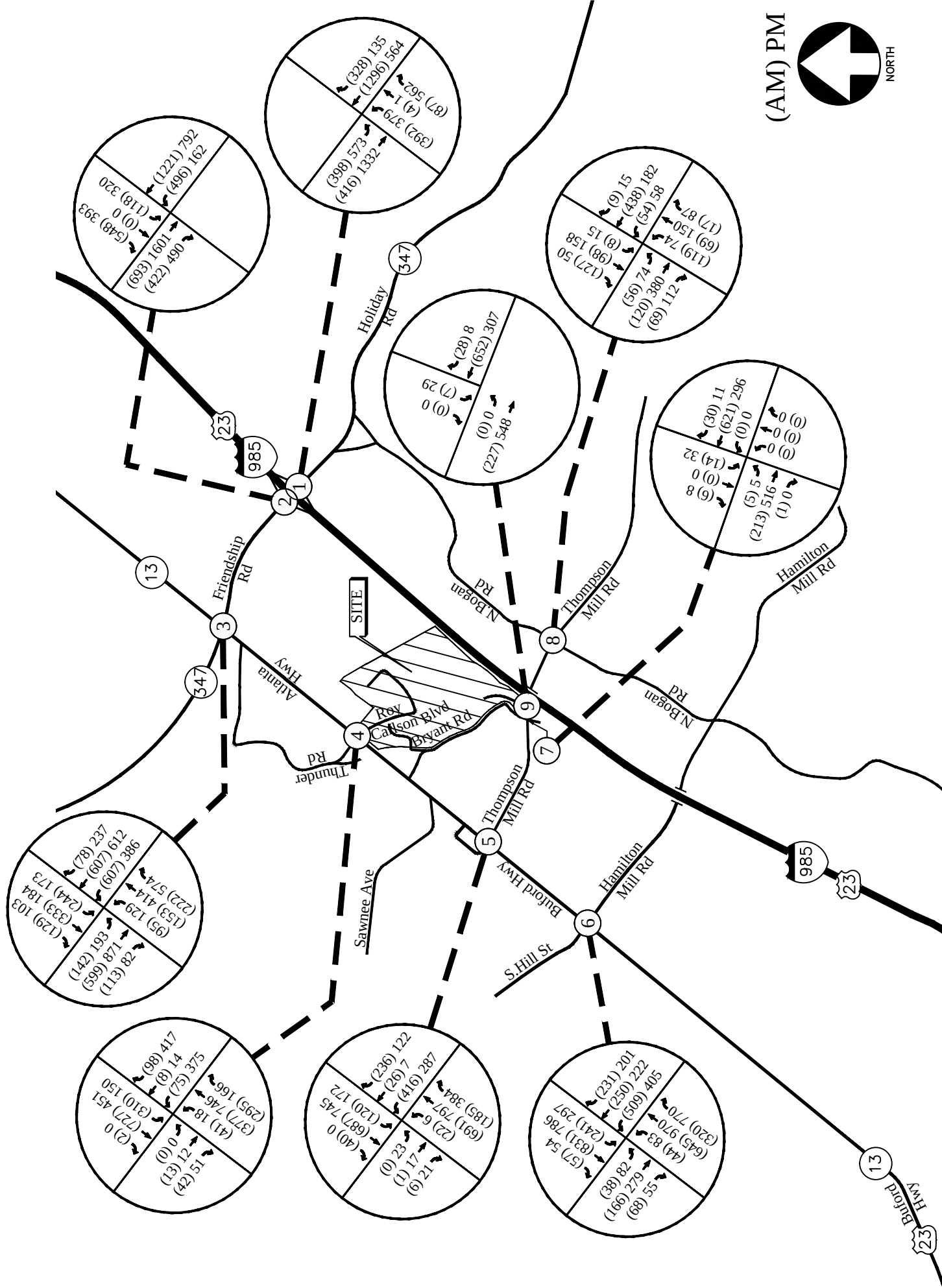
Improvements that are identified as site mitigation improvements address deficiencies that are caused by site traffic and can be identified as related to the proposed development. A summary of the site mitigation improvements is provided below, with more detailed information on each intersection in the following narratives.

### **Summary of Recommended Site Mitigation Improvements**

- It is recommended a second westbound left turn lane be constructed using the existing striping at the intersection of SR 347 (Friendship Road) at SR 13 (Atlanta Highway).

#### **SR 347 (Friendship Road) at SR 13 (Atlanta Highway)**

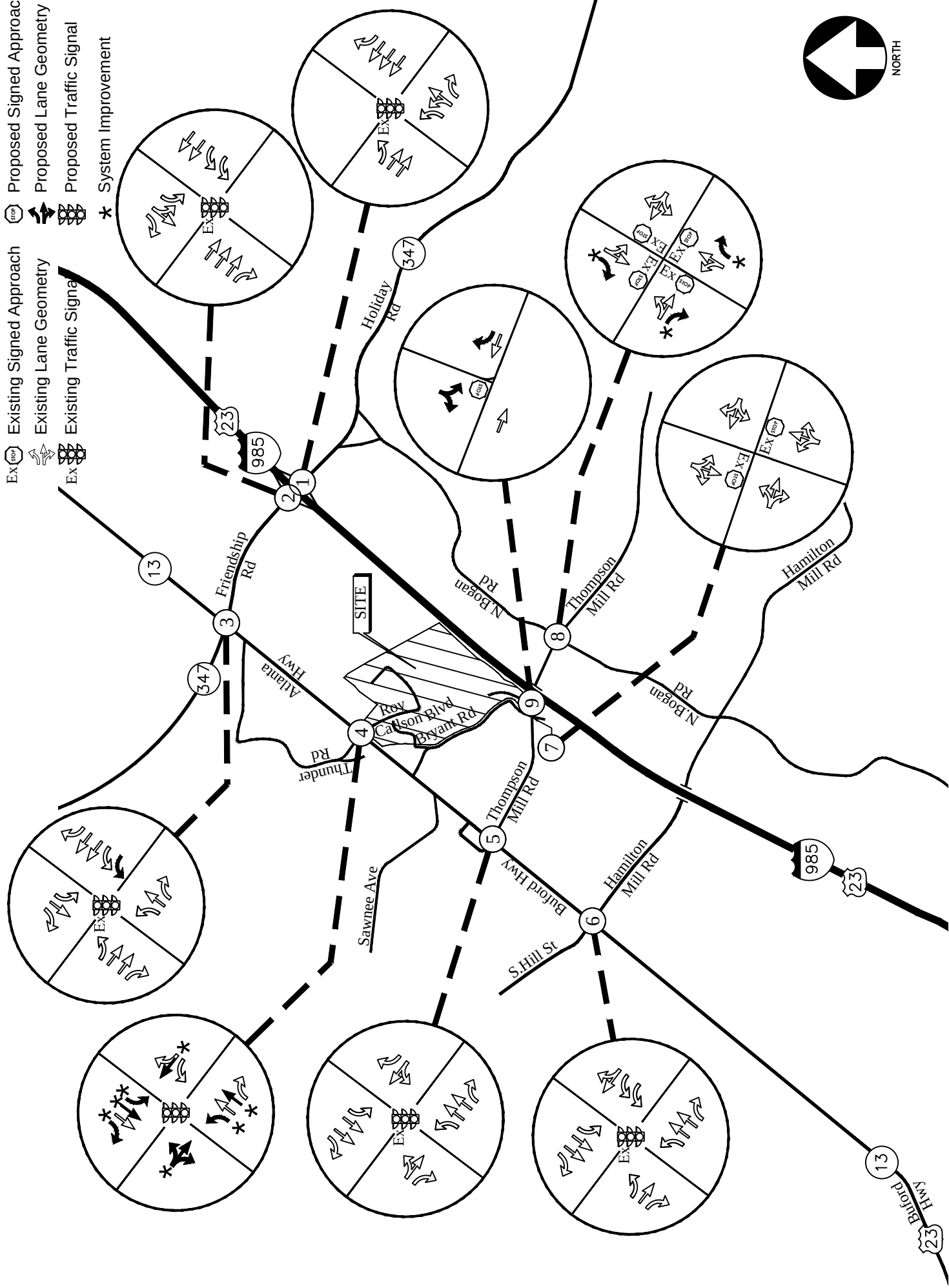
After the addition of site traffic, the intersection of SR 347 (Friendship Road) at SR 13 (Atlanta Highway) will begin to operate at an overall level-of-service “E” during the AM and PM peak hours. Due to the added amount of westbound left turns at the intersection, it is recommended a second westbound left turn lane be installed using the existing striping and given protected signal phasing. With this improvement, the intersection will begin to operate at a level-of-service “D” in the AM and PM peak hours.



FUTURE (BUILD) PEAK HOUR VOLUMES

# LEGEND

- Ex Existing Traffic Signal
- Ex Existing Lane Geometry
- Ex Existing Signed Approach
- Proposed Traffic Signal
- Proposed Lane Geometry
- Proposed Signed Approach
- System Improvement



## CONCLUSIONS AND RECOMMENDATIONS

Traffic impacts were evaluated for the added traffic from the proposed Longacre industrial development located on Roy Carlson Boulevard between SR 13 (Buford Highway) and I-985 in Buford, Georgia. The development will consist of:

- Warehousing: 947,520 square feet
- Industrial Park: 455,600 square feet
- Shopping Center: 40,000 square feet

The development proposes access via Roy Carlson Boulevard, and, for the purpose of this analysis, an additional right-in/right-out/left-out access point on Thompson Mill Road between Bryant Road and I-985. Existing and future operations after completion of the project were analyzed at the intersections of:

- SR 347 (Friendship Road) at I-985 NB Ramps
- SR 347 (Friendship Road) at I-985 SB Ramps
- SR 347 (Friendship Road) at SR 13 (Atlanta Highway)
- SR 13 (Buford Highway) at Roy Carlson Boulevard
- SR 13 (Buford Highway) at Thompson Mill Road
- SR 13 (Buford Highway) at S. Hill Street/Hamilton Mill Road
- Thompson Mill Road at Bryant Road
- Thompson Mill Road at N. Bogan Road

The analysis included the evaluation of Future operations for “No-Build” and “Build” conditions, both of which account for increases in annual growth of through traffic. The results of the analysis are listed below:

### System Recommendations and Improvements

Improvements that are identified as “System Improvements” address deficiencies that are found within the existing road network prior to any impacts from the proposed development’s added traffic. A summary of the system improvements, which address deficiencies that are found within the existing road network for the “No-Build” conditions, is provided below with more detailed information on each intersection in the following narratives.

#### **Summary of Recommended System Improvements**

- Construct a dedicated channelized right turn lane on the northbound, southbound, and eastbound approaches to the intersection of Thompson Mill Road at N. Bogan Road.

#### **Thompson Mill Road at N. Bogan Road**

Several approaches to the intersection of Thompson Mill Road at N. Bogan Road will begin to operate at a level-of-service “E” or “F” in the “No-Build” conditions. As traffic will increase over the next ten years, it is recommended that a dedicated right turn lane be installed per local standards on the northbound, southbound, and eastbound approaches.

## Site Access Configuration

The following access configuration was utilized when modeling the proposed site driveway intersection.

- Site Driveway #1: Truck and employee access via Roy Carlson Boulevard
  - This intersection will be upgraded as part of GDOT project PI #132950 to include signalization as well as the relocation of Thunder Road to align with Roy Carlson Boulevard.
  - As access to SR 13 (Buford Highway) via Thunder Road and Bryant Road will be eliminated, the existing traffic at the intersection was shifted to the proposed signal at Roy Carlson Boulevard as part of the “No-Build” and “Build” analyses.
  - This driveway will consist of two entering lanes and two exiting lanes. The westbound (driveway) approach is assumed to operate with a dedicated left turn lane and shared through/right turn lane.
  - Entering left turn movements will be made from a dedicated southbound left turn lane. It is recommended the signal include a southbound protected + permissive phase for entering left turns (See Appendix).
  - Entering right turn movements will be made from a dedicated northbound right turn lane.
- Site Driveway #2: Right-in/right-out/left-out access on Thompson Mill Road
  - For the purpose of this study, this driveway will only be used by employee/car traffic. Truck traffic will be able to use this access only in emergency situations.
  - As this access geometry was agreed upon by Gwinnett County DOT for the purpose of this study, further discussions will need to take place on the final layout of the driveway.
  - This driveway will consist of one entering lane and one exiting lane.
  - Entering right turn movements will be made from a dedicated westbound right turn lane.
  - The intersection will be unsignalized with a STOP sign on the southbound approach.

## Site Mitigation Improvements

Improvements that are identified as site mitigation improvements address deficiencies that are caused by site traffic and can be identified as related to the proposed development. A summary of the site mitigation improvements is provided below, with more detailed information on each intersection in the following narratives.

### Summary of Recommended Site Mitigation Improvements

- It is recommended a second westbound left turn lane be constructed using the existing striping at the intersection of SR 347 (Friendship Road) at SR 13 (Atlanta Highway).

#### SR 347 (Friendship Road) at SR 13 (Atlanta Highway)

After the addition of site traffic, the intersection of SR 347 (Friendship Road) at SR 13 (Atlanta Highway) will begin to operate at an overall level-of-service “E” during the AM and PM peak hours. Due to the added amount of westbound left turns at the intersection, it is recommended a second westbound left turn lane be installed using the existing striping and given protected signal phasing. With this improvement, the intersection will begin to operate at a level-of-service “D” in the AM and PM peak hours.

## Appendix

|                                                          |  |
|----------------------------------------------------------|--|
| Existing Intersection Traffic Counts .....               |  |
| GRTA Letter of Understanding.....                        |  |
| Linear Regression of Daily Traffic.....                  |  |
| Fact Sheets for Planned and Programmed Improvements..... |  |
| Existing Intersection Analysis.....                      |  |
| Future “No-Build” Intersection Analysis .....            |  |
| Future “No-Build” Improved Intersection Analysis.....    |  |
| Future “Build” Intersection Analysis.....                |  |
| Future “Build” Improved Intersection Analysis .....      |  |
| Traffic Volume Worksheets .....                          |  |



## **Existing Intersection Traffic Counts**

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TMC Data  
Friendship Rd (SR347) @ I-985 NB Ramps  
Buford, GA  
7-9am I 4-6pm

File Name : 39230001  
Site Code : 39230001  
Start Date : 10/19/2016  
Page No : 1

## Groups Printed- Cars and Buses - Trucks

|                  | I-985 NB Off-Ramp<br>Northbound |      |       |      |            | Southbound |      |       |      |            | Friendship Rd (SR347)<br>Eastbound |      |       |      |            | Friendship Rd (SR347)<br>Westbound |      |       |      |            |            |
|------------------|---------------------------------|------|-------|------|------------|------------|------|-------|------|------------|------------------------------------|------|-------|------|------------|------------------------------------|------|-------|------|------------|------------|
| Start Time       | Left                            | Thru | Right | Peds | App. Total | Left       | Thru | Right | Peds | App. Total | Left                               | Thru | Right | Peds | App. Total | Left                               | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM         | 70                              | 1    | 24    | 0    | 95         | 0          | 0    | 0     | 0    | 0          | 58                                 | 86   | 0     | 0    | 144        | 0                                  | 290  | 39    | 0    | 329        | 568        |
| 07:15 AM         | 63                              | 2    | 17    | 0    | 82         | 0          | 0    | 0     | 0    | 0          | 81                                 | 87   | 0     | 0    | 168        | 0                                  | 295  | 67    | 0    | 362        | 612        |
| 07:30 AM         | 76                              | 1    | 21    | 0    | 98         | 0          | 0    | 0     | 0    | 0          | 104                                | 97   | 0     | 0    | 201        | 0                                  | 289  | 102   | 0    | 391        | 690        |
| 07:45 AM         | 88                              | 1    | 16    | 0    | 105        | 0          | 0    | 0     | 0    | 0          | 98                                 | 100  | 0     | 0    | 198        | 0                                  | 350  | 85    | 0    | 435        | 738        |
| Total            | 297                             | 5    | 78    | 0    | 380        | 0          | 0    | 0     | 0    | 0          | 341                                | 370  | 0     | 0    | 711        | 0                                  | 1224 | 293   | 0    | 1517       | 2608       |
| 08:00 AM         | 76                              | 0    | 29    | 0    | 105        | 0          | 0    | 0     | 0    | 0          | 72                                 | 103  | 0     | 0    | 175        | 0                                  | 269  | 58    | 0    | 327        | 607        |
| 08:15 AM         | 58                              | 0    | 18    | 0    | 76         | 0          | 0    | 0     | 0    | 0          | 72                                 | 130  | 0     | 0    | 202        | 0                                  | 273  | 52    | 0    | 325        | 603        |
| 08:30 AM         | 69                              | 0    | 24    | 0    | 93         | 0          | 0    | 0     | 0    | 0          | 62                                 | 91   | 0     | 0    | 153        | 0                                  | 220  | 55    | 0    | 275        | 521        |
| 08:45 AM         | 65                              | 0    | 20    | 0    | 85         | 0          | 0    | 0     | 0    | 0          | 60                                 | 81   | 0     | 0    | 141        | 0                                  | 169  | 32    | 0    | 201        | 427        |
| Total            | 268                             | 0    | 91    | 0    | 359        | 0          | 0    | 0     | 0    | 0          | 266                                | 405  | 0     | 0    | 671        | 0                                  | 931  | 197   | 0    | 1128       | 2158       |
| *** BREAK ***    |                                 |      |       |      |            |            |      |       |      |            |                                    |      |       |      |            |                                    |      |       |      |            |            |
| 04:00 PM         | 75                              | 0    | 80    | 0    | 155        | 0          | 0    | 0     | 0    | 0          | 93                                 | 230  | 0     | 0    | 323        | 0                                  | 99   | 27    | 0    | 126        | 604        |
| 04:15 PM         | 68                              | 1    | 75    | 0    | 144        | 0          | 0    | 0     | 0    | 0          | 89                                 | 237  | 0     | 0    | 326        | 0                                  | 116  | 29    | 0    | 145        | 615        |
| 04:30 PM         | 87                              | 2    | 71    | 0    | 160        | 0          | 0    | 0     | 0    | 0          | 104                                | 274  | 0     | 0    | 378        | 0                                  | 117  | 41    | 0    | 158        | 696        |
| 04:45 PM         | 85                              | 0    | 103   | 0    | 188        | 0          | 0    | 0     | 0    | 0          | 105                                | 246  | 0     | 0    | 351        | 0                                  | 126  | 42    | 0    | 168        | 707        |
| Total            | 315                             | 3    | 329   | 0    | 647        | 0          | 0    | 0     | 0    | 0          | 391                                | 987  | 0     | 0    | 1378       | 0                                  | 458  | 139   | 0    | 597        | 2622       |
| 05:00 PM         | 64                              | 0    | 109   | 0    | 173        | 0          | 0    | 0     | 0    | 0          | 117                                | 281  | 0     | 0    | 398        | 0                                  | 127  | 41    | 0    | 168        | 739        |
| 05:15 PM         | 96                              | 0    | 135   | 0    | 231        | 0          | 0    | 0     | 0    | 0          | 136                                | 348  | 0     | 0    | 484        | 0                                  | 129  | 34    | 0    | 163        | 878        |
| 05:30 PM         | 98                              | 0    | 144   | 0    | 242        | 0          | 0    | 0     | 0    | 0          | 98                                 | 326  | 0     | 0    | 424        | 0                                  | 135  | 23    | 0    | 158        | 824        |
| 05:45 PM         | 72                              | 1    | 147   | 0    | 220        | 0          | 0    | 0     | 0    | 0          | 98                                 | 279  | 0     | 0    | 377        | 0                                  | 132  | 30    | 0    | 162        | 759        |
| Total            | 330                             | 1    | 535   | 0    | 866        | 0          | 0    | 0     | 0    | 0          | 449                                | 1234 | 0     | 0    | 1683       | 0                                  | 523  | 128   | 0    | 651        | 3200       |
| Grand Total      | 1210                            | 9    | 1033  | 0    | 2252       | 0          | 0    | 0     | 0    | 0          | 1447                               | 2996 | 0     | 0    | 4443       | 0                                  | 3136 | 757   | 0    | 3893       | 10588      |
| Apprch %         | 53.7                            | 0.4  | 45.9  | 0    |            | 0          | 0    | 0     | 0    |            | 32.6                               | 67.4 | 0     | 0    |            | 0                                  | 80.6 | 19.4  | 0    |            |            |
| Total %          | 11.4                            | 0.1  | 9.8   | 0    | 21.3       | 0          | 0    | 0     | 0    | 0          | 13.7                               | 28.3 | 0     | 0    | 42         | 0                                  | 29.6 | 7.1   | 0    | 36.8       |            |
| Cars and Buses   | 1191                            | 9    | 1026  | 0    | 2226       | 0          | 0    | 0     | 0    | 0          | 1431                               | 2986 | 0     | 0    | 4417       | 0                                  | 3118 | 752   | 0    | 3870       | 10513      |
| % Cars and Buses | 98.4                            | 100  | 99.3  | 0    | 98.8       | 0          | 0    | 0     | 0    | 0          | 98.9                               | 99.7 | 0     | 0    | 99.4       | 0                                  | 99.4 | 99.3  | 0    | 99.4       | 99.3       |
| Trucks           | 19                              | 0    | 7     | 0    | 26         | 0          | 0    | 0     | 0    | 0          | 16                                 | 10   | 0     | 0    | 26         | 0                                  | 18   | 5     | 0    | 23         | 75         |
| % Trucks         | 1.6                             | 0    | 0.7   | 0    | 1.2        | 0          | 0    | 0     | 0    | 0          | 1.1                                | 0.3  | 0     | 0    | 0.6        | 0                                  | 0.6  | 0.7   | 0    | 0.6        | 0.7        |

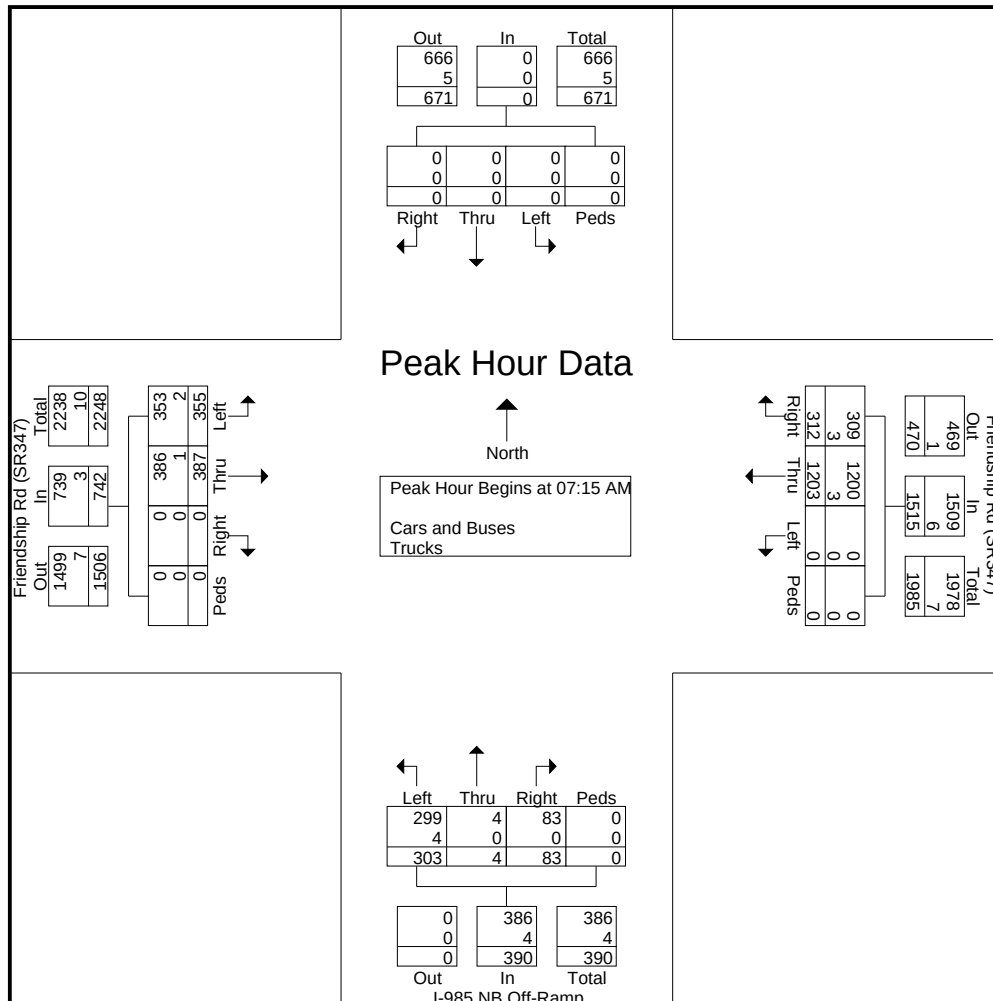
# Reliable Traffic Data Services, LLC

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TMC Data  
Friendship Rd (SR347) @ I-985 NB Ramps  
Buford, GA  
7-9am I 4-6pm

File Name : 39230001  
Site Code : 39230001  
Start Date : 10/19/2016  
Page No : 2

|                                                            | I-985 NB Off-Ramp Northbound |      |       |      |            | Southbound |      |       |      |            | Friendship Rd (SR347) Eastbound |      |       |      |            | Friendship Rd (SR347) Westbound |      |       |      |            |            |
|------------------------------------------------------------|------------------------------|------|-------|------|------------|------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|------------|
| Start Time                                                 | Left                         | Thru | Right | Peds | App. Total | Left       | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 |                              |      |       |      |            |            |      |       |      |            |                                 |      |       |      |            |                                 |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 07:15 AM       |                              |      |       |      |            |            |      |       |      |            |                                 |      |       |      |            |                                 |      |       |      |            |            |
| 07:15 AM                                                   | 63                           | 2    | 17    | 0    | 82         | 0          | 0    | 0     | 0    | 0          | 81                              | 87   | 0     | 0    | 168        | 0                               | 295  | 67    | 0    | 362        | 612        |
| 07:30 AM                                                   | 76                           | 1    | 21    | 0    | 98         | 0          | 0    | 0     | 0    | 0          | 104                             | 97   | 0     | 0    | 201        | 0                               | 289  | 102   | 0    | 391        | 690        |
| 07:45 AM                                                   | 88                           | 1    | 16    | 0    | 105        | 0          | 0    | 0     | 0    | 0          | 98                              | 100  | 0     | 0    | 198        | 0                               | 350  | 85    | 0    | 435        | 738        |
| 08:00 AM                                                   | 76                           | 0    | 29    | 0    | 105        | 0          | 0    | 0     | 0    | 0          | 72                              | 103  | 0     | 0    | 175        | 0                               | 269  | 58    | 0    | 327        | 607        |
| Total Volume                                               | 303                          | 4    | 83    | 0    | 390        | 0          | 0    | 0     | 0    | 0          | 355                             | 387  | 0     | 0    | 742        | 0                               | 1203 | 312   | 0    | 1515       | 2647       |
| % App. Total                                               | 77.7                         | 1    | 21.3  | 0    |            | 0          | 0    | 0     | 0    |            | 47.8                            | 52.2 | 0     | 0    |            | 0                               | 79.4 | 20.6  | 0    |            |            |
| PHF                                                        | .861                         | .500 | .716  | .000 | .929       | .000       | .000 | .000  | .000 | .000       | .853                            | .939 | .000  | .000 | .923       | .000                            | .859 | .765  | .000 | .871       | .897       |
| Cars and Buses                                             | 299                          | 4    | 83    | 0    | 386        | 0          | 0    | 0     | 0    | 0          | 353                             | 386  | 0     | 0    | 739        | 0                               | 1200 | 309   | 0    | 1509       | 2634       |
| % Cars and Buses                                           | 98.7                         | 100  | 100   | 0    | 99.0       | 0          | 0    | 0     | 0    | 0          | 99.4                            | 99.7 | 0     | 0    | 99.6       | 0                               | 99.8 | 99.0  | 0    | 99.6       | 99.5       |
| Trucks                                                     | 4                            | 0    | 0     | 0    | 4          | 0          | 0    | 0     | 0    | 0          | 2                               | 1    | 0     | 0    | 3          | 0                               | 3    | 3     | 0    | 6          | 13         |
| % Trucks                                                   | 1.3                          | 0    | 0     | 0    | 1.0        | 0          | 0    | 0     | 0    | 0          | 0.6                             | 0.3  | 0     | 0    | 0.4        | 0                               | 0.2  | 1.0   | 0    | 0.4        | 0.5        |



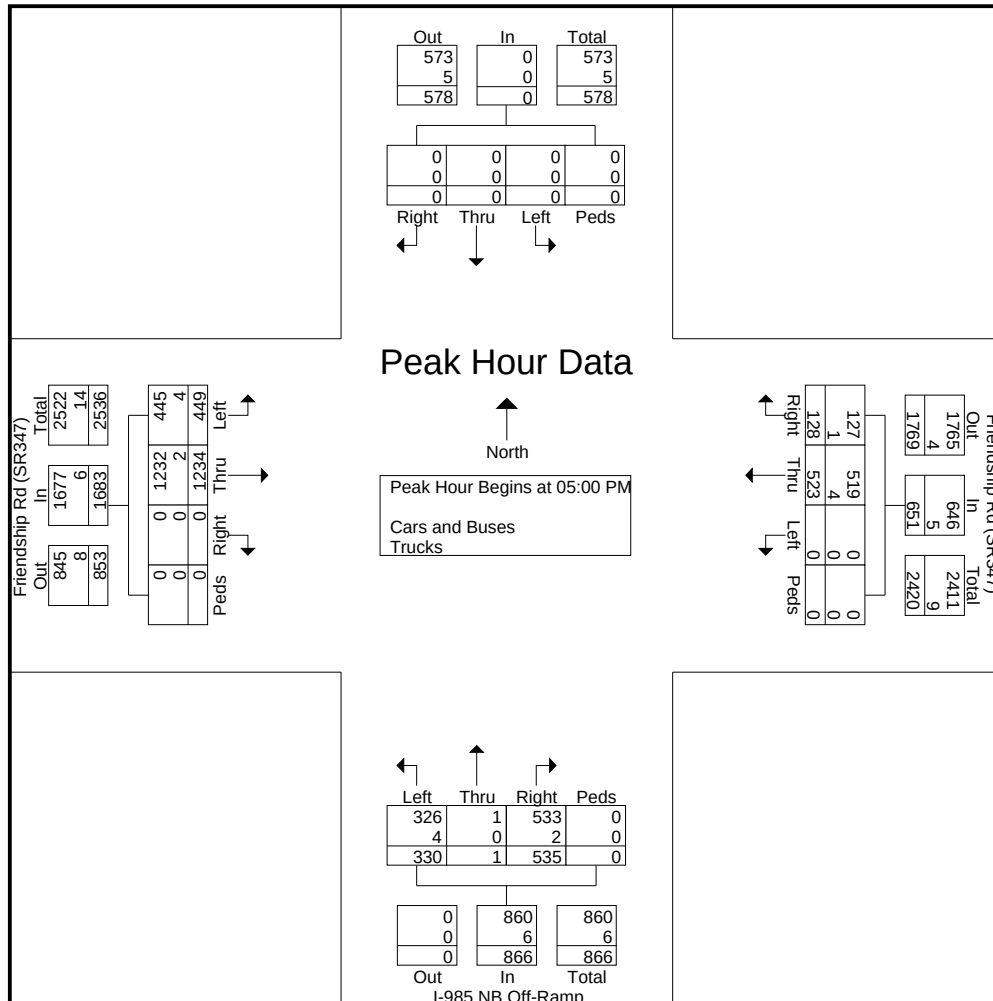
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TMC Data  
Friendship Rd (SR347) @ I-985 NB Ramps  
Buford, GA  
7-9am I 4-6pm

File Name : 39230001  
Site Code : 39230001  
Start Date : 10/19/2016  
Page No : 3

|                                                            | I-985 NB Off-Ramp Northbound |      |       |      |            | Southbound |      |       |      |            | Friendship Rd (SR347) Eastbound |      |       |      |            | Friendship Rd (SR347) Westbound |      |       |      |            |            |
|------------------------------------------------------------|------------------------------|------|-------|------|------------|------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|------------|
| Start Time                                                 | Left                         | Thru | Right | Peds | App. Total | Left       | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 |                              |      |       |      |            |            |      |       |      |            |                                 |      |       |      |            |                                 |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 05:00 PM       |                              |      |       |      |            |            |      |       |      |            |                                 |      |       |      |            |                                 |      |       |      |            |            |
| 05:00 PM                                                   | 64                           | 0    | 109   | 0    | 173        | 0          | 0    | 0     | 0    | 0          | 117                             | 281  | 0     | 0    | 398        | 0                               | 127  | 41    | 0    | 168        | 739        |
| 05:15 PM                                                   | 96                           | 0    | 135   | 0    | 231        | 0          | 0    | 0     | 0    | 0          | 136                             | 348  | 0     | 0    | 484        | 0                               | 129  | 34    | 0    | 163        | 878        |
| 05:30 PM                                                   | 98                           | 0    | 144   | 0    | 242        | 0          | 0    | 0     | 0    | 0          | 98                              | 326  | 0     | 0    | 424        | 0                               | 135  | 23    | 0    | 158        | 824        |
| 05:45 PM                                                   | 72                           | 1    | 147   | 0    | 220        | 0          | 0    | 0     | 0    | 0          | 98                              | 279  | 0     | 0    | 377        | 0                               | 132  | 30    | 0    | 162        | 759        |
| Total Volume                                               | 330                          | 1    | 535   | 0    | 866        | 0          | 0    | 0     | 0    | 0          | 449                             | 1232 | 0     | 0    | 1683       | 0                               | 523  | 128   | 0    | 651        | 3200       |
| % App. Total                                               | 38.1                         | 0.1  | 61.8  | 0    |            | 0          | 0    | 0     | 0    |            | 26.7                            | 73.3 | 0     | 0    |            | 0                               | 80.3 | 19.7  | 0    |            |            |
| PHF                                                        | .842                         | .250 | .910  | .000 | .895       | .000       | .000 | .000  | .000 | .000       | .825                            | .886 | .000  | .000 | .869       | .000                            | .969 | .780  | .000 | .969       | .911       |
| Cars and Buses                                             | 326                          | 1    | 533   | 0    | 860        | 0          | 0    | 0     | 0    | 0          | 445                             | 1232 | 0     | 0    | 1677       | 0                               | 519  | 127   | 0    | 646        | 3183       |
| % Cars and Buses                                           | 98.8                         | 100  | 99.6  | 0    | 99.3       | 0          | 0    | 0     | 0    | 0          | 99.1                            | 99.8 | 0     | 0    | 99.6       | 0                               | 99.2 | 99.2  | 0    | 99.2       | 99.5       |
| Trucks                                                     | 4                            | 0    | 2     | 0    | 6          | 0          | 0    | 0     | 0    | 0          | 4                               | 2    | 0     | 0    | 6          | 0                               | 4    | 1     | 0    | 5          | 17         |
| % Trucks                                                   | 1.2                          | 0    | 0.4   | 0    | 0.7        | 0          | 0    | 0     | 0    | 0          | 0.9                             | 0.2  | 0     | 0    | 0.4        | 0                               | 0.8  | 0.8   | 0    | 0.8        | 0.5        |



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TMC Data  
Friendship Rd (SR347) @ I-985 SB Ramps  
Buford, GA  
7-9am I 4-6pm

File Name : 39230002  
Site Code : 39230002  
Start Date : 10/19/2016  
Page No : 1

## Groups Printed- Cars and Buses - Trucks

|                  | Northbound |      |       |      |            | I-985 SB Off-Ramp<br>Southbound |      |       |      |            | Friendship Rd (SR347)<br>Eastbound |      |       |      |            | Friendship Rd (SR347)<br>Westbound |      |       |      |            |            |
|------------------|------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|------------------------------------|------|-------|------|------------|------------------------------------|------|-------|------|------------|------------|
| Start Time       | Left       | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Left                               | Thru | Right | Peds | App. Total | Left                               | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM         | 0          | 0    | 0     | 0    | 0          | 24                              | 0    | 102   | 0    | 126        | 0                                  | 119  | 83    | 0    | 202        | 89                                 | 239  | 0     | 0    | 328        | 656        |
| 07:15 AM         | 0          | 0    | 0     | 0    | 0          | 33                              | 0    | 103   | 0    | 136        | 0                                  | 132  | 96    | 0    | 228        | 105                                | 243  | 0     | 0    | 348        | 712        |
| 07:30 AM         | 0          | 0    | 0     | 0    | 0          | 28                              | 0    | 113   | 0    | 141        | 0                                  | 183  | 92    | 0    | 275        | 119                                | 248  | 0     | 0    | 367        | 783        |
| 07:45 AM         | 0          | 0    | 0     | 0    | 0          | 19                              | 0    | 129   | 0    | 148        | 0                                  | 158  | 88    | 0    | 246        | 136                                | 322  | 0     | 0    | 458        | 852        |
| Total            | 0          | 0    | 0     | 0    | 0          | 104                             | 0    | 447   | 0    | 551        | 0                                  | 592  | 359   | 0    | 951        | 449                                | 1052 | 0     | 0    | 1501       | 3003       |
| 08:00 AM         | 0          | 0    | 0     | 0    | 0          | 32                              | 0    | 90    | 0    | 122        | 0                                  | 154  | 106   | 0    | 260        | 112                                | 248  | 0     | 0    | 360        | 742        |
| 08:15 AM         | 0          | 0    | 0     | 0    | 0          | 22                              | 1    | 95    | 0    | 118        | 0                                  | 131  | 80    | 0    | 211        | 120                                | 211  | 0     | 0    | 331        | 660        |
| 08:30 AM         | 0          | 0    | 0     | 0    | 0          | 25                              | 0    | 97    | 0    | 122        | 0                                  | 153  | 73    | 0    | 226        | 76                                 | 194  | 0     | 0    | 270        | 618        |
| 08:45 AM         | 0          | 0    | 0     | 0    | 0          | 29                              | 0    | 86    | 0    | 115        | 0                                  | 117  | 65    | 0    | 182        | 55                                 | 184  | 0     | 0    | 239        | 536        |
| Total            | 0          | 0    | 0     | 0    | 0          | 108                             | 1    | 368   | 0    | 477        | 0                                  | 555  | 324   | 0    | 879        | 363                                | 837  | 0     | 0    | 1200       | 2556       |
| *** BREAK ***    |            |      |       |      |            |                                 |      |       |      |            |                                    |      |       |      |            |                                    |      |       |      |            |            |
| 04:00 PM         | 0          | 0    | 0     | 0    | 0          | 62                              | 0    | 87    | 0    | 149        | 0                                  | 260  | 78    | 0    | 338        | 26                                 | 157  | 0     | 0    | 183        | 670        |
| 04:15 PM         | 0          | 0    | 0     | 0    | 0          | 59                              | 0    | 72    | 0    | 131        | 0                                  | 280  | 68    | 0    | 348        | 31                                 | 166  | 0     | 0    | 197        | 676        |
| 04:30 PM         | 0          | 0    | 0     | 0    | 0          | 64                              | 0    | 59    | 0    | 123        | 0                                  | 310  | 99    | 0    | 409        | 32                                 | 171  | 0     | 0    | 203        | 735        |
| 04:45 PM         | 0          | 0    | 0     | 0    | 0          | 55                              | 0    | 99    | 0    | 154        | 0                                  | 273  | 91    | 0    | 364        | 30                                 | 174  | 0     | 0    | 204        | 722        |
| Total            | 0          | 0    | 0     | 0    | 0          | 240                             | 0    | 317   | 0    | 557        | 0                                  | 1123 | 336   | 0    | 1459       | 119                                | 668  | 0     | 0    | 787        | 2803       |
| 05:00 PM         | 0          | 0    | 0     | 0    | 0          | 50                              | 0    | 77    | 0    | 127        | 0                                  | 367  | 119   | 0    | 486        | 33                                 | 163  | 0     | 0    | 196        | 809        |
| 05:15 PM         | 0          | 0    | 0     | 0    | 0          | 92                              | 0    | 100   | 0    | 192        | 0                                  | 367  | 94    | 0    | 461        | 43                                 | 195  | 0     | 0    | 238        | 891        |
| 05:30 PM         | 0          | 0    | 0     | 0    | 0          | 100                             | 0    | 87    | 0    | 187        | 0                                  | 343  | 98    | 0    | 441        | 31                                 | 184  | 0     | 0    | 215        | 843        |
| 05:45 PM         | 0          | 0    | 0     | 0    | 0          | 62                              | 0    | 72    | 0    | 134        | 0                                  | 316  | 77    | 0    | 393        | 47                                 | 168  | 0     | 0    | 215        | 742        |
| Total            | 0          | 0    | 0     | 0    | 0          | 304                             | 0    | 336   | 0    | 640        | 0                                  | 1393 | 388   | 0    | 1781       | 154                                | 710  | 0     | 0    | 864        | 3285       |
| Grand Total      | 0          | 0    | 0     | 0    | 0          | 756                             | 1    | 1468  | 0    | 2225       | 0                                  | 3663 | 1407  | 0    | 5070       | 1085                               | 3267 | 0     | 0    | 4352       | 11647      |
| Apprch %         | 0          | 0    | 0     | 0    | 0          | 34                              | 0    | 66    | 0    |            | 0                                  | 72.2 | 27.8  | 0    |            | 24.9                               | 75.1 | 0     | 0    |            |            |
| Total %          | 0          | 0    | 0     | 0    | 0          | 6.5                             | 0    | 12.6  | 0    | 19.1       | 0                                  | 31.5 | 12.1  | 0    | 43.5       | 9.3                                | 28.1 | 0     | 0    | 37.4       |            |
| Cars and Buses   | 0          | 0    | 0     | 0    | 0          | 754                             | 1    | 1448  | 0    | 2203       | 0                                  | 3634 | 1381  | 0    | 5015       | 1072                               | 3240 | 0     | 0    | 4312       | 11530      |
| % Cars and Buses | 0          | 0    | 0     | 0    | 0          | 99.7                            | 100  | 98.6  | 0    | 99         | 0                                  | 99.2 | 98.2  | 0    | 98.9       | 98.8                               | 99.2 | 0     | 0    | 99.1       | 99         |
| Trucks           | 0          | 0    | 0     | 0    | 0          | 2                               | 0    | 20    | 0    | 22         | 0                                  | 29   | 26    | 0    | 55         | 13                                 | 27   | 0     | 0    | 40         | 117        |
| % Trucks         | 0          | 0    | 0     | 0    | 0          | 0.3                             | 0    | 1.4   | 0    | 1          | 0                                  | 0.8  | 1.8   | 0    | 1.1        | 1.2                                | 0.8  | 0     | 0    | 0.9        | 1          |

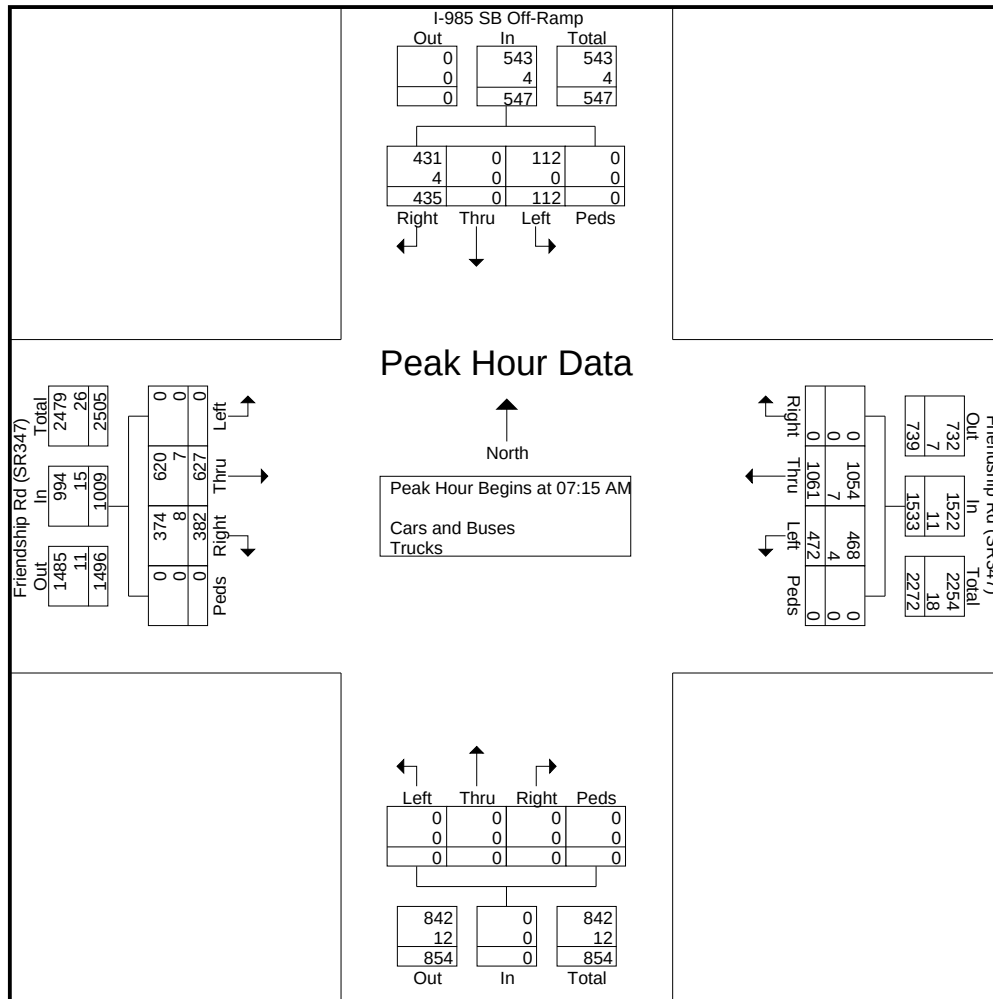
# Reliable Traffic Data Services, LLC

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TMC Data  
Friendship Rd (SR347) @ I-985 SB Ramps  
Buford, GA  
7-9am I 4-6pm

File Name : 39230002  
Site Code : 39230002  
Start Date : 10/19/2016  
Page No : 2

|                                                            | Northbound |      |       |      |            | I-985 SB Off-Ramp Southbound |      |       |      |            | Friendship Rd (SR347) Eastbound |      |       |      |            | Friendship Rd (SR347) Westbound |      |       |      |            |            |
|------------------------------------------------------------|------------|------|-------|------|------------|------------------------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|------------|
| Start Time                                                 | Left       | Thru | Right | Peds | App. Total | Left                         | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 |            |      |       |      |            |                              |      |       |      |            |                                 |      |       |      |            |                                 |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 07:15 AM       |            |      |       |      |            |                              |      |       |      |            |                                 |      |       |      |            |                                 |      |       |      |            |            |
| 07:15 AM                                                   | 0          | 0    | 0     | 0    | 0          | 33                           | 0    | 103   | 0    | 136        | 0                               | 132  | 96    | 0    | 228        | 105                             | 243  | 0     | 0    | 348        | 712        |
| 07:30 AM                                                   | 0          | 0    | 0     | 0    | 0          | 28                           | 0    | 113   | 0    | 141        | 0                               | 183  | 92    | 0    | 275        | 119                             | 248  | 0     | 0    | 367        | 783        |
| 07:45 AM                                                   | 0          | 0    | 0     | 0    | 0          | 19                           | 0    | 129   | 0    | 148        | 0                               | 158  | 88    | 0    | 246        | 136                             | 322  | 0     | 0    | 458        | 852        |
| 08:00 AM                                                   | 0          | 0    | 0     | 0    | 0          | 32                           | 0    | 90    | 0    | 122        | 0                               | 154  | 106   | 0    | 260        | 112                             | 248  | 0     | 0    | 360        | 742        |
| Total Volume                                               | 0          | 0    | 0     | 0    | 0          | 112                          | 0    | 435   | 0    | 547        | 0                               | 627  | 382   | 0    | 1009       | 472                             | 1061 | 0     | 0    | 1533       | 3089       |
| % App. Total                                               | 0          | 0    | 0     | 0    | 0          | 20.5                         | 0    | 79.5  | 0    |            | 0                               | 62.1 | 37.9  | 0    |            | 30.8                            | 69.2 | 0     | 0    |            |            |
| PHF                                                        | .000       | .000 | .000  | .000 | .000       | .848                         | .000 | .843  | .000 | .924       | .000                            | .857 | .901  | .000 | .917       | .868                            | .824 | .000  | .000 | .837       | .906       |
| Cars and Buses                                             | 0          | 0    | 0     | 0    | 0          | 112                          | 0    | 431   | 0    | 543        | 0                               | 620  | 374   | 0    | 994        | 468                             | 1054 | 0     | 0    | 1522       | 3059       |
| % Cars and Buses                                           | 0          | 0    | 0     | 0    | 0          | 100                          | 0    | 99.1  | 0    | 99.3       | 0                               | 98.9 | 97.9  | 0    | 98.5       | 99.2                            | 99.3 | 0     | 0    | 99.3       | 99.0       |
| Trucks                                                     | 0          | 0    | 0     | 0    | 0          | 0                            | 0    | 4     | 0    | 4          | 0                               | 7    | 8     | 0    | 15         | 4                               | 7    | 0     | 0    | 11         | 30         |
| % Trucks                                                   | 0          | 0    | 0     | 0    | 0          | 0                            | 0    | 0.9   | 0    | 0.7        | 0                               | 1.1  | 2.1   | 0    | 1.5        | 0.8                             | 0.7  | 0     | 0    | 0.7        | 1.0        |



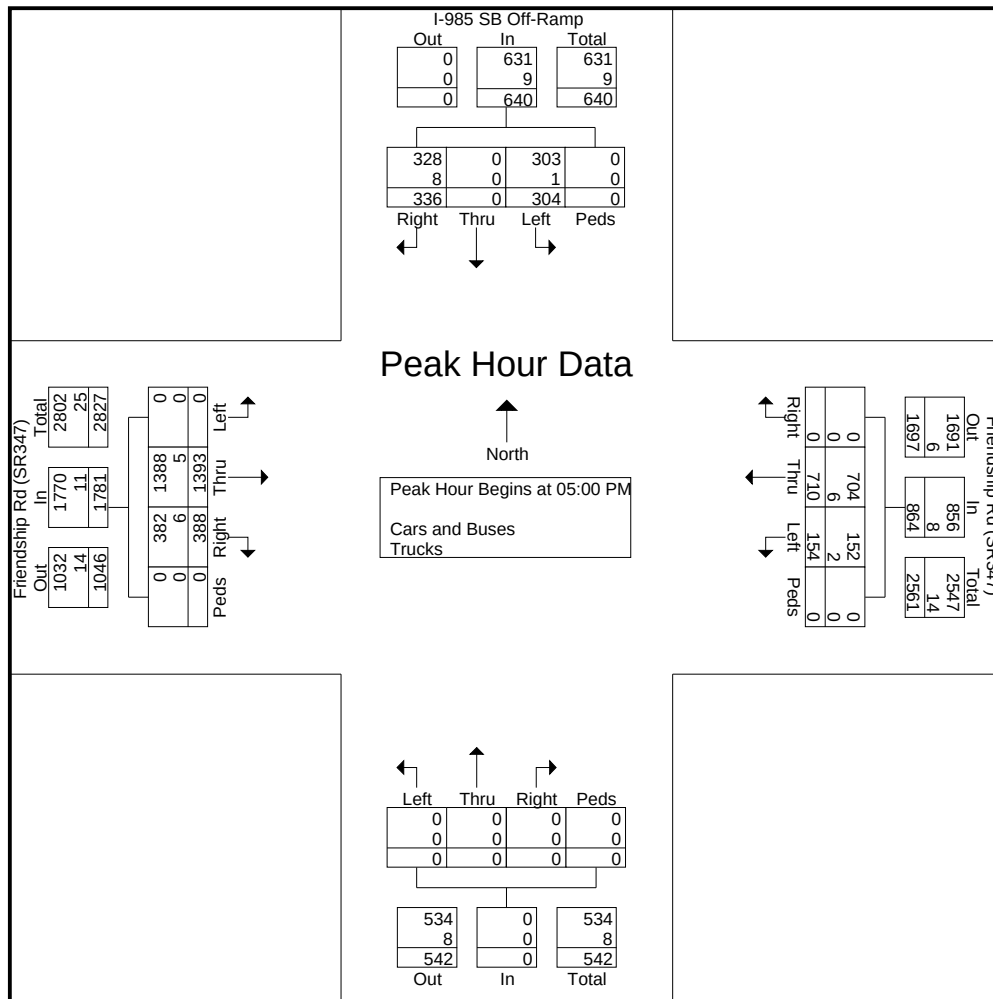
# Reliable Traffic Data Services, LLC

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TMC Data  
Friendship Rd (SR347) @ I-985 SB Ramps  
Buford, GA  
7-9am I 4-6pm

File Name : 39230002  
Site Code : 39230002  
Start Date : 10/19/2016  
Page No : 3

|                                                            | Northbound |      |       |      |            | I-985 SB Off-Ramp Southbound |      |       |      |            | Friendship Rd (SR347) Eastbound |      |       |      |            | Friendship Rd (SR347) Westbound |      |       |      |            |            |
|------------------------------------------------------------|------------|------|-------|------|------------|------------------------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|------------|
| Start Time                                                 | Left       | Thru | Right | Peds | App. Total | Left                         | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 |            |      |       |      |            |                              |      |       |      |            |                                 |      |       |      |            |                                 |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 05:00 PM       |            |      |       |      |            |                              |      |       |      |            |                                 |      |       |      |            |                                 |      |       |      |            |            |
| 05:00 PM                                                   | 0          | 0    | 0     | 0    | 0          | 50                           | 0    | 77    | 0    | 127        | 0                               | 367  | 119   | 0    | 486        | 33                              | 163  | 0     | 0    | 196        | 809        |
| 05:15 PM                                                   | 0          | 0    | 0     | 0    | 0          | 92                           | 0    | 100   | 0    | 192        | 0                               | 367  | 94    | 0    | 461        | 43                              | 195  | 0     | 0    | 238        | 891        |
| 05:30 PM                                                   | 0          | 0    | 0     | 0    | 0          | 100                          | 0    | 87    | 0    | 187        | 0                               | 343  | 98    | 0    | 441        | 31                              | 184  | 0     | 0    | 215        | 843        |
| 05:45 PM                                                   | 0          | 0    | 0     | 0    | 0          | 62                           | 0    | 72    | 0    | 134        | 0                               | 316  | 77    | 0    | 393        | 47                              | 168  | 0     | 0    | 215        | 742        |
| Total Volume                                               | 0          | 0    | 0     | 0    | 0          | 304                          | 0    | 336   | 0    | 640        | 0                               | 1393 | 388   | 0    | 1781       | 154                             | 710  | 0     | 0    | 864        | 3285       |
| % App. Total                                               | 0          | 0    | 0     | 0    | 0          | 47.5                         | 0    | 52.5  | 0    |            | 0                               | 78.2 | 21.8  | 0    |            | 17.8                            | 82.2 | 0     | 0    |            |            |
| PHF                                                        | .000       | .000 | .000  | .000 | .000       | .760                         | .000 | .840  | .000 | .833       | .000                            | .949 | .815  | .000 | .916       | .819                            | .910 | .000  | .000 | .908       | .922       |
| Cars and Buses                                             | 0          | 0    | 0     | 0    | 0          | 303                          | 0    | 328   | 0    | 631        | 0                               | 1388 | 382   | 0    | 1770       | 152                             | 704  | 0     | 0    | 856        | 3257       |
| % Cars and Buses                                           | 0          | 0    | 0     | 0    | 0          | 99.7                         | 0    | 97.6  | 0    | 98.6       | 0                               | 99.6 | 98.5  | 0    | 99.4       | 98.7                            | 99.2 | 0     | 0    | 99.1       | 99.1       |
| Trucks                                                     | 0          | 0    | 0     | 0    | 0          | 1                            | 0    | 8     | 0    | 9          | 0                               | 5    | 6     | 0    | 11         | 2                               | 6    | 0     | 0    | 8          | 28         |
| % Trucks                                                   | 0          | 0    | 0     | 0    | 0          | 0.3                          | 0    | 2.4   | 0    | 1.4        | 0                               | 0.4  | 1.5   | 0    | 0.6        | 1.3                             | 0.8  | 0     | 0    | 0.9        | 0.9        |



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TMC Data  
Lanier Islands Pkwy (SR347) @  
Atlanta Hwy (SR13), Buford, GA  
7-9am I 4-6pm

File Name : 39230003  
Site Code : 39230003  
Start Date : 10/19/2016  
Page No : 1

## Groups Printed- Cars and Buses - Trucks

|                  | Atlanta Hwy (SR13)<br>Northbound |      |       |      |            | Atlanta Hwy (SR13)<br>Southbound |      |       |      |            | Lanier Islands Pkwy<br>(SR347)<br>Eastbound |      |       |      |            | Lanier Islands Pkwy<br>(SR347)<br>Westbound |      |       |      |            |            |
|------------------|----------------------------------|------|-------|------|------------|----------------------------------|------|-------|------|------------|---------------------------------------------|------|-------|------|------------|---------------------------------------------|------|-------|------|------------|------------|
| Start Time       | Left                             | Thru | Right | Peds | App. Total | Left                             | Thru | Right | Peds | App. Total | Left                                        | Thru | Right | Peds | App. Total | Left                                        | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM         | 25                               | 31   | 17    | 0    | 73         | 56                               | 93   | 28    | 0    | 177        | 10                                          | 108  | 22    | 0    | 140        | 93                                          | 135  | 15    | 0    | 243        | 633        |
| 07:15 AM         | 20                               | 38   | 26    | 0    | 84         | 39                               | 76   | 12    | 0    | 127        | 20                                          | 114  | 30    | 0    | 164        | 91                                          | 136  | 12    | 0    | 239        | 614        |
| 07:30 AM         | 25                               | 37   | 42    | 0    | 104        | 55                               | 78   | 26    | 0    | 159        | 32                                          | 142  | 22    | 0    | 196        | 100                                         | 145  | 26    | 0    | 271        | 730        |
| 07:45 AM         | 28                               | 37   | 47    | 0    | 112        | 58                               | 61   | 33    | 0    | 152        | 39                                          | 164  | 31    | 0    | 234        | 106                                         | 171  | 19    | 0    | 296        | 794        |
| Total            | 98                               | 143  | 132   | 0    | 373        | 208                              | 308  | 99    | 0    | 615        | 101                                         | 528  | 105   | 0    | 734        | 390                                         | 587  | 72    | 0    | 1049       | 2771       |
| 08:00 AM         | 15                               | 33   | 31    | 0    | 79         | 59                               | 72   | 38    | 0    | 169        | 35                                          | 140  | 21    | 0    | 196        | 98                                          | 129  | 12    | 0    | 239        | 683        |
| 08:15 AM         | 19                               | 24   | 41    | 0    | 84         | 60                               | 57   | 26    | 0    | 143        | 29                                          | 124  | 20    | 0    | 173        | 85                                          | 132  | 17    | 0    | 234        | 634        |
| 08:30 AM         | 20                               | 33   | 21    | 0    | 74         | 36                               | 53   | 18    | 0    | 107        | 22                                          | 108  | 29    | 0    | 159        | 74                                          | 104  | 20    | 0    | 198        | 538        |
| 08:45 AM         | 30                               | 33   | 24    | 0    | 87         | 27                               | 58   | 17    | 0    | 102        | 22                                          | 107  | 18    | 0    | 147        | 89                                          | 130  | 25    | 0    | 244        | 580        |
| Total            | 84                               | 123  | 117   | 0    | 324        | 182                              | 240  | 99    | 0    | 521        | 108                                         | 479  | 88    | 0    | 675        | 346                                         | 495  | 74    | 0    | 915        | 2435       |
| *** BREAK ***    |                                  |      |       |      |            |                                  |      |       |      |            |                                             |      |       |      |            |                                             |      |       |      |            |            |
| 04:00 PM         | 35                               | 66   | 73    | 0    | 174        | 33                               | 52   | 13    | 0    | 98         | 35                                          | 153  | 19    | 0    | 207        | 68                                          | 131  | 35    | 0    | 234        | 713        |
| 04:15 PM         | 31                               | 77   | 76    | 0    | 184        | 30                               | 48   | 19    | 0    | 97         | 23                                          | 178  | 18    | 0    | 219        | 67                                          | 115  | 40    | 0    | 222        | 722        |
| 04:30 PM         | 39                               | 85   | 84    | 0    | 208        | 35                               | 38   | 17    | 0    | 90         | 37                                          | 193  | 23    | 0    | 253        | 66                                          | 122  | 52    | 0    | 240        | 791        |
| 04:45 PM         | 27                               | 75   | 61    | 0    | 163        | 44                               | 35   | 26    | 0    | 105        | 33                                          | 179  | 16    | 0    | 228        | 69                                          | 126  | 49    | 0    | 244        | 740        |
| Total            | 132                              | 303  | 294   | 0    | 729        | 142                              | 173  | 75    | 0    | 390        | 128                                         | 703  | 76    | 0    | 907        | 270                                         | 494  | 176   | 0    | 940        | 2966       |
| 05:00 PM         | 23                               | 82   | 101   | 0    | 206        | 40                               | 41   | 26    | 0    | 107        | 53                                          | 257  | 18    | 0    | 328        | 58                                          | 167  | 66    | 0    | 291        | 932        |
| 05:15 PM         | 29                               | 106  | 95    | 0    | 230        | 42                               | 46   | 24    | 0    | 112        | 51                                          | 192  | 21    | 0    | 264        | 79                                          | 144  | 55    | 0    | 278        | 884        |
| 05:30 PM         | 29                               | 76   | 82    | 0    | 187        | 39                               | 30   | 22    | 0    | 91         | 47                                          | 201  | 16    | 0    | 264        | 80                                          | 145  | 55    | 0    | 280        | 822        |
| 05:45 PM         | 20                               | 72   | 42    | 0    | 134        | 40                               | 49   | 16    | 0    | 105        | 45                                          | 183  | 26    | 0    | 254        | 64                                          | 111  | 67    | 0    | 242        | 735        |
| Total            | 101                              | 336  | 320   | 0    | 757        | 161                              | 166  | 88    | 0    | 415        | 196                                         | 833  | 81    | 0    | 1110       | 281                                         | 567  | 243   | 0    | 1091       | 3373       |
| Grand Total      | 415                              | 905  | 863   | 0    | 2183       | 693                              | 887  | 361   | 0    | 1941       | 533                                         | 2543 | 350   | 0    | 3426       | 1287                                        | 2143 | 565   | 0    | 3995       | 11545      |
| Apprch %         | 19                               | 41.5 | 39.5  | 0    |            | 35.7                             | 45.7 | 18.6  | 0    |            | 15.6                                        | 74.2 | 10.2  | 0    |            | 32.2                                        | 53.6 | 14.1  | 0    |            |            |
| Total %          | 3.6                              | 7.8  | 7.5   | 0    | 18.9       | 6                                | 7.7  | 3.1   | 0    | 16.8       | 4.6                                         | 22   | 3     | 0    | 29.7       | 11.1                                        | 18.6 | 4.9   | 0    | 34.6       |            |
| Cars and Buses   | 410                              | 891  | 850   | 0    | 2151       | 672                              | 868  | 354   | 0    | 1894       | 529                                         | 2536 | 341   | 0    | 3406       | 1265                                        | 2133 | 549   | 0    | 3947       | 11398      |
| % Cars and Buses | 98.8                             | 98.5 | 98.5  | 0    | 98.5       | 97                               | 97.9 | 98.1  | 0    | 97.6       | 99.2                                        | 99.7 | 97.4  | 0    | 99.4       | 98.3                                        | 99.5 | 97.2  | 0    | 98.8       | 98.7       |
| Trucks           | 5                                | 14   | 13    | 0    | 32         | 21                               | 19   | 7     | 0    | 47         | 4                                           | 7    | 9     | 0    | 20         | 22                                          | 10   | 16    | 0    | 48         | 147        |
| % Trucks         | 1.2                              | 1.5  | 1.5   | 0    | 1.5        | 3                                | 2.1  | 1.9   | 0    | 2.4        | 0.8                                         | 0.3  | 2.6   | 0    | 0.6        | 1.7                                         | 0.5  | 2.8   | 0    | 1.2        | 1.3        |



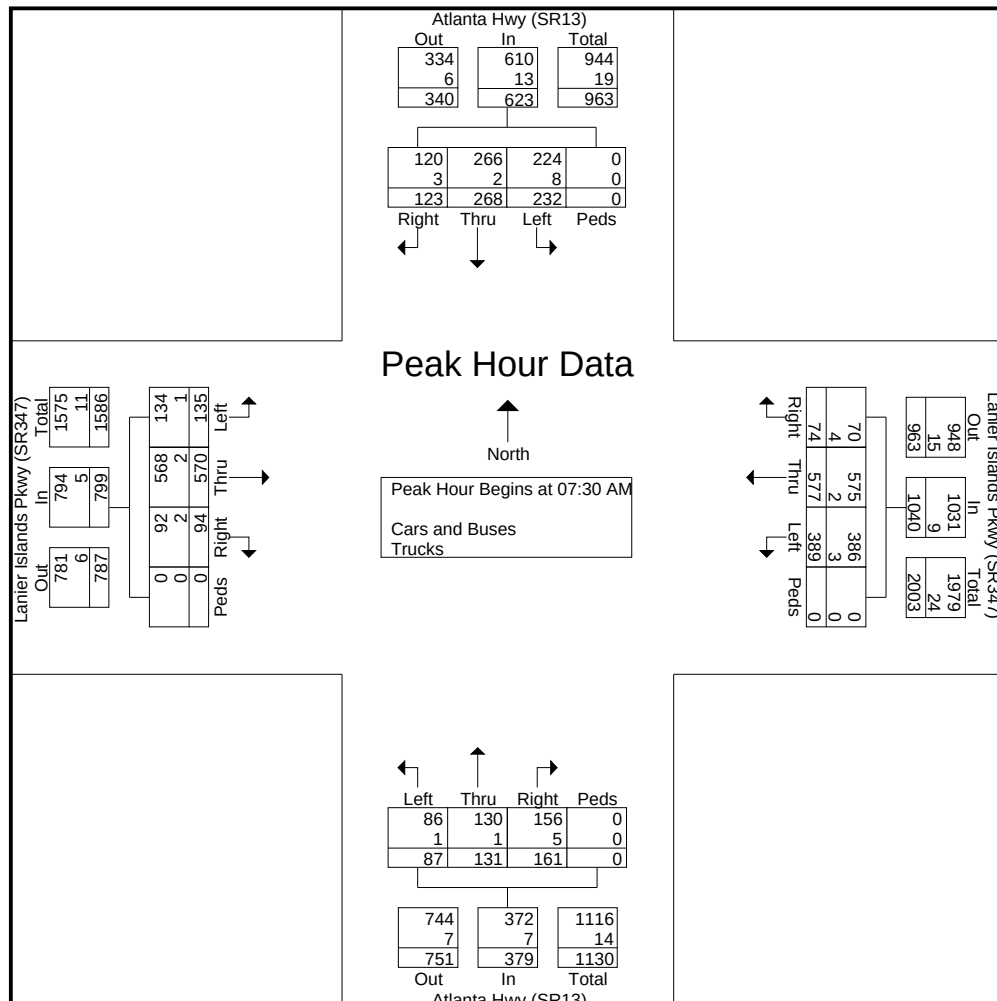
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TMC Data  
Lanier Islands Pkwy (SR347) @  
Atlanta Hwy (SR13), Buford, GA  
7-9am I 4-6pm

File Name : 39230003  
Site Code : 39230003  
Start Date : 10/19/2016  
Page No : 2

|                                                            | Atlanta Hwy (SR13)<br>Northbound |      |       |      |            | Atlanta Hwy (SR13)<br>Southbound |      |       |      |            | Lanier Islands Pkwy<br>(SR347)<br>Eastbound |      |       |      |            | Lanier Islands Pkwy<br>(SR347)<br>Westbound |      |       |      |            |            |
|------------------------------------------------------------|----------------------------------|------|-------|------|------------|----------------------------------|------|-------|------|------------|---------------------------------------------|------|-------|------|------------|---------------------------------------------|------|-------|------|------------|------------|
| Start Time                                                 | Left                             | Thru | Right | Peds | App. Total | Left                             | Thru | Right | Peds | App. Total | Left                                        | Thru | Right | Peds | App. Total | Left                                        | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 |                                  |      |       |      |            |                                  |      |       |      |            |                                             |      |       |      |            |                                             |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 07:30 AM       |                                  |      |       |      |            |                                  |      |       |      |            |                                             |      |       |      |            |                                             |      |       |      |            |            |
| 07:30 AM                                                   | 25                               | 37   | 42    | 0    | 104        | 55                               | 78   | 26    | 0    | 159        | 32                                          | 142  | 22    | 0    | 196        | 100                                         | 145  | 26    | 0    | 271        | 730        |
| 07:45 AM                                                   | 28                               | 37   | 47    | 0    | 112        | 58                               | 61   | 33    | 0    | 152        | 39                                          | 164  | 31    | 0    | 234        | 106                                         | 171  | 19    | 0    | 296        | 794        |
| 08:00 AM                                                   | 15                               | 33   | 31    | 0    | 79         | 59                               | 72   | 38    | 0    | 169        | 35                                          | 140  | 21    | 0    | 196        | 98                                          | 129  | 12    | 0    | 239        | 683        |
| 08:15 AM                                                   | 19                               | 24   | 41    | 0    | 84         | 60                               | 57   | 26    | 0    | 143        | 29                                          | 124  | 20    | 0    | 173        | 85                                          | 132  | 17    | 0    | 234        | 634        |
| Total Volume                                               | 87                               | 131  | 161   | 0    | 379        | 232                              | 268  | 123   | 0    | 623        | 135                                         | 570  | 94    | 0    | 799        | 389                                         | 577  | 74    | 0    | 1040       | 2841       |
| % App. Total                                               | 23                               | 34.6 | 42.5  | 0    |            | 37.2                             | 43   | 19.7  | 0    |            | 16.9                                        | 71.3 | 11.8  | 0    |            | 37.4                                        | 55.5 | 7.1   | 0    |            |            |
| PHF                                                        | .777                             | .885 | .856  | .000 | .846       | .967                             | .859 | .809  | .000 | .922       | .865                                        | .869 | .758  | .000 | .854       | .917                                        | .844 | .712  | .000 | .878       | .895       |
| Cars and Buses                                             | 86                               | 130  | 156   | 0    | 372        | 224                              | 266  | 120   | 0    | 610        | 134                                         | 568  | 92    | 0    | 794        | 386                                         | 575  | 70    | 0    | 1031       | 2807       |
| % Cars and Buses                                           | 98.9                             | 99.2 | 96.9  | 0    | 98.2       | 96.6                             | 99.3 | 97.6  | 0    | 97.9       | 99.3                                        | 99.6 | 97.9  | 0    | 99.4       | 99.2                                        | 99.7 | 94.6  | 0    | 99.1       | 98.8       |
| Trucks                                                     | 1                                | 1    | 5     | 0    | 7          | 8                                | 2    | 3     | 0    | 13         | 1                                           | 2    | 2     | 0    | 5          | 3                                           | 2    | 4     | 0    | 9          | 34         |
| % Trucks                                                   | 1.1                              | 0.8  | 3.1   | 0    | 1.8        | 3.4                              | 0.7  | 2.4   | 0    | 2.1        | 0.7                                         | 0.4  | 2.1   | 0    | 0.6        | 0.8                                         | 0.3  | 5.4   | 0    | 0.9        | 1.2        |



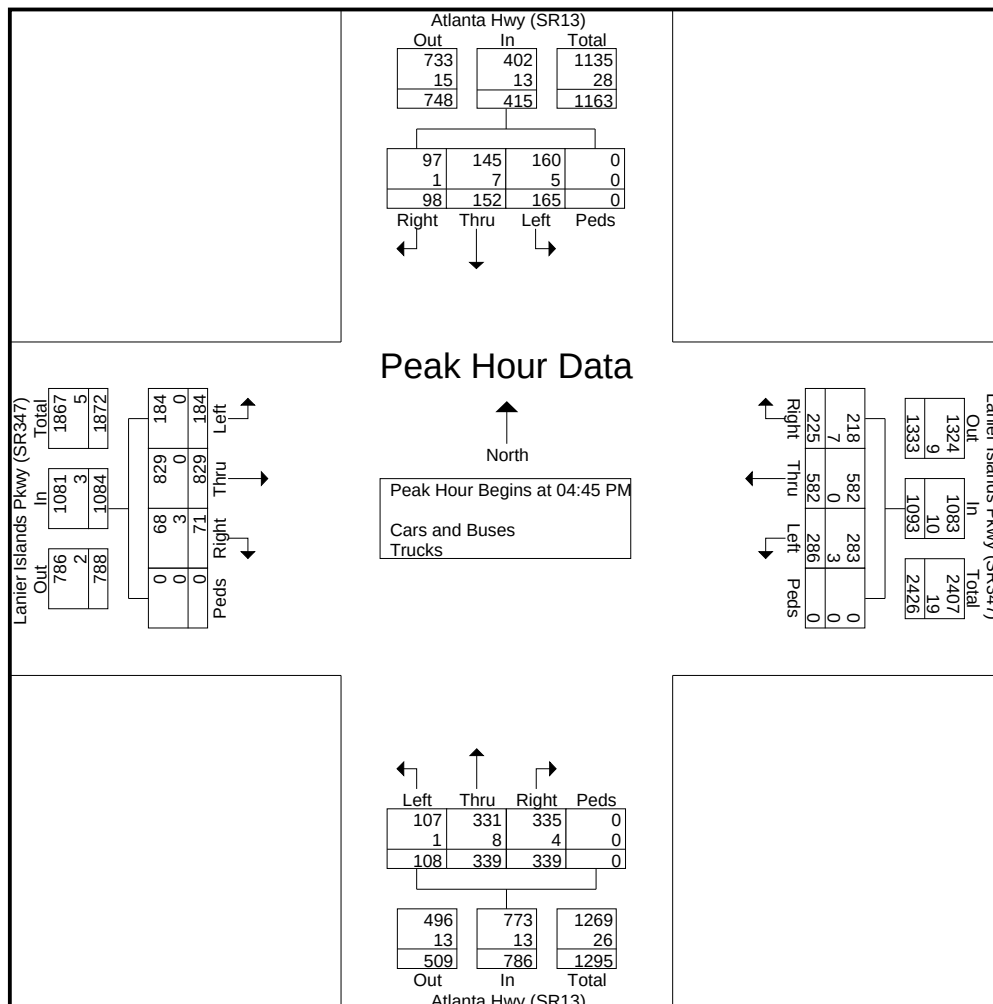
# Reliable Traffic Data Services, LLC

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TMC Data  
Lanier Islands Pkwy (SR347) @  
Atlanta Hwy (SR13), Buford, GA  
7-9am I 4-6pm

File Name : 39230003  
Site Code : 39230003  
Start Date : 10/19/2016  
Page No : 3

|                                                            | Atlanta Hwy (SR13)<br>Northbound |      |       |      |            | Atlanta Hwy (SR13)<br>Southbound |      |       |      |            | Lanier Islands Pkwy<br>(SR347)<br>Eastbound |      |       |      |            | Lanier Islands Pkwy<br>(SR347)<br>Westbound |      |       |      |            |            |
|------------------------------------------------------------|----------------------------------|------|-------|------|------------|----------------------------------|------|-------|------|------------|---------------------------------------------|------|-------|------|------------|---------------------------------------------|------|-------|------|------------|------------|
| Start Time                                                 | Left                             | Thru | Right | Peds | App. Total | Left                             | Thru | Right | Peds | App. Total | Left                                        | Thru | Right | Peds | App. Total | Left                                        | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 |                                  |      |       |      |            |                                  |      |       |      |            |                                             |      |       |      |            |                                             |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 04:45 PM       |                                  |      |       |      |            |                                  |      |       |      |            |                                             |      |       |      |            |                                             |      |       |      |            |            |
| 04:45 PM                                                   | 27                               | 75   | 61    | 0    | 163        | 44                               | 35   | 26    | 0    | 105        | 33                                          | 179  | 16    | 0    | 228        | 69                                          | 126  | 49    | 0    | 244        | 740        |
| 05:00 PM                                                   | 23                               | 82   | 101   | 0    | 206        | 40                               | 41   | 26    | 0    | 107        | 53                                          | 257  | 18    | 0    | 328        | 58                                          | 167  | 66    | 0    | 291        | 932        |
| 05:15 PM                                                   | 29                               | 106  | 95    | 0    | 230        | 42                               | 46   | 24    | 0    | 112        | 51                                          | 192  | 21    | 0    | 264        | 79                                          | 144  | 55    | 0    | 278        | 884        |
| 05:30 PM                                                   | 29                               | 76   | 82    | 0    | 187        | 39                               | 30   | 22    | 0    | 91         | 47                                          | 201  | 16    | 0    | 264        | 80                                          | 145  | 55    | 0    | 280        | 822        |
| Total Volume                                               | 108                              | 339  | 339   | 0    | 786        | 165                              | 152  | 98    | 0    | 415        | 184                                         | 829  | 71    | 0    | 1084       | 286                                         | 582  | 225   | 0    | 1093       | 3378       |
| % App. Total                                               | 13.7                             | 43.1 | 43.1  | 0    |            | 39.8                             | 36.6 | 23.6  | 0    |            | 17                                          | 76.5 | 6.5   | 0    |            | 26.2                                        | 53.2 | 20.6  | 0    |            |            |
| PHF                                                        | .931                             | .800 | .839  | .000 | .854       | .938                             | .826 | .942  | .000 | .926       | .868                                        | .806 | .845  | .000 | .826       | .894                                        | .871 | .852  | .000 | .939       | .906       |
| Cars and Buses                                             | 107                              | 331  | 335   | 0    | 773        | 160                              | 145  | 97    | 0    | 402        | 184                                         | 829  | 68    | 0    | 1081       | 283                                         | 582  | 218   | 0    | 1083       | 3339       |
| % Cars and Buses                                           | 99.1                             | 97.6 | 98.8  | 0    | 98.3       | 97.0                             | 95.4 | 99.0  | 0    | 96.9       | 100                                         | 100  | 95.8  | 0    | 99.7       | 99.0                                        | 100  | 96.9  | 0    | 99.1       | 98.8       |
| Trucks                                                     | 1                                | 8    | 4     | 0    | 13         | 5                                | 7    | 1     | 0    | 13         | 0                                           | 0    | 3     | 0    | 3          | 3                                           | 0    | 7     | 0    | 10         | 39         |
| % Trucks                                                   | 0.9                              | 2.4  | 1.2   | 0    | 1.7        | 3.0                              | 4.6  | 1.0   | 0    | 3.1        | 0                                           | 0    | 4.2   | 0    | 0.3        | 1.0                                         | 0    | 3.1   | 0    | 0.9        | 1.2        |



# Reliable Traffic Data Services, LLC

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TMC Data  
Buford Hwy (SR13) @ Roy Carlson Blvd  
Buford, GA  
7-9am I 4-6pm

File Name : 39230004  
Site Code : 39230004  
Start Date : 10/19/2016  
Page No : 1

## Groups Printed- Cars and Buses - Trucks

|                  | Buford Hwy (SR13)<br>Northbound |      |       |      |            | Buford Hwy (SR13)<br>Southbound |      |       |      |            | Eastbound |      |       |      |            | Roy Carlson Blvd<br>Westbound |      |       |      |            |            |
|------------------|---------------------------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|-----------|------|-------|------|------------|-------------------------------|------|-------|------|------------|------------|
| Start Time       | Left                            | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Left      | Thru | Right | Peds | App. Total | Left                          | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM         | 0                               | 80   | 12    | 0    | 92         | 6                               | 174  | 0     | 0    | 180        | 0         | 0    | 0     | 0    | 0          | 1                             | 0    | 3     | 0    | 4          | 276        |
| 07:15 AM         | 0                               | 87   | 7     | 0    | 94         | 5                               | 204  | 0     | 0    | 209        | 0         | 0    | 0     | 0    | 0          | 1                             | 0    | 1     | 0    | 2          | 305        |
| 07:30 AM         | 0                               | 107  | 13    | 0    | 120        | 7                               | 171  | 0     | 0    | 178        | 0         | 0    | 0     | 0    | 0          | 1                             | 0    | 0     | 0    | 1          | 299        |
| 07:45 AM         | 0                               | 105  | 17    | 0    | 122        | 17                              | 154  | 0     | 0    | 171        | 0         | 0    | 0     | 0    | 0          | 4                             | 0    | 1     | 0    | 5          | 298        |
| Total            | 0                               | 379  | 49    | 0    | 428        | 35                              | 703  | 0     | 0    | 738        | 0         | 0    | 0     | 0    | 0          | 7                             | 0    | 5     | 0    | 12         | 1178       |
| 08:00 AM         | 0                               | 86   | 13    | 0    | 99         | 10                              | 157  | 0     | 0    | 167        | 0         | 0    | 0     | 0    | 0          | 1                             | 0    | 2     | 0    | 3          | 269        |
| 08:15 AM         | 0                               | 92   | 9     | 0    | 101        | 11                              | 135  | 0     | 0    | 146        | 0         | 0    | 0     | 0    | 0          | 0                             | 0    | 5     | 0    | 5          | 252        |
| 08:30 AM         | 0                               | 56   | 20    | 0    | 76         | 5                               | 127  | 0     | 0    | 132        | 0         | 0    | 0     | 0    | 0          | 5                             | 0    | 7     | 0    | 12         | 220        |
| 08:45 AM         | 0                               | 84   | 12    | 0    | 96         | 5                               | 138  | 0     | 0    | 143        | 0         | 0    | 0     | 0    | 0          | 5                             | 0    | 2     | 0    | 7          | 246        |
| Total            | 0                               | 318  | 54    | 0    | 372        | 31                              | 557  | 0     | 0    | 588        | 0         | 0    | 0     | 0    | 0          | 11                            | 0    | 16    | 0    | 27         | 987        |
| *** BREAK ***    |                                 |      |       |      |            |                                 |      |       |      |            |           |      |       |      |            |                               |      |       |      |            |            |
| 04:00 PM         | 0                               | 173  | 4     | 0    | 177        | 6                               | 125  | 0     | 0    | 131        | 0         | 0    | 0     | 0    | 0          | 9                             | 0    | 12    | 0    | 21         | 329        |
| 04:15 PM         | 0                               | 162  | 2     | 0    | 164        | 5                               | 105  | 0     | 0    | 110        | 0         | 0    | 0     | 0    | 0          | 8                             | 0    | 3     | 0    | 11         | 285        |
| 04:30 PM         | 0                               | 166  | 4     | 0    | 170        | 2                               | 111  | 0     | 0    | 113        | 0         | 0    | 0     | 0    | 0          | 23                            | 0    | 34    | 0    | 57         | 340        |
| 04:45 PM         | 0                               | 164  | 6     | 0    | 170        | 0                               | 99   | 0     | 0    | 99         | 0         | 0    | 0     | 0    | 0          | 15                            | 0    | 7     | 0    | 22         | 291        |
| Total            | 0                               | 665  | 16    | 0    | 681        | 13                              | 440  | 0     | 0    | 453        | 0         | 0    | 0     | 0    | 0          | 55                            | 0    | 56    | 0    | 111        | 1245       |
| 05:00 PM         | 0                               | 206  | 3     | 0    | 209        | 1                               | 105  | 0     | 0    | 106        | 0         | 0    | 0     | 0    | 0          | 19                            | 0    | 21    | 0    | 40         | 355        |
| 05:15 PM         | 0                               | 214  | 5     | 0    | 219        | 1                               | 144  | 0     | 0    | 145        | 0         | 0    | 0     | 0    | 0          | 18                            | 0    | 15    | 0    | 33         | 397        |
| 05:30 PM         | 0                               | 150  | 6     | 0    | 156        | 2                               | 111  | 0     | 0    | 113        | 0         | 0    | 0     | 0    | 0          | 5                             | 0    | 4     | 0    | 9          | 278        |
| 05:45 PM         | 0                               | 128  | 2     | 0    | 130        | 1                               | 118  | 0     | 0    | 119        | 0         | 0    | 0     | 0    | 0          | 7                             | 0    | 9     | 0    | 16         | 265        |
| Total            | 0                               | 698  | 16    | 0    | 714        | 5                               | 478  | 0     | 0    | 483        | 0         | 0    | 0     | 0    | 0          | 49                            | 0    | 49    | 0    | 98         | 1295       |
| Grand Total      | 0                               | 2060 | 135   | 0    | 2195       | 84                              | 2178 | 0     | 0    | 2262       | 0         | 0    | 0     | 0    | 0          | 122                           | 0    | 126   | 0    | 248        | 4705       |
| Apprch %         | 0                               | 93.8 | 6.2   | 0    |            | 3.7                             | 96.3 | 0     | 0    |            | 0         | 0    | 0     | 0    |            | 49.2                          | 0    | 50.8  | 0    |            |            |
| Total %          | 0                               | 43.8 | 2.9   | 0    | 46.7       | 1.8                             | 46.3 | 0     | 0    | 48.1       | 0         | 0    | 0     | 0    | 0          | 2.6                           | 0    | 2.7   | 0    | 5.3        |            |
| Cars and Buses   | 0                               | 2028 | 130   | 0    | 2158       | 80                              | 2127 | 0     | 0    | 2207       | 0         | 0    | 0     | 0    | 0          | 114                           | 0    | 121   | 0    | 235        | 4600       |
| % Cars and Buses | 0                               | 98.4 | 96.3  | 0    | 98.3       | 95.2                            | 97.7 | 0     | 0    | 97.6       | 0         | 0    | 0     | 0    | 0          | 93.4                          | 0    | 96    | 0    | 94.8       | 97.8       |
| Trucks           | 0                               | 32   | 5     | 0    | 37         | 4                               | 51   | 0     | 0    | 55         | 0         | 0    | 0     | 0    | 0          | 8                             | 0    | 5     | 0    | 13         | 105        |
| % Trucks         | 0                               | 1.6  | 3.7   | 0    | 1.7        | 4.8                             | 2.3  | 0     | 0    | 2.4        | 0         | 0    | 0     | 0    | 0          | 6.6                           | 0    | 4     | 0    | 5.2        | 2.2        |

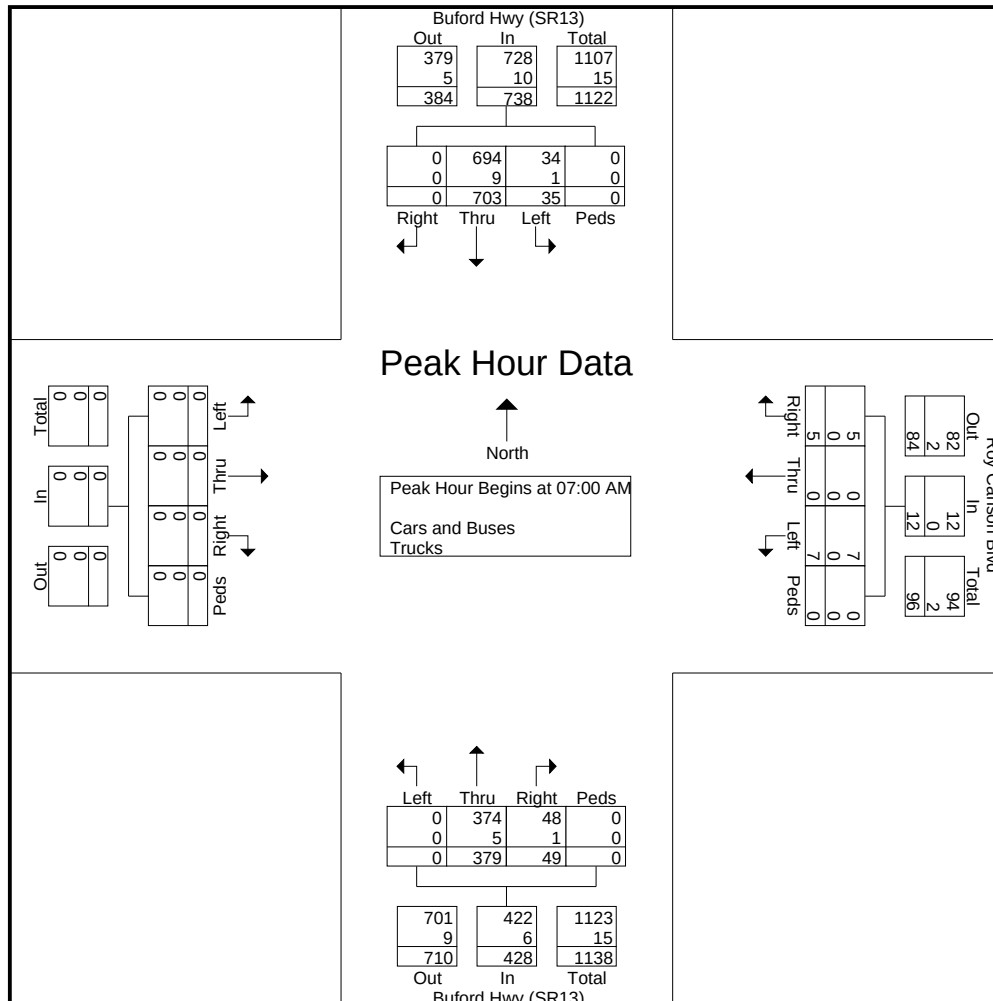
# Reliable Traffic Data Services, LLC

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TMC Data  
Buford Hwy (SR13) @ Roy Carlson Blvd  
Buford, GA  
7-9am I 4-6pm

File Name : 39230004  
Site Code : 39230004  
Start Date : 10/19/2016  
Page No : 2

|                                                            | Buford Hwy (SR13)<br>Northbound |      |       |      |            | Buford Hwy (SR13)<br>Southbound |      |       |      |            | Eastbound |      |       |      |            | Roy Carlson Blvd<br>Westbound |      |       |      |            |            |
|------------------------------------------------------------|---------------------------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|-----------|------|-------|------|------------|-------------------------------|------|-------|------|------------|------------|
| Start Time                                                 | Left                            | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Left      | Thru | Right | Peds | App. Total | Left                          | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 |                                 |      |       |      |            |                                 |      |       |      |            |           |      |       |      |            |                               |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 07:00 AM       |                                 |      |       |      |            |                                 |      |       |      |            |           |      |       |      |            |                               |      |       |      |            |            |
| 07:00 AM                                                   | 0                               | 80   | 12    | 0    | 92         | 6                               | 174  | 0     | 0    | 180        | 0         | 0    | 0     | 0    | 0          | 1                             | 0    | 3     | 0    | 4          | 276        |
| 07:15 AM                                                   | 0                               | 87   | 7     | 0    | 94         | 5                               | 204  | 0     | 0    | 209        | 0         | 0    | 0     | 0    | 0          | 1                             | 0    | 1     | 0    | 2          | 305        |
| 07:30 AM                                                   | 0                               | 107  | 13    | 0    | 120        | 7                               | 171  | 0     | 0    | 178        | 0         | 0    | 0     | 0    | 0          | 1                             | 0    | 0     | 0    | 1          | 299        |
| 07:45 AM                                                   | 0                               | 105  | 17    | 0    | 122        | 17                              | 154  | 0     | 0    | 171        | 0         | 0    | 0     | 0    | 0          | 4                             | 0    | 1     | 0    | 5          | 298        |
| Total Volume                                               | 0                               | 379  | 49    | 0    | 428        | 35                              | 703  | 0     | 0    | 738        | 0         | 0    | 0     | 0    | 0          | 7                             | 0    | 5     | 0    | 12         | 1178       |
| % App. Total                                               | 0                               | 88.6 | 11.4  | 0    |            | 4.7                             | 95.3 | 0     | 0    |            | 0         | 0    | 0     | 0    |            | 58.3                          | 0    | 41.7  | 0    |            |            |
| PHF                                                        | .000                            | .886 | .721  | .000 | .877       | .515                            | .862 | .000  | .000 | .883       | .000      | .000 | .000  | .000 | .000       | .438                          | .000 | .417  | .000 | .600       | .966       |
| Cars and Buses                                             | 0                               | 374  | 48    | 0    | 422        | 34                              | 694  | 0     | 0    | 728        | 0         | 0    | 0     | 0    | 0          | 7                             | 0    | 5     | 0    | 12         | 1162       |
| % Cars and Buses                                           | 0                               | 98.7 | 98.0  | 0    | 98.6       | 97.1                            | 98.7 | 0     | 0    | 98.6       | 0         | 0    | 0     | 0    | 0          | 100                           | 0    | 100   | 0    | 100        | 98.6       |
| Trucks                                                     | 0                               | 5    | 1     | 0    | 6          | 1                               | 9    | 0     | 0    | 10         | 0         | 0    | 0     | 0    | 0          | 0                             | 0    | 0     | 0    | 0          | 16         |
| % Trucks                                                   | 0                               | 1.3  | 2.0   | 0    | 1.4        | 2.9                             | 1.3  | 0     | 0    | 1.4        | 0         | 0    | 0     | 0    | 0          | 0                             | 0    | 0     | 0    | 0          | 1.4        |



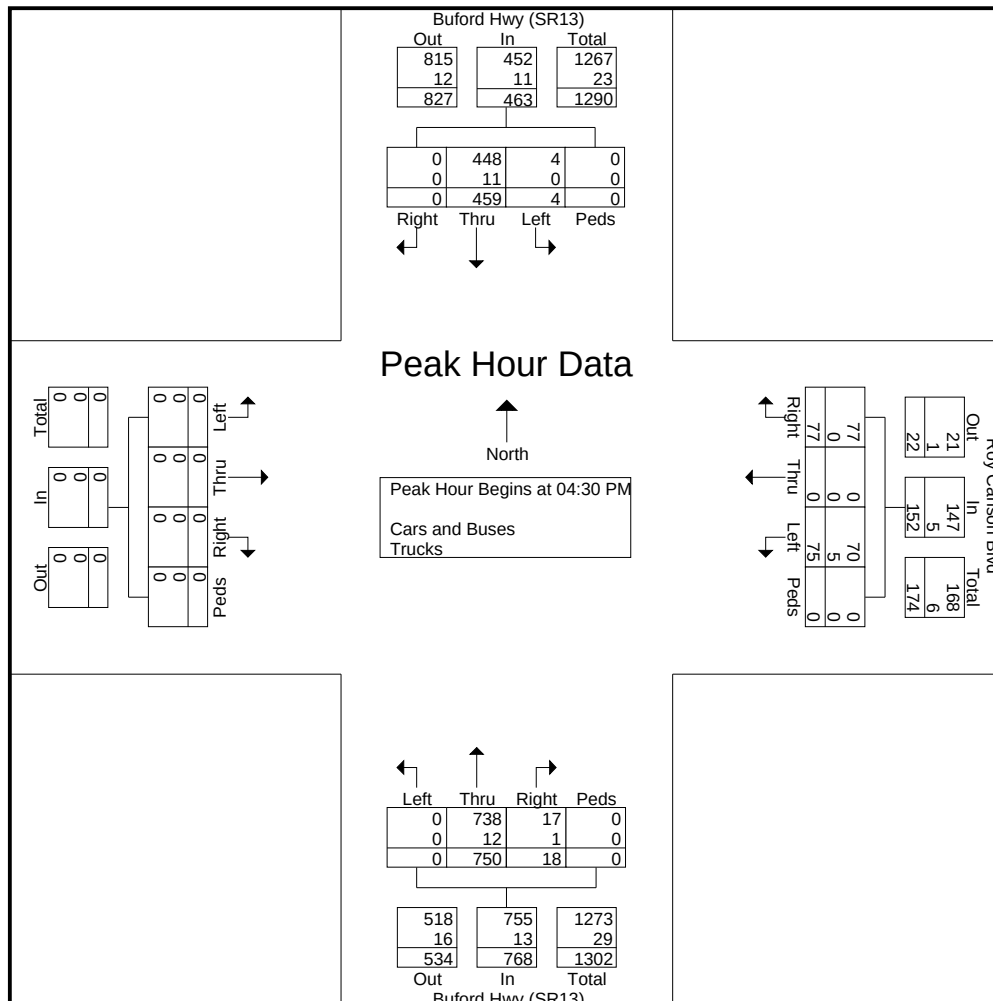
# Reliable Traffic Data Services, LLC

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TMC Data  
Buford Hwy (SR13) @ Roy Carlson Blvd  
Buford, GA  
7-9am I 4-6pm

File Name : 39230004  
Site Code : 39230004  
Start Date : 10/19/2016  
Page No : 3

|                                                            | Buford Hwy (SR13)<br>Northbound |      |       |      |            | Buford Hwy (SR13)<br>Southbound |      |       |      |            | Eastbound |      |       |      |            | Roy Carlson Blvd<br>Westbound |      |       |      |            |            |
|------------------------------------------------------------|---------------------------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|-----------|------|-------|------|------------|-------------------------------|------|-------|------|------------|------------|
| Start Time                                                 | Left                            | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Left      | Thru | Right | Peds | App. Total | Left                          | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 |                                 |      |       |      |            |                                 |      |       |      |            |           |      |       |      |            |                               |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 04:30 PM       |                                 |      |       |      |            |                                 |      |       |      |            |           |      |       |      |            |                               |      |       |      |            |            |
| 04:30 PM                                                   | 0                               | 166  | 4     | 0    | 170        | 2                               | 111  | 0     | 0    | 113        | 0         | 0    | 0     | 0    | 0          | 23                            | 0    | 34    | 0    | 57         | 340        |
| 04:45 PM                                                   | 0                               | 164  | 6     | 0    | 170        | 0                               | 99   | 0     | 0    | 99         | 0         | 0    | 0     | 0    | 0          | 15                            | 0    | 7     | 0    | 22         | 291        |
| 05:00 PM                                                   | 0                               | 206  | 3     | 0    | 209        | 1                               | 105  | 0     | 0    | 106        | 0         | 0    | 0     | 0    | 0          | 19                            | 0    | 21    | 0    | 40         | 355        |
| 05:15 PM                                                   | 0                               | 214  | 5     | 0    | 219        | 1                               | 144  | 0     | 0    | 145        | 0         | 0    | 0     | 0    | 0          | 18                            | 0    | 15    | 0    | 33         | 397        |
| Total Volume                                               | 0                               | 750  | 18    | 0    | 768        | 4                               | 459  | 0     | 0    | 463        | 0         | 0    | 0     | 0    | 0          | 75                            | 0    | 77    | 0    | 152        | 1383       |
| % App. Total                                               | 0                               | 97.7 | 2.3   | 0    |            | 0.9                             | 99.1 | 0     | 0    |            | 0         | 0    | 0     | 0    | 0          | 49.3                          | 0    | 50.7  | 0    |            |            |
| PHF                                                        | .000                            | .876 | .750  | .000 | .877       | .500                            | .797 | .000  | .000 | .798       | .000      | .000 | .000  | .000 | .000       | .815                          | .000 | .566  | .000 | .667       | .871       |
| Cars and Buses                                             | 0                               | 738  | 17    | 0    | 755        | 4                               | 448  | 0     | 0    | 452        | 0         | 0    | 0     | 0    | 0          | 70                            | 0    | 77    | 0    | 147        | 1354       |
| % Cars and Buses                                           | 0                               | 98.4 | 94.4  | 0    | 98.3       | 100                             | 97.6 | 0     | 0    | 97.6       | 0         | 0    | 0     | 0    | 0          | 93.3                          | 0    | 100   | 0    | 96.7       | 97.9       |
| Trucks                                                     | 0                               | 12   | 1     | 0    | 13         | 0                               | 11   | 0     | 0    | 11         | 0         | 0    | 0     | 0    | 0          | 5                             | 0    | 0     | 0    | 5          | 29         |
| % Trucks                                                   | 0                               | 1.6  | 5.6   | 0    | 1.7        | 0                               | 2.4  | 0     | 0    | 2.4        | 0         | 0    | 0     | 0    | 0          | 6.7                           | 0    | 0     | 0    | 3.3        | 2.1        |



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TMC Data  
Buford Hwy (SR13) @ Bryant Rd/Thunder Rd  
Buford, GA  
7-9am I 4-6pm

File Name : 39230005  
Site Code : 39230005  
Start Date : 10/19/2016  
Page No : 1

## Groups Printed- Cars and Buses - Trucks

|                  | Buford Hwy (SR13)<br>Northbound |      |       |      |            | Buford Hwy (SR13)<br>Southbound |      |       |      |            | Thunder Rd<br>Eastbound |      |       |      |            | Bryant Rd<br>Westbound |      |       |      |            |            |
|------------------|---------------------------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|-------------------------|------|-------|------|------------|------------------------|------|-------|------|------------|------------|
| Start Time       | Left                            | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Left                    | Thru | Right | Peds | App. Total | Left                   | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM         | 3                               | 80   | 0     | 0    | 83         | 2                               | 177  | 0     | 0    | 179        | 0                       | 1    | 6     | 0    | 7          | 0                      | 0    | 3     | 1    | 4          | 273        |
| 07:15 AM         | 9                               | 92   | 0     | 0    | 101        | 3                               | 202  | 0     | 0    | 205        | 0                       | 1    | 14    | 0    | 15         | 0                      | 0    | 3     | 0    | 3          | 324        |
| 07:30 AM         | 14                              | 109  | 2     | 0    | 125        | 4                               | 162  | 1     | 0    | 167        | 0                       | 6    | 10    | 0    | 16         | 0                      | 4    | 4     | 0    | 8          | 316        |
| 07:45 AM         | 12                              | 104  | 0     | 0    | 116        | 2                               | 159  | 0     | 0    | 161        | 0                       | 2    | 6     | 0    | 8          | 0                      | 1    | 10    | 0    | 11         | 296        |
| Total            | 38                              | 385  | 2     | 0    | 425        | 11                              | 700  | 1     | 0    | 712        | 0                       | 10   | 36    | 0    | 46         | 0                      | 5    | 20    | 1    | 26         | 1209       |
| 08:00 AM         | 6                               | 102  | 0     | 0    | 108        | 1                               | 156  | 1     | 0    | 158        | 0                       | 4    | 12    | 0    | 16         | 0                      | 3    | 4     | 0    | 7          | 289        |
| 08:15 AM         | 9                               | 97   | 0     | 0    | 106        | 2                               | 139  | 0     | 0    | 141        | 0                       | 4    | 6     | 0    | 10         | 0                      | 3    | 3     | 0    | 6          | 263        |
| 08:30 AM         | 6                               | 87   | 1     | 0    | 94         | 2                               | 128  | 1     | 0    | 131        | 2                       | 3    | 4     | 0    | 9          | 0                      | 0    | 4     | 0    | 4          | 238        |
| 08:45 AM         | 7                               | 82   | 1     | 0    | 90         | 1                               | 135  | 1     | 0    | 137        | 1                       | 4    | 11    | 0    | 16         | 0                      | 0    | 2     | 0    | 2          | 245        |
| Total            | 28                              | 368  | 2     | 0    | 398        | 6                               | 558  | 3     | 0    | 567        | 3                       | 15   | 33    | 0    | 51         | 0                      | 6    | 13    | 0    | 19         | 1035       |
| *** BREAK ***    |                                 |      |       |      |            |                                 |      |       |      |            |                         |      |       |      |            |                        |      |       |      |            |            |
| 04:00 PM         | 7                               | 172  | 0     | 0    | 179        | 4                               | 117  | 0     | 0    | 121        | 0                       | 7    | 12    | 0    | 19         | 0                      | 3    | 4     | 1    | 8          | 327        |
| 04:15 PM         | 7                               | 167  | 2     | 0    | 176        | 1                               | 112  | 1     | 0    | 114        | 1                       | 6    | 10    | 0    | 17         | 0                      | 2    | 4     | 0    | 6          | 313        |
| 04:30 PM         | 9                               | 164  | 1     | 0    | 174        | 2                               | 115  | 0     | 0    | 117        | 1                       | 3    | 9     | 0    | 13         | 0                      | 2    | 2     | 0    | 4          | 308        |
| 04:45 PM         | 1                               | 167  | 0     | 0    | 168        | 4                               | 108  | 0     | 0    | 112        | 0                       | 4    | 12    | 0    | 16         | 0                      | 5    | 2     | 0    | 7          | 303        |
| Total            | 24                              | 670  | 3     | 0    | 697        | 11                              | 452  | 1     | 0    | 464        | 2                       | 20   | 43    | 0    | 65         | 0                      | 12   | 12    | 1    | 25         | 1251       |
| 05:00 PM         | 9                               | 203  | 1     | 0    | 213        | 2                               | 105  | 0     | 0    | 107        | 0                       | 4    | 18    | 0    | 22         | 0                      | 3    | 1     | 0    | 4          | 346        |
| 05:15 PM         | 2                               | 208  | 1     | 0    | 211        | 4                               | 143  | 0     | 0    | 147        | 0                       | 2    | 8     | 0    | 10         | 0                      | 2    | 3     | 0    | 5          | 373        |
| 05:30 PM         | 6                               | 167  | 0     | 0    | 173        | 1                               | 124  | 0     | 0    | 125        | 0                       | 2    | 13    | 0    | 15         | 1                      | 4    | 4     | 0    | 9          | 322        |
| 05:45 PM         | 3                               | 129  | 0     | 0    | 132        | 5                               | 116  | 0     | 0    | 121        | 0                       | 6    | 2     | 0    | 8          | 0                      | 1    | 1     | 0    | 2          | 263        |
| Total            | 20                              | 707  | 2     | 0    | 729        | 12                              | 488  | 0     | 0    | 500        | 0                       | 14   | 41    | 0    | 55         | 1                      | 10   | 9     | 0    | 20         | 1304       |
| Grand Total      | 110                             | 2130 | 9     | 0    | 2249       | 40                              | 2198 | 5     | 0    | 2243       | 5                       | 59   | 153   | 0    | 217        | 1                      | 33   | 54    | 2    | 90         | 4799       |
| Apprch %         | 4.9                             | 94.7 | 0.4   | 0    |            | 1.8                             | 98   | 0.2   | 0    |            | 2.3                     | 27.2 | 70.5  | 0    |            | 1.1                    | 36.7 | 60    | 2.2  |            |            |
| Total %          | 2.3                             | 44.4 | 0.2   | 0    | 46.9       | 0.8                             | 45.8 | 0.1   | 0    | 46.7       | 0.1                     | 1.2  | 3.2   | 0    | 4.5        | 0                      | 0.7  | 1.1   | 0    | 1.9        |            |
| Cars and Buses   | 110                             | 2130 | 9     | 0    | 2249       | 40                              | 2198 | 5     | 0    | 2243       | 5                       | 3    | 153   | 0    | 161        | 1                      | 1    | 54    | 2    | 58         | 4711       |
| % Cars and Buses | 100                             | 100  | 100   | 0    | 100        | 100                             | 100  | 100   | 0    | 100        | 100                     | 5.1  | 100   | 0    | 74.2       | 100                    | 3    | 100   | 100  | 64.4       | 98.2       |
| Trucks           | 0                               | 0    | 0     | 0    | 0          | 0                               | 0    | 0     | 0    | 0          | 0                       | 56   | 0     | 0    | 56         | 0                      | 32   | 0     | 0    | 32         | 88         |
| % Trucks         | 0                               | 0    | 0     | 0    | 0          | 0                               | 0    | 0     | 0    | 0          | 0                       | 94.9 | 0     | 0    | 25.8       | 0                      | 97   | 0     | 0    | 35.6       | 1.8        |

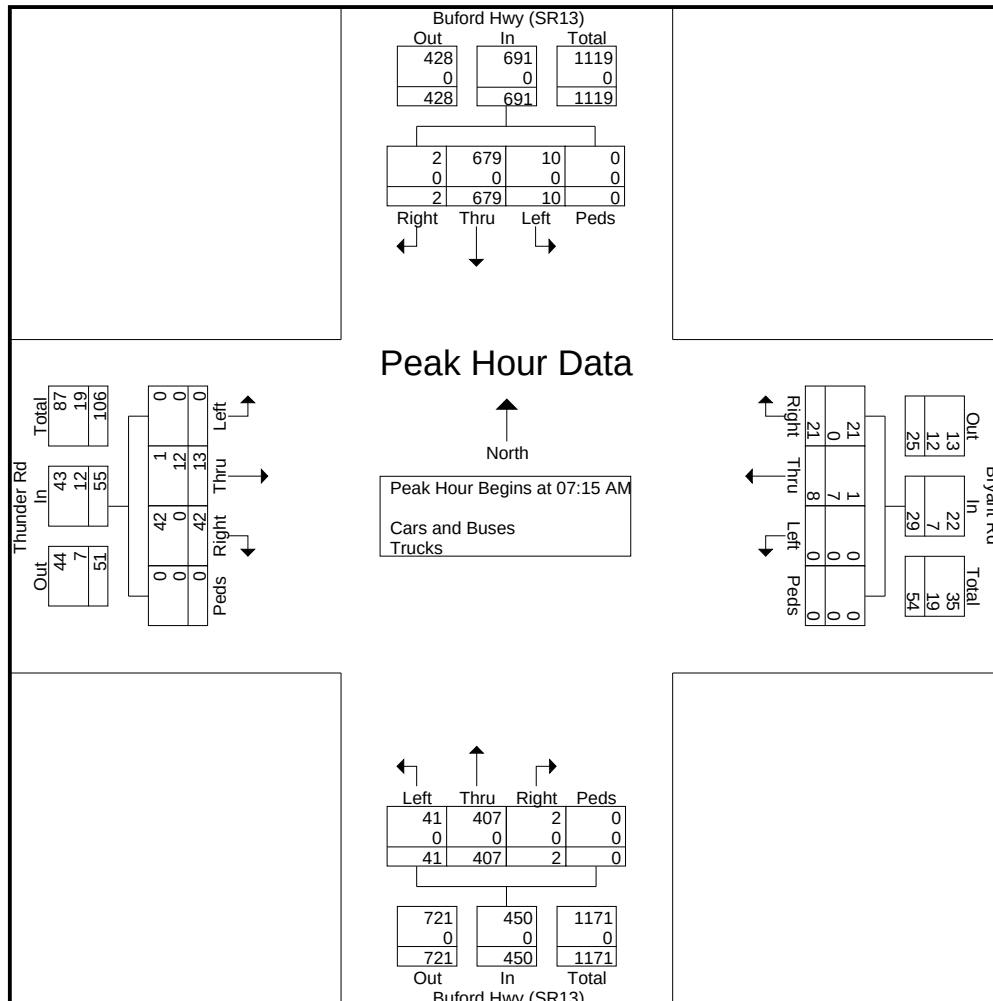
# Reliable Traffic Data Services, LLC

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TMC Data  
Buford Hwy (SR13) @ Bryant Rd/Thunder Rd  
Buford, GA  
7-9am | 4-6pm

File Name : 39230005  
Site Code : 39230005  
Start Date : 10/19/2016  
Page No : 2

|                                                            | Buford Hwy (SR13)<br>Northbound |      |       |      |            | Buford Hwy (SR13)<br>Southbound |      |       |      |            | Thunder Rd<br>Eastbound |      |       |      |            | Bryant Rd<br>Westbound |      |       |      |            |            |
|------------------------------------------------------------|---------------------------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|-------------------------|------|-------|------|------------|------------------------|------|-------|------|------------|------------|
| Start Time                                                 | Left                            | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Left                    | Thru | Right | Peds | App. Total | Left                   | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 |                                 |      |       |      |            |                                 |      |       |      |            |                         |      |       |      |            |                        |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 07:15 AM       |                                 |      |       |      |            |                                 |      |       |      |            |                         |      |       |      |            |                        |      |       |      |            |            |
| 07:15 AM                                                   | 9                               | 92   | 0     | 0    | 101        | 3                               | 202  | 0     | 0    | 205        | 0                       | 1    | 14    | 0    | 15         | 0                      | 0    | 3     | 0    | 3          | 324        |
| 07:30 AM                                                   | 14                              | 109  | 2     | 0    | 125        | 4                               | 162  | 1     | 0    | 167        | 0                       | 6    | 10    | 0    | 16         | 0                      | 4    | 4     | 0    | 8          | 316        |
| 07:45 AM                                                   | 12                              | 104  | 0     | 0    | 116        | 2                               | 159  | 0     | 0    | 161        | 0                       | 2    | 6     | 0    | 8          | 0                      | 1    | 10    | 0    | 11         | 296        |
| 08:00 AM                                                   | 6                               | 102  | 0     | 0    | 108        | 1                               | 156  | 1     | 0    | 158        | 0                       | 4    | 12    | 0    | 16         | 0                      | 3    | 4     | 0    | 7          | 289        |
| Total Volume                                               | 41                              | 407  | 2     | 0    | 450        | 10                              | 679  | 2     | 0    | 691        | 0                       | 13   | 42    | 0    | 55         | 0                      | 8    | 21    | 0    | 29         | 1225       |
| % App. Total                                               | 9.1                             | 90.4 | 0.4   | 0    |            | 1.4                             | 98.3 | 0.3   | 0    |            | 0                       | 23.6 | 76.4  | 0    |            | 0                      | 27.6 | 72.4  | 0    |            |            |
| PHF                                                        | .732                            | .933 | .250  | .000 | .900       | .625                            | .840 | .500  | .000 | .843       | .000                    | .542 | .750  | .000 | .859       | .000                   | .500 | .525  | .000 | .659       | .945       |
| Cars and Buses                                             | 41                              | 407  | 2     | 0    | 450        | 10                              | 679  | 2     | 0    | 691        | 0                       | 1    | 42    | 0    | 43         | 0                      | 1    | 21    | 0    | 22         | 1206       |
| % Cars and Buses                                           | 100                             | 100  | 100   | 0    | 100        | 100                             | 100  | 100   | 0    | 100        | 0                       | 7.7  | 100   | 0    | 78.2       | 0                      | 12.5 | 100   | 0    | 75.9       | 98.4       |
| Trucks                                                     | 0                               | 0    | 0     | 0    | 0          | 0                               | 0    | 0     | 0    | 0          | 0                       | 12   | 0     | 0    | 12         | 0                      | 7    | 0     | 0    | 7          | 19         |
| % Trucks                                                   | 0                               | 0    | 0     | 0    | 0          | 0                               | 0    | 0     | 0    | 0          | 0                       | 92.3 | 0     | 0    | 21.8       | 0                      | 87.5 | 0     | 0    | 24.1       | 1.6        |



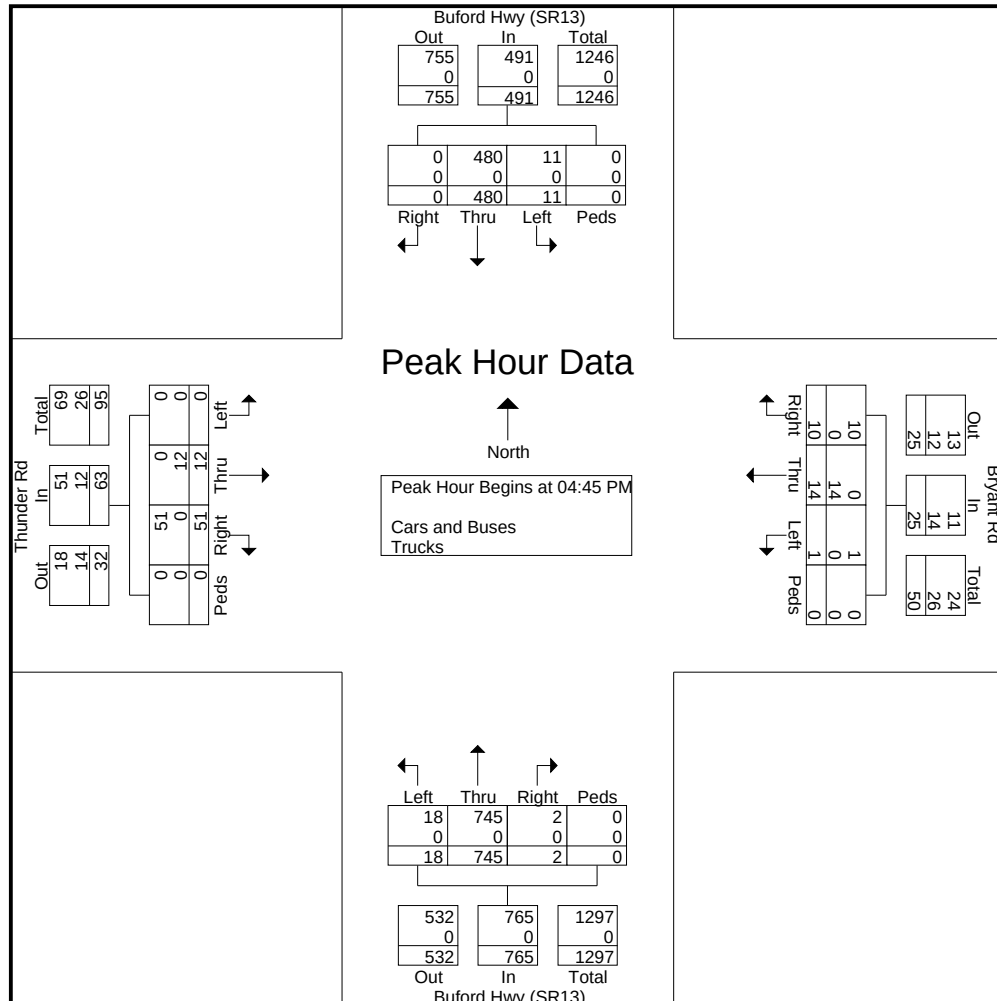
# Reliable Traffic Data Services, LLC

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TMC Data  
Buford Hwy (SR13) @ Bryant Rd/Thunder Rd  
Buford, GA  
7-9am I 4-6pm

File Name : 39230005  
Site Code : 39230005  
Start Date : 10/19/2016  
Page No : 3

|                                                            | Buford Hwy (SR13)<br>Northbound |      |       |      |            | Buford Hwy (SR13)<br>Southbound |      |       |      |            | Thunder Rd<br>Eastbound |      |       |      |            | Bryant Rd<br>Westbound |      |       |      |            |            |
|------------------------------------------------------------|---------------------------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|-------------------------|------|-------|------|------------|------------------------|------|-------|------|------------|------------|
| Start Time                                                 | Left                            | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Left                    | Thru | Right | Peds | App. Total | Left                   | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 |                                 |      |       |      |            |                                 |      |       |      |            |                         |      |       |      |            |                        |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 04:45 PM       |                                 |      |       |      |            |                                 |      |       |      |            |                         |      |       |      |            |                        |      |       |      |            |            |
| 04:45 PM                                                   | 1                               | 167  | 0     | 0    | 168        | 4                               | 108  | 0     | 0    | 112        | 0                       | 4    | 12    | 0    | 16         | 0                      | 5    | 2     | 0    | 7          | 303        |
| 05:00 PM                                                   | 9                               | 203  | 1     | 0    | 213        | 2                               | 105  | 0     | 0    | 107        | 0                       | 4    | 18    | 0    | 22         | 0                      | 3    | 1     | 0    | 4          | 346        |
| 05:15 PM                                                   | 2                               | 208  | 1     | 0    | 211        | 4                               | 143  | 0     | 0    | 147        | 0                       | 2    | 8     | 0    | 10         | 0                      | 2    | 3     | 0    | 5          | 373        |
| 05:30 PM                                                   | 6                               | 167  | 0     | 0    | 173        | 1                               | 124  | 0     | 0    | 125        | 0                       | 2    | 13    | 0    | 15         | 1                      | 4    | 4     | 0    | 9          | 322        |
| Total Volume                                               | 18                              | 745  | 2     | 0    | 765        | 11                              | 480  | 0     | 0    | 491        | 0                       | 12   | 51    | 0    | 63         | 1                      | 14   | 10    | 0    | 25         | 1344       |
| % App. Total                                               | 2.4                             | 97.4 | 0.3   | 0    |            | 2.2                             | 97.8 | 0     | 0    |            | 0                       | 19   | 81    | 0    |            | 4                      | 56   | 40    | 0    |            |            |
| PHF                                                        | .500                            | .895 | .500  | .000 | .898       | .688                            | .839 | .000  | .000 | .835       | .000                    | .750 | .708  | .000 | .716       | .250                   | .700 | .625  | .000 | .694       | .901       |
| Cars and Buses                                             | 18                              | 745  | 2     | 0    | 765        | 11                              | 480  | 0     | 0    | 491        | 0                       | 0    | 51    | 0    | 51         | 1                      | 0    | 10    | 0    | 11         | 1318       |
| % Cars and Buses                                           | 100                             | 100  | 100   | 0    | 100        | 100                             | 100  | 0     | 0    | 100        | 0                       | 0    | 100   | 0    | 81.0       | 100                    | 0    | 100   | 0    | 44.0       | 98.1       |
| Trucks                                                     | 0                               | 0    | 0     | 0    | 0          | 0                               | 0    | 0     | 0    | 0          | 0                       | 12   | 0     | 0    | 12         | 0                      | 14   | 0     | 0    | 14         | 26         |
| % Trucks                                                   | 0                               | 0    | 0     | 0    | 0          | 0                               | 0    | 0     | 0    | 0          | 0                       | 100  | 0     | 0    | 19.0       | 0                      | 100  | 0     | 0    | 56.0       | 1.9        |





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TMC Data  
Buford Hwy (SR13) @ Thompson Mill Rd  
Buford, GA  
7-9am I 4-6pm

File Name : 39230006  
Site Code : 39230006  
Start Date : 10/19/2016  
Page No : 1

## Groups Printed- Cars and Buses - Trucks

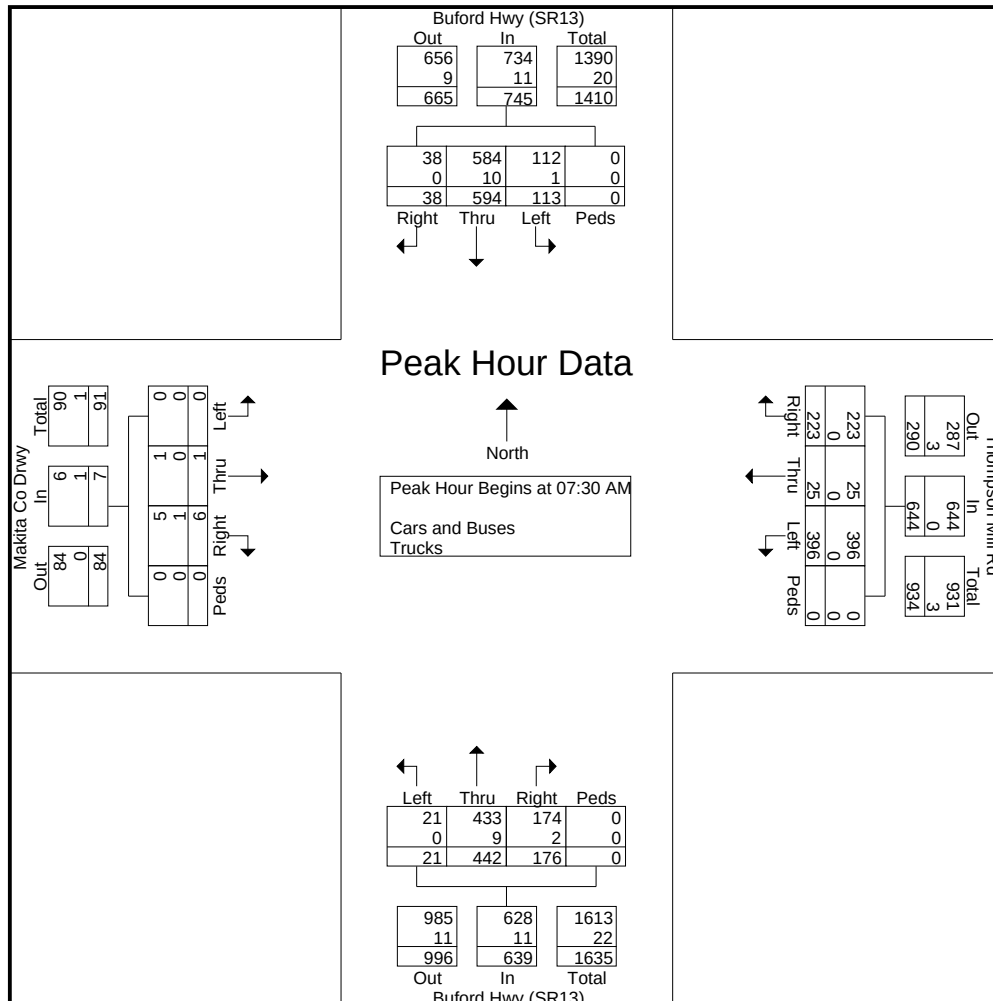
|                  | Buford Hwy (SR13)<br>Northbound |      |       |      |            | Buford Hwy (SR13)<br>Southbound |      |       |      |            | Makita Co Drwy<br>Eastbound |      |       |      |            | Thompson Mill Rd<br>Westbound |      |       |      |            |            |
|------------------|---------------------------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|-----------------------------|------|-------|------|------------|-------------------------------|------|-------|------|------------|------------|
| Start Time       | Left                            | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Left                        | Thru | Right | Peds | App. Total | Left                          | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM         | 3                               | 92   | 24    | 0    | 119        | 14                              | 112  | 3     | 0    | 129        | 0                           | 0    | 0     | 0    | 0          | 71                            | 1    | 42    | 0    | 114        | 362        |
| 07:15 AM         | 3                               | 97   | 31    | 0    | 131        | 14                              | 136  | 6     | 0    | 156        | 0                           | 0    | 1     | 0    | 1          | 85                            | 2    | 55    | 0    | 142        | 430        |
| 07:30 AM         | 2                               | 107  | 39    | 0    | 148        | 23                              | 150  | 10    | 0    | 183        | 0                           | 0    | 1     | 0    | 1          | 87                            | 6    | 56    | 0    | 149        | 481        |
| 07:45 AM         | 7                               | 110  | 45    | 0    | 162        | 38                              | 166  | 8     | 0    | 212        | 0                           | 0    | 3     | 0    | 3          | 102                           | 8    | 63    | 0    | 173        | 550        |
| Total            | 15                              | 406  | 139   | 0    | 560        | 89                              | 564  | 27    | 0    | 680        | 0                           | 0    | 5     | 0    | 5          | 345                           | 17   | 216   | 0    | 578        | 1823       |
| 08:00 AM         | 9                               | 108  | 44    | 0    | 161        | 22                              | 149  | 13    | 0    | 184        | 0                           | 0    | 1     | 0    | 1          | 107                           | 9    | 58    | 0    | 174        | 520        |
| 08:15 AM         | 3                               | 117  | 48    | 0    | 168        | 30                              | 129  | 7     | 0    | 166        | 0                           | 1    | 1     | 0    | 2          | 100                           | 2    | 46    | 0    | 148        | 484        |
| 08:30 AM         | 4                               | 105  | 43    | 0    | 152        | 19                              | 121  | 4     | 0    | 144        | 1                           | 0    | 0     | 0    | 1          | 87                            | 1    | 23    | 0    | 111        | 408        |
| 08:45 AM         | 4                               | 109  | 34    | 0    | 147        | 13                              | 136  | 4     | 0    | 153        | 0                           | 0    | 1     | 0    | 1          | 96                            | 2    | 26    | 0    | 124        | 425        |
| Total            | 20                              | 439  | 169   | 0    | 628        | 84                              | 535  | 28    | 0    | 647        | 1                           | 1    | 3     | 0    | 5          | 390                           | 14   | 153   | 0    | 557        | 1837       |
| *** BREAK ***    |                                 |      |       |      |            |                                 |      |       |      |            |                             |      |       |      |            |                               |      |       |      |            |            |
| 04:00 PM         | 3                               | 161  | 81    | 1    | 246        | 41                              | 118  | 1     | 0    | 160        | 9                           | 6    | 10    | 0    | 25         | 52                            | 0    | 31    | 0    | 83         | 514        |
| 04:15 PM         | 5                               | 148  | 85    | 0    | 238        | 41                              | 92   | 0     | 0    | 133        | 2                           | 0    | 2     | 0    | 4          | 53                            | 0    | 32    | 0    | 85         | 460        |
| 04:30 PM         | 1                               | 147  | 90    | 0    | 238        | 36                              | 114  | 0     | 0    | 150        | 8                           | 10   | 10    | 0    | 28         | 61                            | 2    | 26    | 0    | 89         | 505        |
| 04:45 PM         | 2                               | 137  | 87    | 0    | 226        | 37                              | 81   | 0     | 0    | 118        | 5                           | 1    | 2     | 0    | 8          | 69                            | 4    | 18    | 0    | 91         | 443        |
| Total            | 11                              | 593  | 343   | 1    | 948        | 155                             | 405  | 1     | 0    | 561        | 24                          | 17   | 24    | 0    | 65         | 235                           | 6    | 107   | 0    | 348        | 1922       |
| 05:00 PM         | 0                               | 198  | 92    | 0    | 290        | 46                              | 127  | 0     | 0    | 173        | 6                           | 5    | 7     | 0    | 18         | 68                            | 0    | 35    | 0    | 103        | 584        |
| 05:15 PM         | 3                               | 179  | 96    | 0    | 278        | 41                              | 144  | 0     | 0    | 185        | 3                           | 0    | 1     | 0    | 4          | 75                            | 1    | 33    | 0    | 109        | 576        |
| 05:30 PM         | 0                               | 159  | 91    | 0    | 250        | 21                              | 119  | 0     | 0    | 140        | 1                           | 5    | 4     | 0    | 10         | 50                            | 0    | 27    | 0    | 77         | 477        |
| 05:45 PM         | 0                               | 111  | 90    | 0    | 201        | 41                              | 95   | 0     | 0    | 136        | 0                           | 0    | 1     | 0    | 1          | 59                            | 2    | 15    | 0    | 76         | 414        |
| Total            | 3                               | 647  | 369   | 0    | 1019       | 149                             | 485  | 0     | 0    | 634        | 10                          | 10   | 13    | 0    | 33         | 252                           | 3    | 110   | 0    | 365        | 2051       |
| Grand Total      | 49                              | 2085 | 1020  | 1    | 3155       | 477                             | 1989 | 56    | 0    | 2522       | 35                          | 28   | 45    | 0    | 108        | 1222                          | 40   | 586   | 0    | 1848       | 7633       |
| Apprch %         | 1.6                             | 66.1 | 32.3  | 0    |            | 18.9                            | 78.9 | 2.2   | 0    |            | 32.4                        | 25.9 | 41.7  | 0    |            | 66.1                          | 2.2  | 31.7  | 0    |            |            |
| Total %          | 0.6                             | 27.3 | 13.4  | 0    | 41.3       | 6.2                             | 26.1 | 0.7   | 0    | 33         | 0.5                         | 0.4  | 0.6   | 0    | 1.4        | 16                            | 0.5  | 7.7   | 0    | 24.2       |            |
| Cars and Buses   | 48                              | 2051 | 1017  | 1    | 3117       | 476                             | 1943 | 56    | 0    | 2475       | 35                          | 28   | 43    | 0    | 106        | 1222                          | 40   | 586   | 0    | 1848       | 7546       |
| % Cars and Buses | 98                              | 98.4 | 99.7  | 100  | 98.8       | 99.8                            | 97.7 | 100   | 0    | 98.1       | 100                         | 100  | 95.6  | 0    | 98.1       | 100                           | 100  | 100   | 0    | 100        | 98.9       |
| Trucks           | 1                               | 34   | 3     | 0    | 38         | 1                               | 46   | 0     | 0    | 47         | 0                           | 0    | 2     | 0    | 2          | 0                             | 0    | 0     | 0    | 0          | 87         |
| % Trucks         | 2                               | 1.6  | 0.3   | 0    | 1.2        | 0.2                             | 2.3  | 0     | 0    | 1.9        | 0                           | 0    | 4.4   | 0    | 1.9        | 0                             | 0    | 0     | 0    | 0          | 1.1        |

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TMC Data  
Buford Hwy (SR13) @ Thompson Mill Rd  
Buford, GA  
7-9am | 4-6pm

File Name : 39230006  
Site Code : 39230006  
Start Date : 10/19/2016  
Page No : 2

|                                                            | Buford Hwy (SR13)<br>Northbound |            |           |      |            | Buford Hwy (SR13)<br>Southbound |            |           |      |            | Makita Co Drwy<br>Eastbound |          |          |      |            | Thompson Mill Rd<br>Westbound |          |           |      |            |            |
|------------------------------------------------------------|---------------------------------|------------|-----------|------|------------|---------------------------------|------------|-----------|------|------------|-----------------------------|----------|----------|------|------------|-------------------------------|----------|-----------|------|------------|------------|
| Start Time                                                 | Left                            | Thru       | Right     | Peds | App. Total | Left                            | Thru       | Right     | Peds | App. Total | Left                        | Thru     | Right    | Peds | App. Total | Left                          | Thru     | Right     | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 |                                 |            |           |      |            |                                 |            |           |      |            |                             |          |          |      |            |                               |          |           |      |            |            |
| Peak Hour for Entire Intersection Begins at 07:30 AM       |                                 |            |           |      |            |                                 |            |           |      |            |                             |          |          |      |            |                               |          |           |      |            |            |
| 07:30 AM                                                   | 2                               | 107        | 39        | 0    | 148        | 23                              | 150        | 10        | 0    | 183        | 0                           | 0        | 1        | 0    | 1          | 87                            | 6        | 56        | 0    | 149        | 481        |
| 07:45 AM                                                   | 7                               | 110        | 45        | 0    | 162        | <b>38</b>                       | <b>166</b> | 8         | 0    | <b>212</b> | 0                           | 0        | <b>3</b> | 0    | <b>3</b>   | <b>102</b>                    | 8        | <b>63</b> | 0    | 173        | <b>550</b> |
| 08:00 AM                                                   | <b>9</b>                        | 108        | 44        | 0    | 161        | 22                              | 149        | <b>13</b> | 0    | 184        | 0                           | 0        | 1        | 0    | <b>1</b>   | <b>107</b>                    | <b>9</b> | 58        | 0    | <b>174</b> | 520        |
| 08:15 AM                                                   | <b>3</b>                        | <b>117</b> | <b>48</b> | 0    | <b>168</b> | 30                              | 129        | 7         | 0    | 166        | 0                           | <b>1</b> | 1        | 0    | 2          | 100                           | 2        | 46        | 0    | 148        | 484        |
| Total Volume                                               | 21                              | 442        | 176       | 0    | 639        | 113                             | 594        | 38        | 0    | 745        | 0                           | 1        | 6        | 0    | 7          | 396                           | 25       | 223       | 0    | 644        | 2035       |
| % App. Total                                               | 3.3                             | 69.2       | 27.5      | 0    |            | 15.2                            | 79.7       | 5.1       | 0    |            | 0                           | 14.3     | 85.7     | 0    |            | 61.5                          | 3.9      | 34.6      | 0    |            |            |
| PHF                                                        | .583                            | .944       | .917      | .000 | .951       | .743                            | .895       | .731      | .000 | .879       | .000                        | .250     | .500     | .000 | .583       | .925                          | .694     | .885      | .000 | .925       | .925       |
| Cars and Buses                                             | 21                              | 433        | 174       | 0    | 628        | 112                             | 584        | 38        | 0    | 734        | 0                           | 1        | 5        | 0    | 6          | 396                           | 25       | 223       | 0    | 644        | 2012       |
| % Cars and Buses                                           | 100                             | 98.0       | 98.9      | 0    | 98.3       | 99.1                            | 98.3       | 100       | 0    | 98.5       | 0                           | 100      | 83.3     | 0    | 85.7       | 100                           | 100      | 100       | 0    | 100        | 98.9       |
| Trucks                                                     | 0                               | 9          | 2         | 0    | 11         | 1                               | 10         | 0         | 0    | 11         | 0                           | 0        | 1        | 0    | 1          | 0                             | 0        | 0         | 0    | 0          | 23         |
| % Trucks                                                   | 0                               | 2.0        | 1.1       | 0    | 1.7        | 0.9                             | 1.7        | 0         | 0    | 1.5        | 0                           | 0        | 16.7     | 0    | 14.3       | 0                             | 0        | 0         | 0    | 0          | 1.1        |



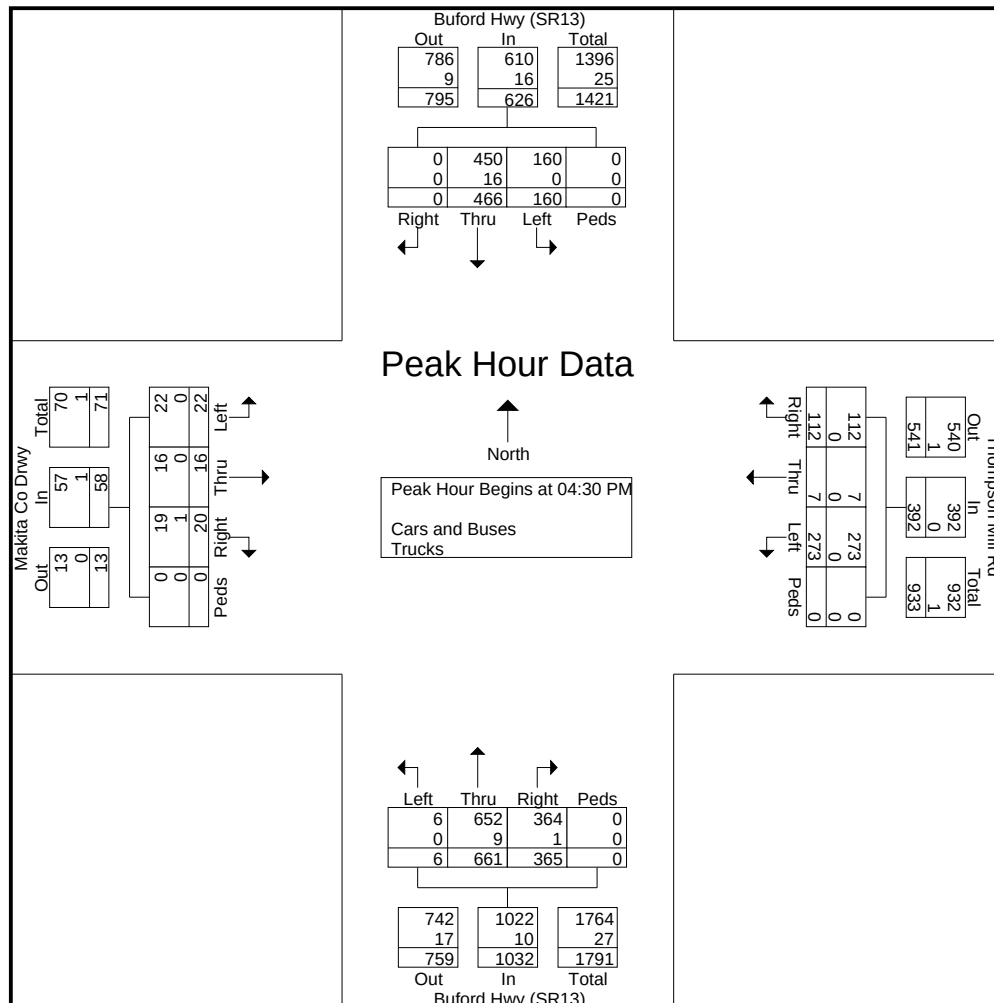
# Reliable Traffic Data Services, LLC

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TMC Data  
Buford Hwy (SR13) @ Thompson Mill Rd  
Buford, GA  
7-9am I 4-6pm

File Name : 39230006  
Site Code : 39230006  
Start Date : 10/19/2016  
Page No : 3

|                                                            | Buford Hwy (SR13)<br>Northbound |      |       |      |            | Buford Hwy (SR13)<br>Southbound |      |       |      |            | Makita Co Drwy<br>Eastbound |      |       |      |            | Thompson Mill Rd<br>Westbound |      |       |      |            |            |
|------------------------------------------------------------|---------------------------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|-----------------------------|------|-------|------|------------|-------------------------------|------|-------|------|------------|------------|
| Start Time                                                 | Left                            | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Left                        | Thru | Right | Peds | App. Total | Left                          | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 |                                 |      |       |      |            |                                 |      |       |      |            |                             |      |       |      |            |                               |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 04:30 PM       |                                 |      |       |      |            |                                 |      |       |      |            |                             |      |       |      |            |                               |      |       |      |            |            |
| 04:30 PM                                                   | 1                               | 147  | 90    | 0    | 238        | 36                              | 114  | 0     | 0    | 150        | 8                           | 10   | 10    | 0    | 28         | 61                            | 2    | 26    | 0    | 89         | 505        |
| 04:45 PM                                                   | 2                               | 137  | 87    | 0    | 226        | 37                              | 81   | 0     | 0    | 118        | 5                           | 1    | 2     | 0    | 8          | 69                            | 4    | 18    | 0    | 91         | 443        |
| 05:00 PM                                                   | 0                               | 198  | 92    | 0    | 290        | 46                              | 127  | 0     | 0    | 173        | 6                           | 5    | 7     | 0    | 18         | 68                            | 0    | 35    | 0    | 103        | 584        |
| 05:15 PM                                                   | 3                               | 179  | 96    | 0    | 278        | 41                              | 144  | 0     | 0    | 185        | 3                           | 0    | 1     | 0    | 4          | 75                            | 1    | 33    | 0    | 109        | 576        |
| Total Volume                                               | 6                               | 661  | 365   | 0    | 1032       | 160                             | 466  | 0     | 0    | 626        | 22                          | 16   | 20    | 0    | 58         | 273                           | 7    | 112   | 0    | 392        | 2108       |
| % App. Total                                               | 0.6                             | 64.1 | 35.4  | 0    |            | 25.6                            | 74.4 | 0     | 0    |            | 37.9                        | 27.6 | 34.5  | 0    |            | 69.6                          | 1.8  | 28.6  | 0    |            |            |
| PHF                                                        | .500                            | .835 | .951  | .000 | .890       | .870                            | .809 | .000  | .000 | .846       | .688                        | .400 | .500  | .000 | .518       | .910                          | .438 | .800  | .000 | .899       | .902       |
| Cars and Buses                                             | 6                               | 652  | 364   | 0    | 1022       | 160                             | 450  | 0     | 0    | 610        | 22                          | 16   | 19    | 0    | 57         | 273                           | 7    | 112   | 0    | 392        | 2081       |
| % Cars and Buses                                           | 100                             | 98.6 | 99.7  | 0    | 99.0       | 100                             | 96.6 | 0     | 0    | 97.4       | 100                         | 100  | 95.0  | 0    | 98.3       | 100                           | 100  | 100   | 0    | 100        | 98.7       |
| Trucks                                                     | 0                               | 9    | 1     | 0    | 10         | 0                               | 16   | 0     | 0    | 16         | 0                           | 0    | 1     | 0    | 1          | 0                             | 0    | 0     | 0    | 0          | 27         |
| % Trucks                                                   | 0                               | 1.4  | 0.3   | 0    | 1.0        | 0                               | 3.4  | 0     | 0    | 2.6        | 0                           | 0    | 5.0   | 0    | 1.7        | 0                             | 0    | 0     | 0    | 0          | 1.3        |



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TMC Data  
Buford Hwy (SR13) @ Hamilton Mill Rd/  
S Hill St, Buford, GA  
7-9am I 4-6pm

File Name : 39230007  
Site Code : 39230007  
Start Date : 10/19/2016  
Page No : 1

## Groups Printed- Cars and Buses - Trucks

|                  | Buford Hwy (SR13)<br>Northbound |      |       |      |            | Buford Hwy (SR13)<br>Southbound |      |       |      |            | S Hill St<br>Eastbound |      |       |      |            | Hamilton Mill Rd<br>Westbound |      |       |      |            |            |
|------------------|---------------------------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|------------------------|------|-------|------|------------|-------------------------------|------|-------|------|------------|------------|
| Start Time       | Left                            | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Left                   | Thru | Right | Peds | App. Total | Left                          | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM         | 10                              | 99   | 47    | 0    | 156        | 36                              | 129  | 8     | 0    | 173        | 6                      | 18   | 7     | 0    | 31         | 92                            | 41   | 52    | 0    | 185        | 545        |
| 07:15 AM         | 5                               | 104  | 47    | 0    | 156        | 79                              | 187  | 10    | 0    | 276        | 4                      | 25   | 6     | 0    | 35         | 92                            | 39   | 63    | 0    | 194        | 661        |
| 07:30 AM         | 9                               | 109  | 55    | 0    | 173        | 78                              | 197  | 14    | 0    | 289        | 4                      | 32   | 10    | 0    | 46         | 120                           | 73   | 53    | 0    | 246        | 754        |
| 07:45 AM         | 14                              | 118  | 84    | 0    | 216        | 65                              | 200  | 10    | 0    | 275        | 5                      | 28   | 16    | 0    | 49         | 120                           | 58   | 40    | 0    | 218        | 758        |
| Total            | 38                              | 430  | 233   | 0    | 701        | 258                             | 713  | 42    | 0    | 1013       | 19                     | 103  | 39    | 0    | 161        | 424                           | 211  | 208   | 0    | 843        | 2718       |
| 08:00 AM         | 12                              | 112  | 63    | 0    | 187        | 32                              | 173  | 13    | 0    | 218        | 6                      | 35   | 16    | 0    | 57         | 132                           | 61   | 64    | 0    | 257        | 719        |
| 08:15 AM         | 7                               | 93   | 102   | 0    | 202        | 47                              | 171  | 14    | 0    | 232        | 13                     | 63   | 23    | 0    | 99         | 112                           | 46   | 38    | 0    | 196        | 729        |
| 08:30 AM         | 11                              | 71   | 66    | 0    | 148        | 35                              | 156  | 13    | 0    | 204        | 5                      | 28   | 14    | 0    | 47         | 105                           | 37   | 12    | 0    | 154        | 553        |
| 08:45 AM         | 14                              | 98   | 77    | 0    | 189        | 26                              | 143  | 23    | 0    | 192        | 7                      | 33   | 12    | 0    | 52         | 114                           | 55   | 18    | 0    | 187        | 620        |
| Total            | 44                              | 374  | 308   | 0    | 726        | 140                             | 643  | 63    | 0    | 846        | 31                     | 159  | 65    | 0    | 255        | 463                           | 199  | 132   | 0    | 794        | 2621       |
| *** BREAK ***    |                                 |      |       |      |            |                                 |      |       |      |            |                        |      |       |      |            |                               |      |       |      |            |            |
| 04:00 PM         | 28                              | 178  | 135   | 0    | 341        | 65                              | 134  | 12    | 0    | 211        | 21                     | 51   | 10    | 0    | 82         | 72                            | 30   | 40    | 0    | 142        | 776        |
| 04:15 PM         | 26                              | 205  | 141   | 0    | 372        | 53                              | 109  | 14    | 0    | 176        | 14                     | 57   | 26    | 0    | 97         | 105                           | 49   | 47    | 0    | 201        | 846        |
| 04:30 PM         | 32                              | 199  | 164   | 0    | 395        | 67                              | 143  | 10    | 0    | 220        | 15                     | 65   | 19    | 0    | 99         | 73                            | 47   | 34    | 0    | 154        | 868        |
| 04:45 PM         | 29                              | 201  | 180   | 0    | 410        | 44                              | 107  | 12    | 0    | 163        | 19                     | 69   | 13    | 0    | 101        | 80                            | 47   | 45    | 0    | 172        | 846        |
| Total            | 115                             | 783  | 620   | 0    | 1518       | 229                             | 493  | 48    | 0    | 770        | 69                     | 242  | 68    | 0    | 379        | 330                           | 173  | 166   | 0    | 669        | 3336       |
| 05:00 PM         | 17                              | 230  | 187   | 0    | 434        | 75                              | 162  | 9     | 0    | 246        | 15                     | 66   | 16    | 0    | 97         | 107                           | 61   | 58    | 0    | 226        | 1003       |
| 05:15 PM         | 10                              | 225  | 200   | 0    | 435        | 75                              | 153  | 12    | 0    | 240        | 21                     | 61   | 9     | 0    | 91         | 88                            | 49   | 37    | 0    | 174        | 940        |
| 05:30 PM         | 23                              | 185  | 166   | 0    | 374        | 61                              | 121  | 9     | 0    | 191        | 19                     | 69   | 14    | 0    | 102        | 110                           | 54   | 40    | 0    | 204        | 871        |
| 05:45 PM         | 14                              | 172  | 157   | 0    | 343        | 43                              | 119  | 8     | 0    | 170        | 17                     | 41   | 13    | 0    | 71         | 83                            | 40   | 34    | 0    | 157        | 741        |
| Total            | 64                              | 812  | 710   | 0    | 1586       | 254                             | 555  | 38    | 0    | 847        | 72                     | 237  | 52    | 0    | 361        | 388                           | 204  | 169   | 0    | 761        | 3555       |
| Grand Total      | 261                             | 2399 | 1871  | 0    | 4531       | 881                             | 2404 | 191   | 0    | 3476       | 191                    | 741  | 224   | 0    | 1156       | 1605                          | 787  | 675   | 0    | 3067       | 12230      |
| Apprch %         | 5.8                             | 52.9 | 41.3  | 0    |            | 25.3                            | 69.2 | 5.5   | 0    |            | 16.5                   | 64.1 | 19.4  | 0    |            | 52.3                          | 25.7 | 22    | 0    |            |            |
| Total %          | 2.1                             | 19.6 | 15.3  | 0    | 37         | 7.2                             | 19.7 | 1.6   | 0    | 28.4       | 1.6                    | 6.1  | 1.8   | 0    | 9.5        | 13.1                          | 6.4  | 5.5   | 0    | 25.1       |            |
| Cars and Buses   | 259                             | 2377 | 1790  | 0    | 4426       | 851                             | 2369 | 190   | 0    | 3410       | 191                    | 741  | 223   | 0    | 1155       | 1527                          | 781  | 651   | 0    | 2959       | 11950      |
| % Cars and Buses | 99.2                            | 99.1 | 95.7  | 0    | 97.7       | 96.6                            | 98.5 | 99.5  | 0    | 98.1       | 100                    | 100  | 99.6  | 0    | 99.9       | 95.1                          | 99.2 | 96.4  | 0    | 96.5       | 97.7       |
| Trucks           | 2                               | 22   | 81    | 0    | 105        | 30                              | 35   | 1     | 0    | 66         | 0                      | 0    | 1     | 0    | 1          | 78                            | 6    | 24    | 0    | 108        | 280        |
| % Trucks         | 0.8                             | 0.9  | 4.3   | 0    | 2.3        | 3.4                             | 1.5  | 0.5   | 0    | 1.9        | 0                      | 0    | 0.4   | 0    | 0.1        | 4.9                           | 0.8  | 3.6   | 0    | 3.5        | 2.3        |

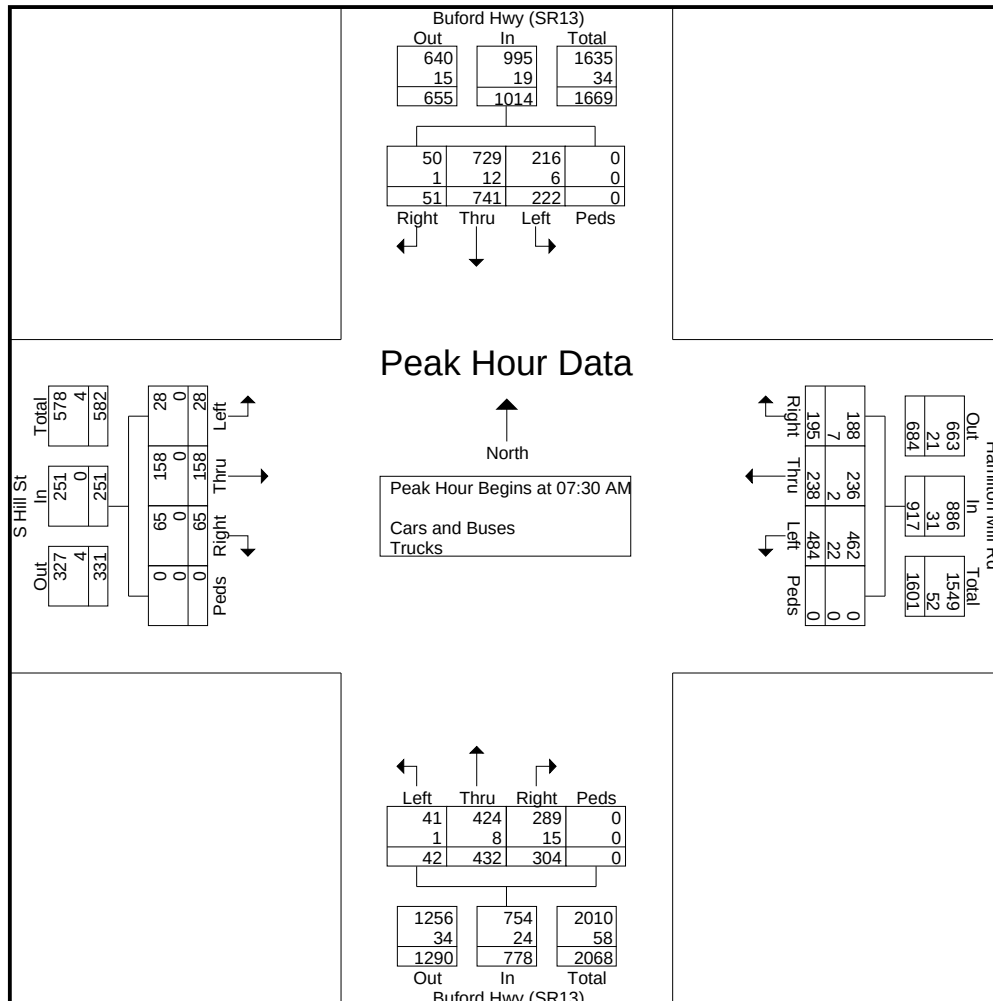
# Reliable Traffic Data Services, LLC

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TMC Data  
Buford Hwy (SR13) @ Hamilton Mill Rd/  
S Hill St, Buford, GA  
7-9am I 4-6pm

File Name : 39230007  
Site Code : 39230007  
Start Date : 10/19/2016  
Page No : 2

|                                                            | Buford Hwy (SR13)<br>Northbound |      |       |      |            | Buford Hwy (SR13)<br>Southbound |      |       |      |            | S Hill St<br>Eastbound |      |       |      |            | Hamilton Mill Rd<br>Westbound |      |       |      |            |            |
|------------------------------------------------------------|---------------------------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|------------------------|------|-------|------|------------|-------------------------------|------|-------|------|------------|------------|
| Start Time                                                 | Left                            | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Left                   | Thru | Right | Peds | App. Total | Left                          | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 |                                 |      |       |      |            |                                 |      |       |      |            |                        |      |       |      |            |                               |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 07:30 AM       |                                 |      |       |      |            |                                 |      |       |      |            |                        |      |       |      |            |                               |      |       |      |            |            |
| 07:30 AM                                                   | 9                               | 109  | 55    | 0    | 173        | 78                              | 197  | 14    | 0    | 289        | 4                      | 32   | 10    | 0    | 46         | 120                           | 73   | 53    | 0    | 246        | 754        |
| 07:45 AM                                                   | 14                              | 118  | 84    | 0    | 216        | 65                              | 200  | 10    | 0    | 275        | 5                      | 28   | 16    | 0    | 49         | 120                           | 58   | 40    | 0    | 218        | 758        |
| 08:00 AM                                                   | 12                              | 112  | 63    | 0    | 187        | 32                              | 173  | 13    | 0    | 218        | 6                      | 35   | 16    | 0    | 57         | 132                           | 61   | 64    | 0    | 257        | 719        |
| 08:15 AM                                                   | 7                               | 93   | 102   | 0    | 202        | 47                              | 171  | 14    | 0    | 232        | 13                     | 63   | 23    | 0    | 99         | 112                           | 46   | 38    | 0    | 196        | 729        |
| Total Volume                                               | 42                              | 432  | 304   | 0    | 778        | 222                             | 741  | 51    | 0    | 1014       | 28                     | 158  | 65    | 0    | 251        | 484                           | 238  | 195   | 0    | 917        | 2960       |
| % App. Total                                               | 5.4                             | 55.5 | 39.1  | 0    |            | 21.9                            | 73.1 | 5     | 0    |            | 11.2                   | 62.9 | 25.9  | 0    |            | 52.8                          | 26   | 21.3  | 0    |            |            |
| PHF                                                        | .750                            | .915 | .745  | .000 | .900       | .712                            | .926 | .911  | .000 | .877       | .538                   | .627 | .707  | .000 | .634       | .917                          | .815 | .762  | .000 | .892       | .976       |
| Cars and Buses                                             | 41                              | 424  | 289   | 0    | 754        | 216                             | 729  | 50    | 0    | 995        | 28                     | 158  | 65    | 0    | 251        | 462                           | 236  | 188   | 0    | 886        | 2886       |
| % Cars and Buses                                           | 97.6                            | 98.1 | 95.1  | 0    | 96.9       | 97.3                            | 98.4 | 98.0  | 0    | 98.1       | 100                    | 100  | 100   | 0    | 100        | 95.5                          | 99.2 | 96.4  | 0    | 96.6       | 97.5       |
| Trucks                                                     | 1                               | 8    | 15    | 0    | 24         | 6                               | 12   | 1     | 0    | 19         | 0                      | 0    | 0     | 0    | 0          | 22                            | 2    | 7     | 0    | 31         | 74         |
| % Trucks                                                   | 2.4                             | 1.9  | 4.9   | 0    | 3.1        | 2.7                             | 1.6  | 2.0   | 0    | 1.9        | 0                      | 0    | 0     | 0    | 0          | 4.5                           | 0.8  | 3.6   | 0    | 3.4        | 2.5        |



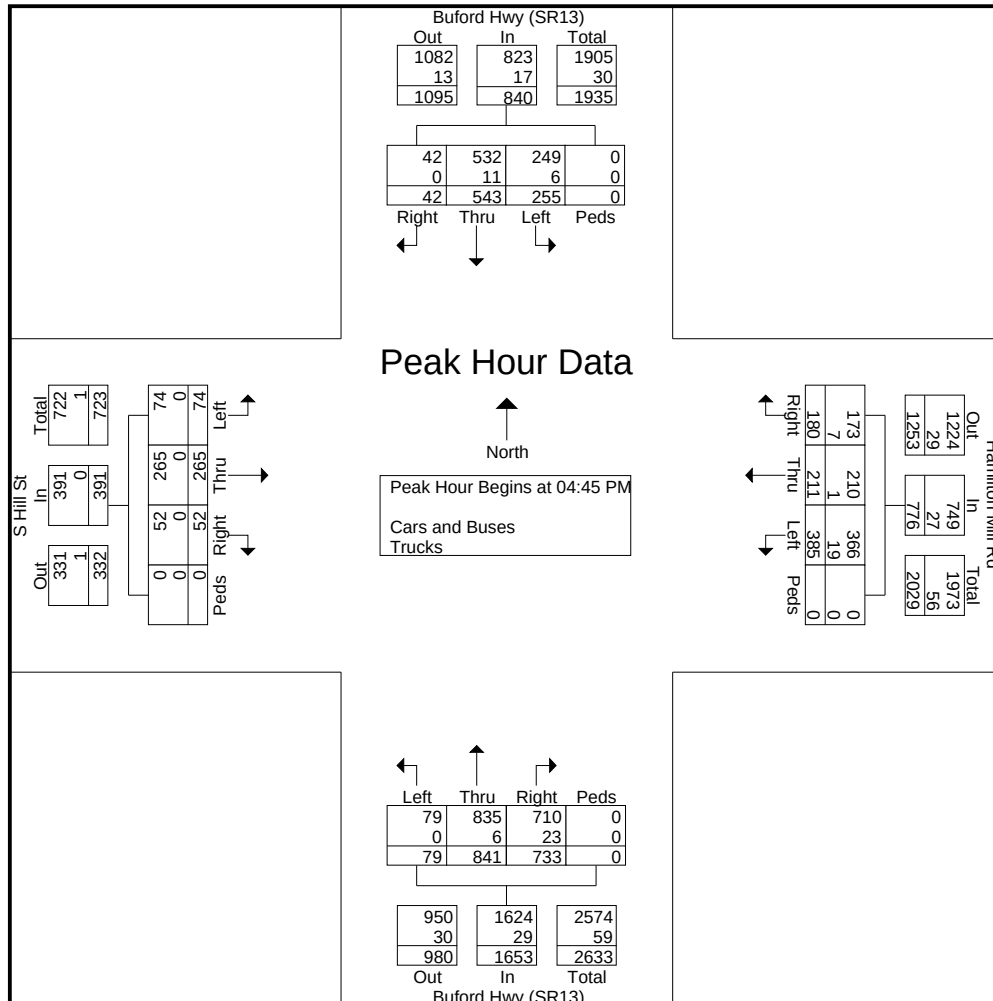
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TMC Data  
Buford Hwy (SR13) @ Hamilton Mill Rd/  
S Hill St, Buford, GA  
7-9am I 4-6pm

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|                                                            | Buford Hwy (SR13)<br>Northbound |      |       |      |            | Buford Hwy (SR13)<br>Southbound |      |       |      |            | S Hill St<br>Eastbound |      |       |      |            | Hamilton Mill Rd<br>Westbound |      |       |      |            |            |
|------------------------------------------------------------|---------------------------------|------|-------|------|------------|---------------------------------|------|-------|------|------------|------------------------|------|-------|------|------------|-------------------------------|------|-------|------|------------|------------|
| Start Time                                                 | Left                            | Thru | Right | Peds | App. Total | Left                            | Thru | Right | Peds | App. Total | Left                   | Thru | Right | Peds | App. Total | Left                          | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 |                                 |      |       |      |            |                                 |      |       |      |            |                        |      |       |      |            |                               |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 04:45 PM       |                                 |      |       |      |            |                                 |      |       |      |            |                        |      |       |      |            |                               |      |       |      |            |            |
| 04:45 PM                                                   | 29                              | 201  | 180   | 0    | 410        | 44                              | 107  | 12    | 0    | 163        | 19                     | 69   | 13    | 0    | 101        | 80                            | 47   | 45    | 0    | 172        | 846        |
| 05:00 PM                                                   | 17                              | 230  | 187   | 0    | 434        | 75                              | 162  | 9     | 0    | 246        | 15                     | 66   | 16    | 0    | 97         | 107                           | 61   | 58    | 0    | 226        | 1003       |
| 05:15 PM                                                   | 10                              | 225  | 200   | 0    | 435        | 75                              | 153  | 12    | 0    | 240        | 21                     | 61   | 9     | 0    | 91         | 88                            | 49   | 37    | 0    | 174        | 940        |
| 05:30 PM                                                   | 23                              | 185  | 166   | 0    | 374        | 61                              | 121  | 9     | 0    | 191        | 19                     | 69   | 14    | 0    | 102        | 110                           | 54   | 40    | 0    | 204        | 871        |
| Total Volume                                               | 79                              | 841  | 733   | 0    | 1653       | 255                             | 543  | 42    | 0    | 840        | 74                     | 265  | 52    | 0    | 391        | 385                           | 211  | 180   | 0    | 776        | 3660       |
| % App. Total                                               | 4.8                             | 50.9 | 44.3  | 0    |            | 30.4                            | 64.6 | 5     | 0    |            | 18.9                   | 67.8 | 13.3  | 0    |            | 49.6                          | 27.2 | 23.2  | 0    |            |            |
| PHF                                                        | .681                            | .914 | .916  | .000 | .950       | .850                            | .838 | .875  | .000 | .854       | .881                   | .960 | .813  | .000 | .958       | .875                          | .865 | .776  | .000 | .858       | .912       |
| Cars and Buses                                             | 79                              | 835  | 710   | 0    | 1624       | 249                             | 532  | 42    | 0    | 823        | 74                     | 265  | 52    | 0    | 391        | 366                           | 210  | 173   | 0    | 749        | 3587       |
| % Cars and Buses                                           | 100                             | 99.3 | 96.9  | 0    | 98.2       | 97.6                            | 98.0 | 100   | 0    | 98.0       | 100                    | 100  | 100   | 0    | 100        | 95.1                          | 99.5 | 96.1  | 0    | 96.5       | 98.0       |
| Trucks                                                     | 0                               | 6    | 23    | 0    | 29         | 6                               | 11   | 0     | 0    | 17         | 0                      | 0    | 0     | 0    | 0          | 19                            | 1    | 7     | 0    | 27         | 73         |
| % Trucks                                                   | 0                               | 0.7  | 3.1   | 0    | 1.8        | 2.4                             | 2.0  | 0     | 0    | 2.0        | 0                      | 0    | 0     | 0    | 0          | 4.9                           | 0.5  | 3.9   | 0    | 3.5        | 2.0        |



# Reliable Traffic Data Services, LLC

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info@reliabletraffic.org | www.reliabletraffic.org

TMC Data  
Thompson Mill Rd @ Bryant Rd  
Buford, GA  
7-9am I 4-6pm

File Name : 39230008  
Site Code : 39230008  
Start Date : 10/19/2016  
Page No : 1

## Groups Printed- Cars and Buses - Trucks

|                  | Private Drwy (Gated)<br>Northbound |      |       |      |            | Bryant Rd<br>Southbound |      |       |      |            | Thompson Mill Rd<br>Eastbound |      |       |      |            | Thompson Mill Rd<br>Westbound |      |       |      |            |            |
|------------------|------------------------------------|------|-------|------|------------|-------------------------|------|-------|------|------------|-------------------------------|------|-------|------|------------|-------------------------------|------|-------|------|------------|------------|
| Start Time       | Left                               | Thru | Right | Peds | App. Total | Left                    | Thru | Right | Peds | App. Total | Left                          | Thru | Right | Peds | App. Total | Left                          | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM         | 0                                  | 0    | 0     | 0    | 0          | 1                       | 0    | 1     | 0    | 2          | 1                             | 29   | 0     | 0    | 30         | 0                             | 144  | 2     | 0    | 146        | 178        |
| 07:15 AM         | 0                                  | 0    | 0     | 0    | 0          | 5                       | 0    | 1     | 0    | 6          | 1                             | 42   | 0     | 0    | 43         | 0                             | 157  | 6     | 0    | 163        | 212        |
| 07:30 AM         | 0                                  | 0    | 0     | 0    | 0          | 4                       | 0    | 2     | 0    | 6          | 0                             | 61   | 1     | 0    | 62         | 0                             | 149  | 5     | 0    | 154        | 222        |
| 07:45 AM         | 0                                  | 0    | 0     | 0    | 0          | 0                       | 0    | 1     | 0    | 1          | 3                             | 43   | 0     | 0    | 46         | 0                             | 146  | 6     | 0    | 152        | 199        |
| Total            | 0                                  | 0    | 0     | 0    | 0          | 10                      | 0    | 5     | 0    | 15         | 5                             | 175  | 1     | 0    | 181        | 0                             | 596  | 19    | 0    | 615        | 811        |
| 08:00 AM         | 0                                  | 0    | 0     | 0    | 0          | 3                       | 0    | 2     | 0    | 5          | 1                             | 56   | 0     | 0    | 57         | 0                             | 137  | 10    | 0    | 147        | 209        |
| 08:15 AM         | 0                                  | 0    | 0     | 0    | 0          | 1                       | 0    | 2     | 0    | 3          | 1                             | 52   | 0     | 0    | 53         | 0                             | 105  | 4     | 0    | 109        | 165        |
| 08:30 AM         | 0                                  | 0    | 0     | 0    | 0          | 2                       | 0    | 4     | 0    | 6          | 1                             | 48   | 0     | 0    | 49         | 0                             | 103  | 3     | 0    | 106        | 161        |
| 08:45 AM         | 0                                  | 0    | 0     | 0    | 0          | 1                       | 0    | 3     | 0    | 4          | 2                             | 41   | 1     | 0    | 44         | 0                             | 93   | 1     | 0    | 94         | 142        |
| Total            | 0                                  | 0    | 0     | 0    | 0          | 7                       | 0    | 11    | 0    | 18         | 5                             | 197  | 1     | 0    | 203        | 0                             | 438  | 18    | 0    | 456        | 677        |
| *** BREAK ***    |                                    |      |       |      |            |                         |      |       |      |            |                               |      |       |      |            |                               |      |       |      |            |            |
| 04:00 PM         | 0                                  | 0    | 0     | 0    | 0          | 6                       | 0    | 8     | 0    | 14         | 1                             | 114  | 0     | 0    | 115        | 0                             | 45   | 6     | 0    | 51         | 180        |
| 04:15 PM         | 0                                  | 0    | 0     | 0    | 0          | 6                       | 0    | 4     | 0    | 10         | 3                             | 113  | 0     | 0    | 116        | 0                             | 65   | 3     | 0    | 68         | 194        |
| 04:30 PM         | 0                                  | 0    | 0     | 0    | 0          | 4                       | 0    | 1     | 0    | 5          | 1                             | 107  | 0     | 0    | 108        | 0                             | 51   | 1     | 0    | 52         | 165        |
| 04:45 PM         | 0                                  | 0    | 0     | 0    | 0          | 5                       | 0    | 2     | 0    | 7          | 4                             | 115  | 0     | 0    | 119        | 0                             | 69   | 3     | 0    | 72         | 198        |
| Total            | 0                                  | 0    | 0     | 0    | 0          | 21                      | 0    | 15    | 0    | 36         | 9                             | 449  | 0     | 0    | 458        | 0                             | 230  | 13    | 0    | 243        | 737        |
| 05:00 PM         | 0                                  | 0    | 0     | 0    | 0          | 6                       | 0    | 3     | 0    | 9          | 0                             | 153  | 0     | 0    | 153        | 0                             | 70   | 0     | 0    | 70         | 232        |
| 05:15 PM         | 0                                  | 0    | 0     | 0    | 0          | 11                      | 0    | 1     | 0    | 12         | 1                             | 116  | 0     | 0    | 117        | 0                             | 72   | 1     | 0    | 73         | 202        |
| 05:30 PM         | 0                                  | 0    | 0     | 0    | 0          | 5                       | 0    | 2     | 0    | 7          | 0                             | 103  | 0     | 0    | 103        | 0                             | 67   | 3     | 0    | 70         | 180        |
| 05:45 PM         | 0                                  | 0    | 0     | 0    | 0          | 7                       | 0    | 2     | 0    | 9          | 3                             | 96   | 0     | 0    | 99         | 0                             | 60   | 1     | 0    | 61         | 169        |
| Total            | 0                                  | 0    | 0     | 0    | 0          | 29                      | 0    | 8     | 0    | 37         | 4                             | 468  | 0     | 0    | 472        | 0                             | 269  | 5     | 0    | 274        | 783        |
| Grand Total      | 0                                  | 0    | 0     | 0    | 0          | 67                      | 0    | 39    | 0    | 106        | 23                            | 1289 | 2     | 0    | 1314       | 0                             | 1533 | 55    | 0    | 1588       | 3008       |
| Apprch %         | 0                                  | 0    | 0     | 0    |            | 63.2                    | 0    | 36.8  | 0    |            | 1.8                           | 98.1 | 0.2   | 0    |            | 0                             | 96.5 | 3.5   | 0    |            |            |
| Total %          | 0                                  | 0    | 0     | 0    | 0          | 2.2                     | 0    | 1.3   | 0    | 3.5        | 0.8                           | 42.9 | 0.1   | 0    | 43.7       | 0                             | 51   | 1.8   | 0    | 52.8       |            |
| Cars and Buses   | 0                                  | 0    | 0     | 0    | 0          | 67                      | 0    | 39    | 0    | 106        | 23                            | 1288 | 0     | 0    | 1311       | 0                             | 1529 | 55    | 0    | 1584       | 3001       |
| % Cars and Buses | 0                                  | 0    | 0     | 0    | 0          | 100                     | 0    | 100   | 0    | 100        | 100                           | 99.9 | 0     | 0    | 99.8       | 0                             | 99.7 | 100   | 0    | 99.7       | 99.8       |
| Trucks           | 0                                  | 0    | 0     | 0    | 0          | 0                       | 0    | 0     | 0    | 0          | 0                             | 1    | 2     | 0    | 3          | 0                             | 4    | 0     | 0    | 4          | 7          |
| % Trucks         | 0                                  | 0    | 0     | 0    | 0          | 0                       | 0    | 0     | 0    | 0          | 0                             | 0.1  | 100   | 0    | 0.2        | 0                             | 0.3  | 0     | 0    | 0.3        | 0.2        |

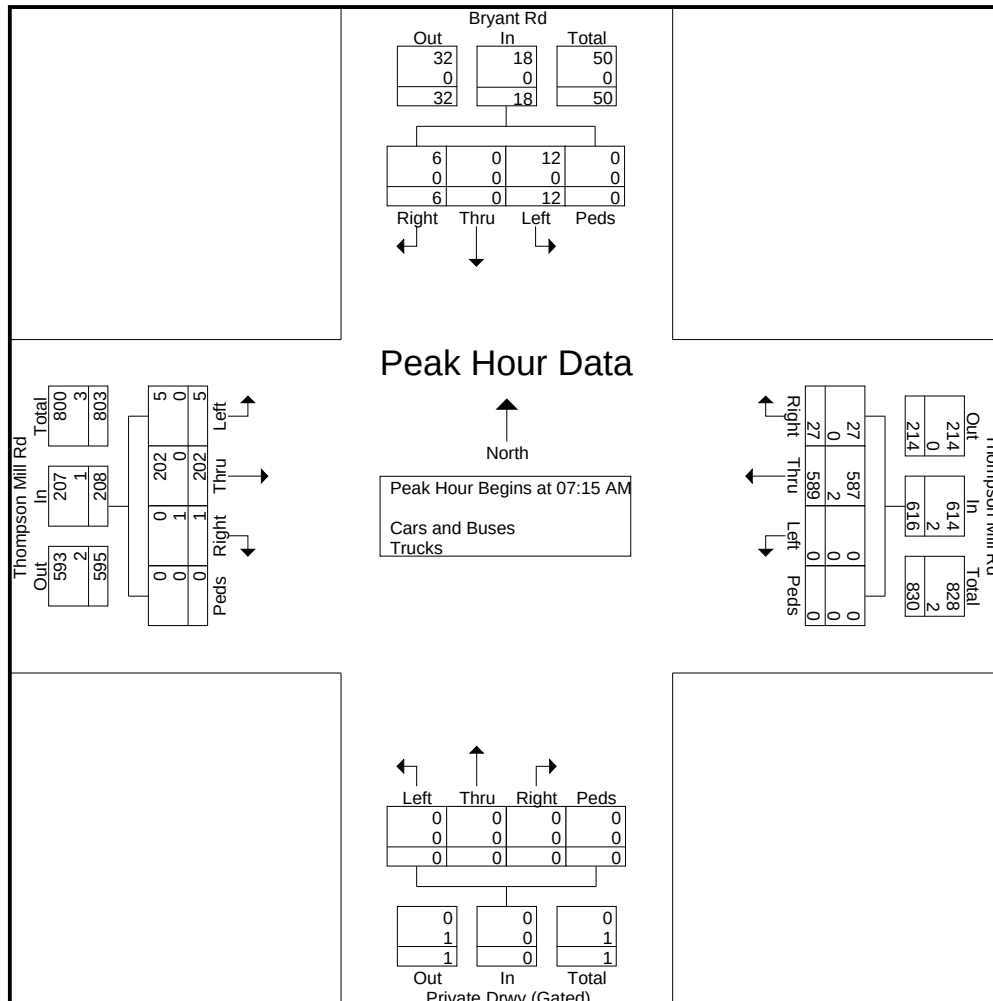
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TMC Data  
Thompson Mill Rd @ Bryant Rd  
Buford, GA  
7-9am I 4-6pm

File Name : 39230008  
Site Code : 39230008  
Start Date : 10/19/2016  
Page No : 2

|                                                            | Private Drwy (Gated)<br>Northbound |      |       |      |            | Bryant Rd<br>Southbound |      |       |      |            | Thompson Mill Rd<br>Eastbound |      |       |      |            | Thompson Mill Rd<br>Westbound |      |       |      |            |            |
|------------------------------------------------------------|------------------------------------|------|-------|------|------------|-------------------------|------|-------|------|------------|-------------------------------|------|-------|------|------------|-------------------------------|------|-------|------|------------|------------|
| Start Time                                                 | Left                               | Thru | Right | Peds | App. Total | Left                    | Thru | Right | Peds | App. Total | Left                          | Thru | Right | Peds | App. Total | Left                          | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 |                                    |      |       |      |            |                         |      |       |      |            |                               |      |       |      |            |                               |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 07:15 AM       |                                    |      |       |      |            |                         |      |       |      |            |                               |      |       |      |            |                               |      |       |      |            |            |
| 07:15 AM                                                   | 0                                  | 0    | 0     | 0    | 0          | 5                       | 0    | 1     | 0    | 6          | 1                             | 42   | 0     | 0    | 43         | 0                             | 157  | 6     | 0    | 163        | 212        |
| 07:30 AM                                                   | 0                                  | 0    | 0     | 0    | 0          | 4                       | 0    | 2     | 0    | 6          | 0                             | 61   | 1     | 0    | 62         | 0                             | 149  | 5     | 0    | 154        | 222        |
| 07:45 AM                                                   | 0                                  | 0    | 0     | 0    | 0          | 0                       | 0    | 1     | 0    | 1          | 3                             | 43   | 0     | 0    | 46         | 0                             | 146  | 6     | 0    | 152        | 199        |
| 08:00 AM                                                   | 0                                  | 0    | 0     | 0    | 0          | 3                       | 0    | 2     | 0    | 5          | 1                             | 56   | 0     | 0    | 57         | 0                             | 137  | 10    | 0    | 147        | 209        |
| Total Volume                                               | 0                                  | 0    | 0     | 0    | 0          | 12                      | 0    | 6     | 0    | 18         | 5                             | 202  | 1     | 0    | 208        | 0                             | 589  | 27    | 0    | 616        | 842        |
| % App. Total                                               | 0                                  | 0    | 0     | 0    | 0          | 66.7                    | 0    | 33.3  | 0    |            | 2.4                           | 97.1 | 0.5   | 0    |            | 0                             | 95.6 | 4.4   | 0    |            |            |
| PHF                                                        | .000                               | .000 | .000  | .000 | .000       | .600                    | .000 | .750  | .000 | .750       | .417                          | .828 | .250  | .000 | .839       | .000                          | .938 | .675  | .000 | .945       | .948       |
| Cars and Buses                                             | 0                                  | 0    | 0     | 0    | 0          | 12                      | 0    | 6     | 0    | 18         | 5                             | 202  | 0     | 0    | 207        | 0                             | 587  | 27    | 0    | 614        | 839        |
| % Cars and Buses                                           | 0                                  | 0    | 0     | 0    | 0          | 100                     | 0    | 100   | 0    | 100        | 100                           | 100  | 0     | 0    | 99.5       | 0                             | 99.7 | 100   | 0    | 99.7       | 99.6       |
| Trucks                                                     | 0                                  | 0    | 0     | 0    | 0          | 0                       | 0    | 0     | 0    | 0          | 0                             | 0    | 1     | 0    | 1          | 0                             | 2    | 0     | 0    | 2          | 3          |
| % Trucks                                                   | 0                                  | 0    | 0     | 0    | 0          | 0                       | 0    | 0     | 0    | 0          | 0                             | 0    | 100   | 0    | 0.5        | 0                             | 0.3  | 0     | 0    | 0.3        | 0.4        |





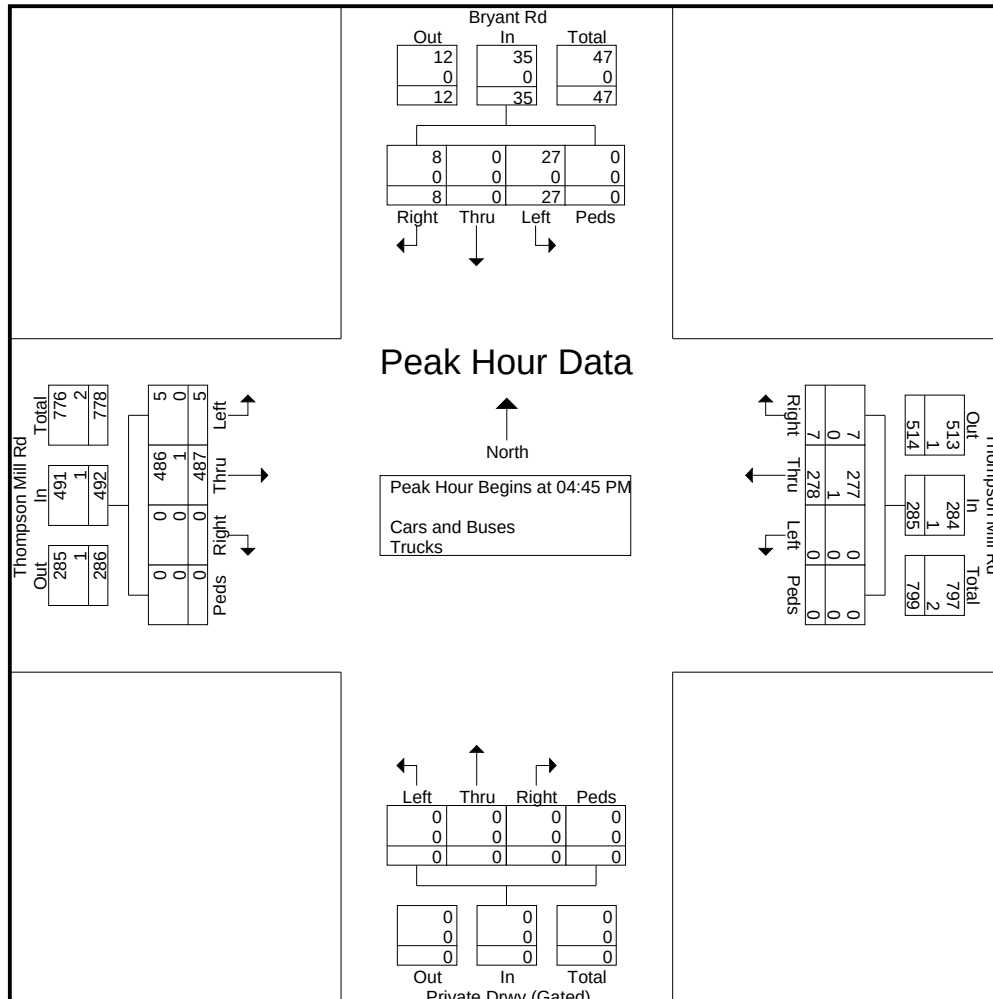
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|                                                            | Private Drwy (Gated)<br>Northbound |      |       |      |            | Bryant Rd<br>Southbound |      |       |      |            | Thompson Mill Rd<br>Eastbound |      |       |      |            | Thompson Mill Rd<br>Westbound |      |       |      |            |            |
|------------------------------------------------------------|------------------------------------|------|-------|------|------------|-------------------------|------|-------|------|------------|-------------------------------|------|-------|------|------------|-------------------------------|------|-------|------|------------|------------|
| Start Time                                                 | Left                               | Thru | Right | Peds | App. Total | Left                    | Thru | Right | Peds | App. Total | Left                          | Thru | Right | Peds | App. Total | Left                          | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 |                                    |      |       |      |            |                         |      |       |      |            |                               |      |       |      |            |                               |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 04:45 PM       |                                    |      |       |      |            |                         |      |       |      |            |                               |      |       |      |            |                               |      |       |      |            |            |
| 04:45 PM                                                   | 0                                  | 0    | 0     | 0    | 0          | 5                       | 0    | 2     | 0    | 7          | 4                             | 115  | 0     | 0    | 119        | 0                             | 69   | 3     | 0    | 72         | 198        |
| 05:00 PM                                                   | 0                                  | 0    | 0     | 0    | 0          | 6                       | 0    | 3     | 0    | 9          | 0                             | 153  | 0     | 0    | 153        | 0                             | 70   | 0     | 0    | 70         | 232        |
| 05:15 PM                                                   | 0                                  | 0    | 0     | 0    | 0          | 11                      | 0    | 1     | 0    | 12         | 1                             | 116  | 0     | 0    | 117        | 0                             | 72   | 1     | 0    | 73         | 202        |
| 05:30 PM                                                   | 0                                  | 0    | 0     | 0    | 0          | 5                       | 0    | 2     | 0    | 7          | 0                             | 103  | 0     | 0    | 103        | 0                             | 67   | 3     | 0    | 70         | 180        |
| Total Volume                                               | 0                                  | 0    | 0     | 0    | 0          | 27                      | 0    | 8     | 0    | 35         | 5                             | 487  | 0     | 0    | 492        | 0                             | 278  | 7     | 0    | 285        | 812        |
| % App. Total                                               | 0                                  | 0    | 0     | 0    | 0          | 77.1                    | 0    | 22.9  | 0    | 0          | 1                             | 99   | 0     | 0    | 0          | 0                             | 97.5 | 2.5   | 0    | 0          | 0          |
| PHF                                                        | .000                               | .000 | .000  | .000 | .000       | .614                    | .000 | .667  | .000 | .729       | .313                          | .796 | .000  | .000 | .804       | .000                          | .965 | .583  | .000 | .976       | .875       |
| Cars and Buses                                             | 0                                  | 0    | 0     | 0    | 0          | 27                      | 0    | 8     | 0    | 35         | 5                             | 486  | 0     | 0    | 491        | 0                             | 277  | 7     | 0    | 284        | 810        |
| % Cars and Buses                                           | 0                                  | 0    | 0     | 0    | 0          | 100                     | 0    | 100   | 0    | 100        | 100                           | 99.8 | 0     | 0    | 99.8       | 0                             | 99.6 | 100   | 0    | 99.6       | 99.8       |
| Trucks                                                     | 0                                  | 0    | 0     | 0    | 0          | 0                       | 0    | 0     | 0    | 0          | 0                             | 1    | 0     | 0    | 1          | 0                             | 1    | 0     | 0    | 1          | 2          |
| % Trucks                                                   | 0                                  | 0    | 0     | 0    | 0          | 0                       | 0    | 0     | 0    | 0          | 0                             | 0.2  | 0     | 0    | 0.2        | 0                             | 0.4  | 0     | 0    | 0.4        | 0.2        |



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7-9am I 4-6pm

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## Groups Printed- Cars and Buses - Trucks

|                  | N Bogan Rd Northbound |      |       |      |            | N Bogan Rd Southbound |      |       |      |            | Thompson Mill Rd Eastbound |      |       |      |            | Thompson Mill Rd Westbound |      |       |      |            |            |
|------------------|-----------------------|------|-------|------|------------|-----------------------|------|-------|------|------------|----------------------------|------|-------|------|------------|----------------------------|------|-------|------|------------|------------|
| Start Time       | Left                  | Thru | Right | Peds | App. Total | Left                  | Thru | Right | Peds | App. Total | Left                       | Thru | Right | Peds | App. Total | Left                       | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM         | 31                    | 10   | 1     | 0    | 42         | 0                     | 20   | 34    | 0    | 54         | 6                          | 16   | 13    | 0    | 35         | 15                         | 95   | 2     | 0    | 112        | 243        |
| 07:15 AM         | 39                    | 19   | 5     | 0    | 63         | 0                     | 24   | 29    | 0    | 53         | 10                         | 22   | 18    | 0    | 50         | 11                         | 99   | 4     | 0    | 114        | 280        |
| 07:30 AM         | 24                    | 16   | 4     | 0    | 44         | 4                     | 23   | 22    | 0    | 49         | 14                         | 27   | 20    | 0    | 61         | 15                         | 97   | 5     | 0    | 117        | 271        |
| 07:45 AM         | 28                    | 13   | 5     | 0    | 46         | 3                     | 21   | 31    | 0    | 55         | 11                         | 24   | 22    | 0    | 57         | 12                         | 101  | 0     | 0    | 113        | 271        |
| Total            | 122                   | 58   | 15    | 0    | 195        | 7                     | 88   | 116   | 0    | 211        | 41                         | 89   | 73    | 0    | 203        | 53                         | 392  | 11    | 0    | 456        | 1065       |
| 08:00 AM         | 22                    | 18   | 2     | 0    | 42         | 1                     | 25   | 39    | 0    | 65         | 18                         | 33   | 6     | 0    | 57         | 13                         | 89   | 0     | 0    | 102        | 266        |
| 08:15 AM         | 11                    | 22   | 12    | 0    | 45         | 1                     | 33   | 25    | 0    | 59         | 10                         | 31   | 20    | 0    | 61         | 24                         | 72   | 5     | 0    | 101        | 266        |
| 08:30 AM         | 16                    | 27   | 5     | 0    | 48         | 3                     | 29   | 19    | 0    | 51         | 6                          | 17   | 15    | 0    | 38         | 15                         | 61   | 2     | 0    | 78         | 215        |
| 08:45 AM         | 14                    | 19   | 6     | 0    | 39         | 2                     | 28   | 10    | 0    | 40         | 4                          | 21   | 11    | 0    | 36         | 14                         | 65   | 5     | 0    | 84         | 199        |
| Total            | 63                    | 86   | 25    | 0    | 174        | 7                     | 115  | 93    | 0    | 215        | 38                         | 102  | 52    | 0    | 192        | 66                         | 287  | 12    | 0    | 365        | 946        |
| *** BREAK ***    |                       |      |       |      |            |                       |      |       |      |            |                            |      |       |      |            |                            |      |       |      |            |            |
| 04:00 PM         | 19                    | 38   | 11    | 0    | 68         | 3                     | 23   | 10    | 0    | 36         | 20                         | 74   | 29    | 0    | 123        | 8                          | 27   | 4     | 0    | 39         | 266        |
| 04:15 PM         | 19                    | 33   | 20    | 0    | 72         | 6                     | 30   | 6     | 0    | 42         | 15                         | 91   | 19    | 0    | 125        | 8                          | 46   | 7     | 0    | 61         | 300        |
| 04:30 PM         | 9                     | 50   | 12    | 0    | 71         | 5                     | 23   | 11    | 0    | 39         | 16                         | 74   | 25    | 0    | 115        | 10                         | 28   | 3     | 0    | 41         | 266        |
| 04:45 PM         | 23                    | 34   | 15    | 0    | 72         | 4                     | 28   | 16    | 0    | 48         | 19                         | 72   | 21    | 0    | 112        | 10                         | 35   | 4     | 0    | 49         | 281        |
| Total            | 70                    | 155  | 58    | 0    | 283        | 18                    | 104  | 43    | 0    | 165        | 70                         | 311  | 94    | 0    | 475        | 36                         | 136  | 18    | 0    | 190        | 1113       |
| 05:00 PM         | 19                    | 27   | 23    | 0    | 69         | 2                     | 32   | 15    | 0    | 49         | 16                         | 91   | 28    | 0    | 135        | 12                         | 46   | 3     | 0    | 61         | 314        |
| 05:15 PM         | 18                    | 44   | 27    | 0    | 89         | 5                     | 28   | 6     | 0    | 39         | 21                         | 82   | 28    | 0    | 131        | 14                         | 45   | 4     | 0    | 63         | 322        |
| 05:30 PM         | 16                    | 42   | 19    | 0    | 77         | 3                     | 50   | 15    | 0    | 68         | 17                         | 87   | 17    | 0    | 121        | 15                         | 27   | 3     | 0    | 45         | 311        |
| 05:45 PM         | 17                    | 30   | 14    | 0    | 61         | 4                     | 40   | 12    | 0    | 56         | 16                         | 66   | 34    | 0    | 116        | 14                         | 41   | 4     | 0    | 59         | 292        |
| Total            | 70                    | 143  | 83    | 0    | 296        | 14                    | 150  | 48    | 0    | 212        | 70                         | 326  | 107   | 0    | 503        | 55                         | 159  | 14    | 0    | 228        | 1239       |
| Grand Total      | 325                   | 442  | 181   | 0    | 948        | 46                    | 457  | 300   | 0    | 803        | 219                        | 828  | 326   | 0    | 1373       | 210                        | 974  | 55    | 0    | 1239       | 4363       |
| Apprch %         | 34.3                  | 46.6 | 19.1  | 0    |            | 5.7                   | 56.9 | 37.4  | 0    |            | 16                         | 60.3 | 23.7  | 0    |            | 16.9                       | 78.6 | 4.4   | 0    |            |            |
| Total %          | 7.4                   | 10.1 | 4.1   | 0    | 21.7       | 1.1                   | 10.5 | 6.9   | 0    | 18.4       | 5                          | 19   | 7.5   | 0    | 31.5       | 4.8                        | 22.3 | 1.3   | 0    | 28.4       |            |
| Cars and Buses   | 324                   | 441  | 180   | 0    | 945        | 46                    | 457  | 299   | 0    | 802        | 218                        | 827  | 326   | 0    | 1371       | 210                        | 974  | 55    | 0    | 1239       | 4357       |
| % Cars and Buses | 99.7                  | 99.8 | 99.4  | 0    | 99.7       | 100                   | 100  | 99.7  | 0    | 99.9       | 99.5                       | 99.9 | 100   | 0    | 99.9       | 100                        | 100  | 100   | 0    | 100        | 99.9       |
| Trucks           | 1                     | 1    | 1     | 0    | 3          | 0                     | 0    | 1     | 0    | 1          | 1                          | 1    | 0     | 0    | 2          | 0                          | 0    | 0     | 0    | 0          | 6          |
| % Trucks         | 0.3                   | 0.2  | 0.6   | 0    | 0.3        | 0                     | 0    | 0.3   | 0    | 0.1        | 0.5                        | 0.1  | 0     | 0    | 0.1        | 0                          | 0    | 0     | 0    | 0          | 0.1        |

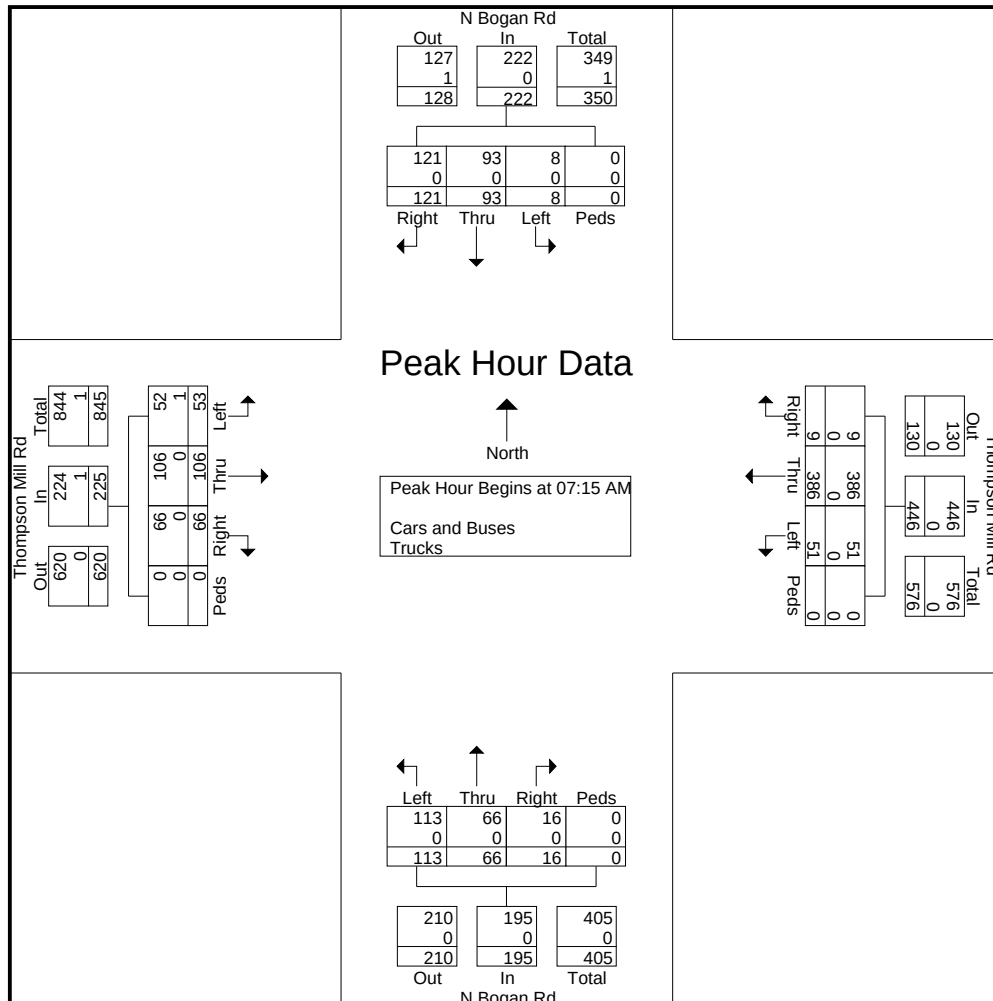
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|                                                            | N Bogan Rd Northbound |      |       |      |            | N Bogan Rd Southbound |      |       |      |            | Thompson Mill Rd Eastbound |      |       |      |            | Thompson Mill Rd Westbound |      |       |      |            |            |
|------------------------------------------------------------|-----------------------|------|-------|------|------------|-----------------------|------|-------|------|------------|----------------------------|------|-------|------|------------|----------------------------|------|-------|------|------------|------------|
| Start Time                                                 | Left                  | Thru | Right | Peds | App. Total | Left                  | Thru | Right | Peds | App. Total | Left                       | Thru | Right | Peds | App. Total | Left                       | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 |                       |      |       |      |            |                       |      |       |      |            |                            |      |       |      |            |                            |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 07:15 AM       |                       |      |       |      |            |                       |      |       |      |            |                            |      |       |      |            |                            |      |       |      |            |            |
| 07:15 AM                                                   | 39                    | 19   | 5     | 0    | 63         | 0                     | 24   | 29    | 0    | 53         | 10                         | 22   | 18    | 0    | 50         | 11                         | 99   | 4     | 0    | 114        | 280        |
| 07:30 AM                                                   | 24                    | 16   | 4     | 0    | 44         | 4                     | 23   | 22    | 0    | 49         | 14                         | 27   | 20    | 0    | 61         | 15                         | 97   | 5     | 0    | 117        | 271        |
| 07:45 AM                                                   | 28                    | 13   | 5     | 0    | 46         | 3                     | 21   | 31    | 0    | 55         | 11                         | 24   | 22    | 0    | 57         | 12                         | 101  | 0     | 0    | 113        | 271        |
| 08:00 AM                                                   | 22                    | 18   | 2     | 0    | 42         | 1                     | 25   | 39    | 0    | 65         | 18                         | 33   | 6     | 0    | 57         | 13                         | 89   | 0     | 0    | 102        | 266        |
| Total Volume                                               | 113                   | 66   | 16    | 0    | 195        | 8                     | 93   | 121   | 0    | 222        | 53                         | 106  | 66    | 0    | 225        | 51                         | 386  | 9     | 0    | 446        | 1088       |
| % App. Total                                               | 57.9                  | 33.8 | 8.2   | 0    |            | 3.6                   | 41.9 | 54.5  | 0    |            | 23.6                       | 47.1 | 29.3  | 0    |            | 11.4                       | 86.5 | 2     | 0    |            |            |
| PHF                                                        | .724                  | .868 | .800  | .000 | .774       | .500                  | .930 | .776  | .000 | .854       | .736                       | .803 | .750  | .000 | .922       | .850                       | .955 | .450  | .000 | .953       | .971       |
| Cars and Buses                                             | 113                   | 66   | 16    | 0    | 195        | 8                     | 93   | 121   | 0    | 222        | 52                         | 106  | 66    | 0    | 224        | 51                         | 386  | 9     | 0    | 446        | 1087       |
| % Cars and Buses                                           | 100                   | 100  | 100   | 0    | 100        | 100                   | 100  | 100   | 0    | 100        | 98.1                       | 100  | 100   | 0    | 99.6       | 100                        | 100  | 100   | 0    | 100        | 99.9       |
| Trucks                                                     | 0                     | 0    | 0     | 0    | 0          | 0                     | 0    | 0     | 0    | 0          | 1                          | 0    | 0     | 0    | 1          | 0                          | 0    | 0     | 0    | 0          | 1          |
| % Trucks                                                   | 0                     | 0    | 0     | 0    | 0          | 0                     | 0    | 0     | 0    | 0          | 1.9                        | 0    | 0     | 0    | 0.4        | 0                          | 0    | 0     | 0    | 0          | 0.1        |



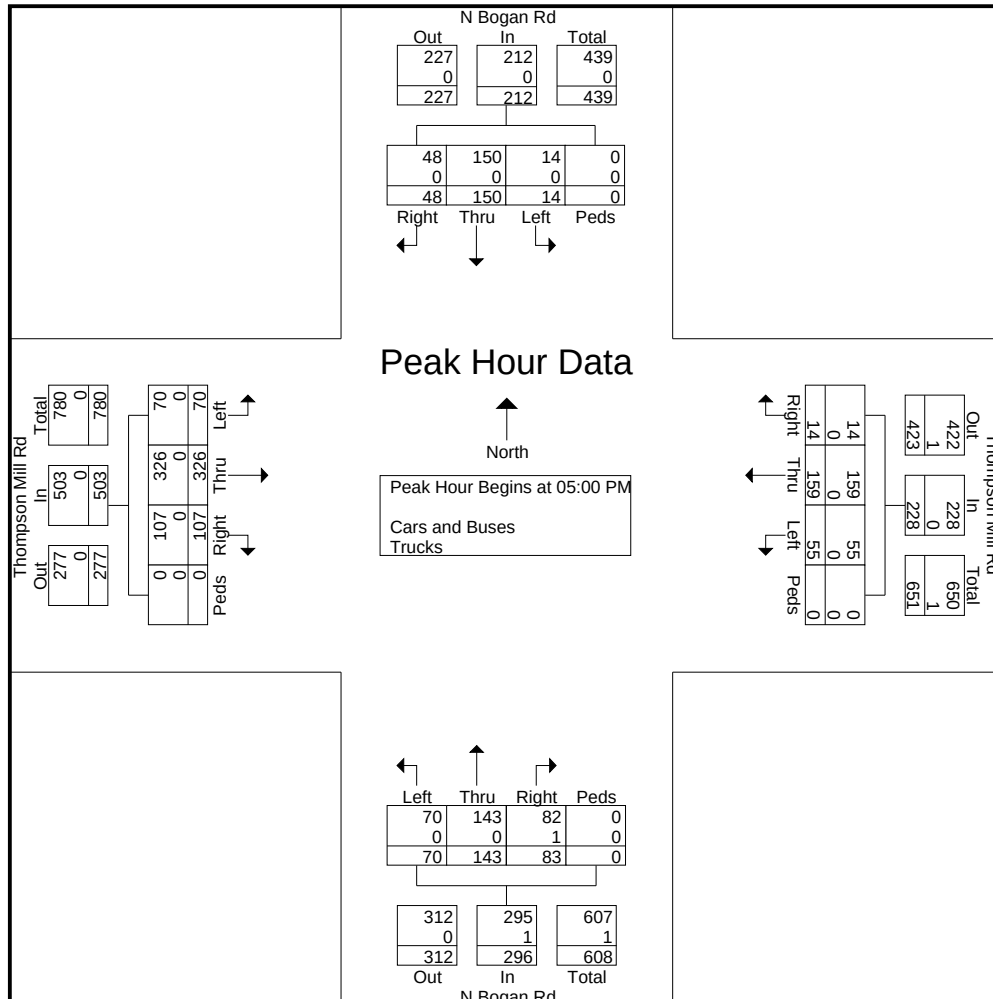
# Reliable Traffic Data Services, LLC

Tel: (770) 578-8158 | Fax: (770) 578-8159  
info@reliabletraffic.org | www.reliabletraffic.org

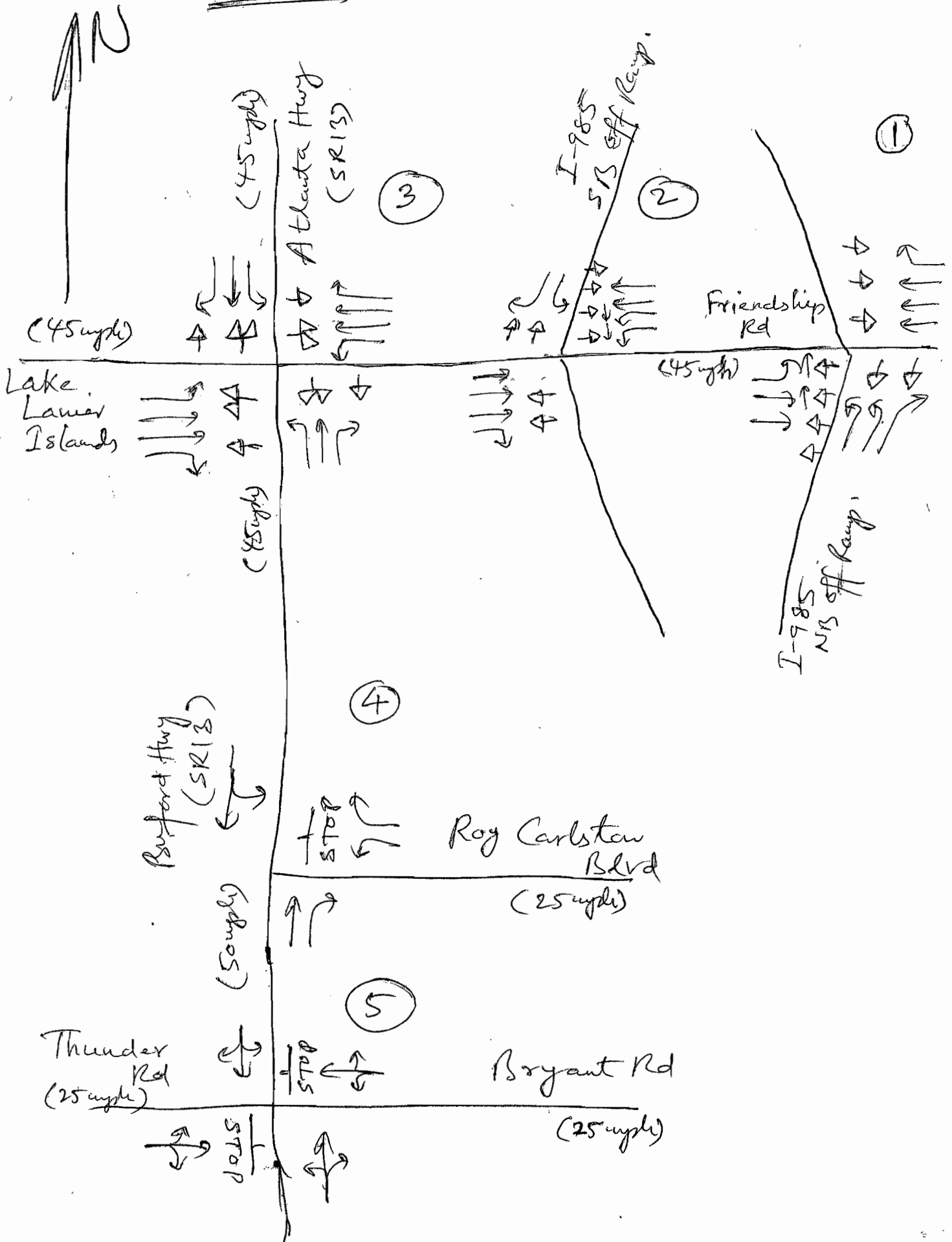
TMC Data  
Thompson Mill Rd @ N Bogan Rd  
Buford, GA  
7-9am I 4-6pm

File Name : 39230009  
Site Code : 39230009  
Start Date : 10/19/2016  
Page No : 3

|                                                            | N Bogan Rd Northbound |      |       |      |            | N Bogan Rd Southbound |      |       |      |            | Thompson Mill Rd Eastbound |      |       |      |            | Thompson Mill Rd Westbound |      |       |      |            |            |
|------------------------------------------------------------|-----------------------|------|-------|------|------------|-----------------------|------|-------|------|------------|----------------------------|------|-------|------|------------|----------------------------|------|-------|------|------------|------------|
| Start Time                                                 | Left                  | Thru | Right | Peds | App. Total | Left                  | Thru | Right | Peds | App. Total | Left                       | Thru | Right | Peds | App. Total | Left                       | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 |                       |      |       |      |            |                       |      |       |      |            |                            |      |       |      |            |                            |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 05:00 PM       |                       |      |       |      |            |                       |      |       |      |            |                            |      |       |      |            |                            |      |       |      |            |            |
| 05:00 PM                                                   | 19                    | 27   | 23    | 0    | 69         | 2                     | 32   | 15    | 0    | 49         | 16                         | 91   | 28    | 0    | 135        | 12                         | 46   | 3     | 0    | 61         | 314        |
| 05:15 PM                                                   | 18                    | 44   | 27    | 0    | 89         | 5                     | 28   | 6     | 0    | 39         | 21                         | 82   | 28    | 0    | 131        | 14                         | 45   | 4     | 0    | 63         | 322        |
| 05:30 PM                                                   | 16                    | 42   | 19    | 0    | 77         | 3                     | 50   | 15    | 0    | 68         | 17                         | 87   | 17    | 0    | 121        | 15                         | 27   | 3     | 0    | 45         | 311        |
| 05:45 PM                                                   | 17                    | 30   | 14    | 0    | 61         | 4                     | 40   | 12    | 0    | 56         | 16                         | 66   | 34    | 0    | 116        | 14                         | 41   | 4     | 0    | 59         | 292        |
| Total Volume                                               | 70                    | 143  | 83    | 0    | 296        | 14                    | 150  | 48    | 0    | 212        | 70                         | 326  | 107   | 0    | 503        | 55                         | 159  | 14    | 0    | 228        | 1239       |
| % App. Total                                               | 23.6                  | 48.3 | 28    | 0    |            | 6.6                   | 70.8 | 22.6  | 0    |            | 13.9                       | 64.8 | 21.3  | 0    |            | 24.1                       | 69.7 | 6.1   | 0    |            |            |
| PHF                                                        | .921                  | .813 | .769  | .000 | .831       | .700                  | .750 | .800  | .000 | .779       | .833                       | .896 | .787  | .000 | .931       | .917                       | .864 | .875  | .000 | .905       | .962       |
| Cars and Buses                                             | 70                    | 143  | 82    | 0    | 295        | 14                    | 150  | 48    | 0    | 212        | 70                         | 326  | 107   | 0    | 503        | 55                         | 159  | 14    | 0    | 228        | 1238       |
| % Cars and Buses                                           | 100                   | 100  | 98.8  | 0    | 99.7       | 100                   | 100  | 100   | 0    | 100        | 100                        | 100  | 100   | 0    | 100        | 100                        | 100  | 100   | 0    | 100        | 99.9       |
| Trucks                                                     | 0                     | 0    | 1     | 0    | 1          | 0                     | 0    | 0     | 0    | 0          | 0                          | 0    | 0     | 0    | 0          | 0                          | 0    | 0     | 0    | 0          | 1          |
| % Trucks                                                   | 0                     | 0    | 1.2   | 0    | 0.3        | 0                     | 0    | 0     | 0    | 0          | 0                          | 0    | 0     | 0    | 0          | 0                          | 0    | 0     | 0    | 0          | 0.1        |

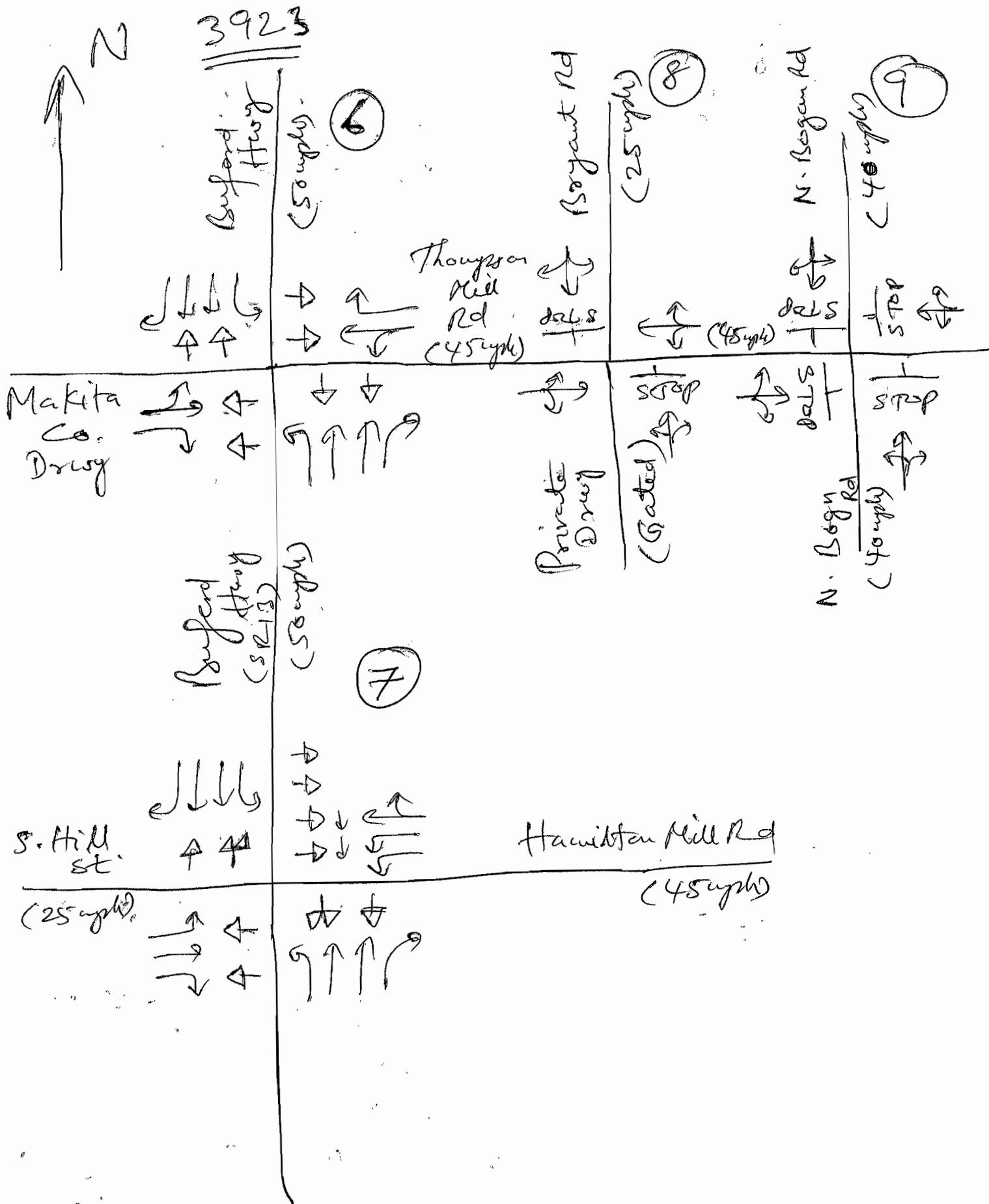


3923





3923



## **GRTA Letter of Understanding**



## LETTER OF UNDERSTANDING

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October 11, 2016

Adam Terrell  
Prologis  
3475 Piedmont Road NE, Suite 650  
Atlanta, Georgia 30305-2996

**RE: DRI 2636 Longacre Development**

Dear Mr. Terrell:

The purpose of this letter is to document the discussions during the Pre-Review and Methodology Meeting held at ARC's office on October 3, 2016 regarding **DRI 2636 Longacre Development**. Some of the following items were discussed in this meeting and should assist you and your consultant team in preparing the DRI Review Package.

### PROJECT OVERVIEW

- The project is located in City of Buford. The proposed development is located on the eastern side of SR 13/Buford Highway with existing direct access from Roy Carlson Boulevard. Additional access is proposed onto Thompson Mill Road, just west of I-985 Bridge.
- The DRI trigger for this development is a land disturbance permit.
- The proposed development consists of 1,403,120 square feet light industrial and warehouse space and 40,000 square feet commercial/retail use.
- The vehicular (including freight) trip generation is estimated to be 10,104 gross daily trips using the *ITE Trip Generation Manual 9<sup>th</sup> edition*, land use codes 130 – *Industrial Park*, 150- *Warehousing*, and 820 – *Shopping Center*.
- The projected build out for this DRI is 2026.
- The applicant is applying for approval under GRTA's non-expedited review process.

### STUDY NETWORK

1. SR 347 (Friendship Rd) @ I-985 NB Ramps
2. SR 347 (Friendship Rd) @ I-985 SB Ramps
3. SR 347 (Friendship Rd) @ SR 13 (Atlanta Hwy)
4. SR 13 (Buford Hwy) @ Roy Carlson Blvd/Site driveway
5. SR 13 (Buford Hwy) @ Thompson Mill Road
6. SR 13 (Buford Hwy) @ Hamilton Mill Rd/S. Hill St
7. Thompson Mill Road at N. Bogan Road
8. Thompson Mill Road at Bryant Road
9. Site driveway at Thompson Mill Road

### METHODOLOGY

- All intersections identified as within the study network shall be analyzed during the AM and PM peak hours for (1) existing conditions, (2) future "no-build" conditions [may not be applicable for the site



driveways], and (3) future “build” conditions. This DRI shall be reviewed in one phase to be completed by 2026.

- Capacity analysis shall be based on turning movement counts collected not more than 12-months prior to the date of the actual DRI submittal to GRTA. As appropriate, pedestrian counts and heavy vehicle counts shall be collected with vehicle counts and considered within the capacity analysis. Turning movement counts shall be collected while local schools are in session and ordinarily not between the week of Thanksgiving and the second week of January or any week of a major holiday.
- A 0.5% background traffic growth rate shall be used for all roadways.
- The level of service standard for all analyses shall be LOS D.
- No alternate mode trips reductions are allowed. Standard mixed use and pass-by trip reductions are allowed.
- Default values should not be assumed in the traffic modeling. Existing conditions shall be taken into account.
- The applicant shall research TIP, STIP, RTP, and GDOT’s construction work program, as well as any local government plans (SPLOST, CIP, etc.), to determine the open-to-traffic date, sponsor, cost of the project, funding source(s), for future roadway projects in the project vicinity. This information shall be included within the traffic analysis.

#### ADDITIONAL INFORMATION

Every roadway segment and intersection listed above will be analyzed for “required improvements.” If the existing LOS for the segment or intersection is below the applicable level of service for a particular time period (e.g., A.M. peak period, P.M. peak period, etc.), then the measured LOS service for that segment and time periods is the standard by which the “base” and “future” traffic conditions will be designed. For example, if the County’s LOS standard is LOS D, but an intersection or segment currently operates at LOS E for a certain peak period, then the LOS standard for that intersection or segment for “base” and “future” conditions becomes LOS E (only for that intersection and only for that peak period). The “base” is the phase year traffic without the development traffic (also called future “no-build” conditions) and the “future” is the phase year with the development traffic (also called future “build” conditions). As required in the technical guidelines, specific “required improvements” will be identified to bring the “base” LOS and “future” LOS for every roadway segment and intersection up to the applicable LOS standard. If the existing LOS for the segment or intersection is LOS F, then the future “no-build” and future “build” LOS standard will be LOS E. The improvements required to achieve the desired LOS standard will be provided in a table and graphic within the study. The traffic study should indicate the existing roadway laneage at each studied intersection as well as the laneage required (to meet the LOS standard) for future “no-build” and future “build” conditions. The improvements may include both programmed improvements and improvements identified in the study.

The planned and programmed improvement should indicate the project sponsor, the anticipated funding by source (federal, state, city/county, developer, CID, etc.), the year open-to-traffic, and estimate of the total project cost. All other required improvements identified in the study should, to the extent known, identify the cost, sponsor, funding, and timing. If any of these elements are not known, please state as “unknown.”

The future “no-build” and the future “build” analyses should NOT automatically include/assume the additional lanes/capacity associated with planned and programmed improvement projects unless those roadway projects are currently under construction. Instead, the traffic consultant should recommend the additional laneage required to satisfy the level of service standard.

### DRI REVIEW PACKAGE CHECKLIST

Please use the DRI Review Package Checklist to help you prepare your GRTA DRI Review Package for expedited review of your application. The Checklist reflects the understandings set forth in this letter, and is incorporated into this letter by reference.

The site plan shall be prepared in accordance with Section 4-104 of the DRI Review Package Technical Guidelines and it shall be dated, and shall be at a scale of 1"= 200' or larger (showing more detail). The site plan shall be consistent with GRTA's Site Plan Information Guidelines, which represents the minimum required information on site plans.

The applicant shall indicate on the site plans all adjacent land uses, current zoning, and future land use as indicated on the future land use map. Additionally, all existing and proposed sidewalks, existing and proposed pedestrian trails, and existing and proposed roadway laneage should be indicated on the site plan.

### DRI REVIEW PACKAGE SUBMITTAL

At the time you are ready to submit your DRI Review Package to GRTA, please note the following:

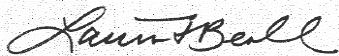
- Provide one (1) paper copy of all materials:
  - Transportation analysis
  - Site Plan
- Provide one (1) CD-ROM with electronic versions of all submittal documents:
  - Provide a PDF of each document
  - Provide the native format for each document
    - .dwg is the preferred CAD format (AutoCAD)
    - .doc is the preferred word processing format (Word)
    - .xls is the preferred spreadsheet format (Excel)
    - .sy6, .sy7, .sy8 or .sy9 is the preferred capacity analysis format (Synchro)

As part of the completeness certification process, please have your consultant forward one copy of the completed GRTA DRI Review Package (traffic analysis, site plan, CD) to the GDOT District Office, Regional Commission and local government Planning & Development and Transportation group (contact information provided below). GRTA shall be copied on each of the transmittal letters.

| <b>GDOT DISTRICT 1</b>                                   | <b>GWINNETT CO DOT</b>                                         | <b>CITY OF BUFORD</b>                                | <b>ATLANTA REGIONAL COMMISSION</b>                                |
|----------------------------------------------------------|----------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------------------|
| Shane Giles<br>PO Box 1057<br>Gainesville, GA 30503-1057 | Michael Johnson<br>75 Langley Drive<br>Lawrenceville, GA 30046 | Kim Wolfe<br>2300 Buford Highway<br>Buford, GA 30518 | Andrew Smith<br>40 Courtland Street, NE<br>Atlanta, Georgia 30303 |

We encourage your consultant team to verify the items covered in this letter prior to compiling the submittal materials. If you have any questions, please feel free to contact me directly at 404-463-3068 (lbeall@grta.org).

Sincerely,



Laura F. Beall, AICP  
Program Manager

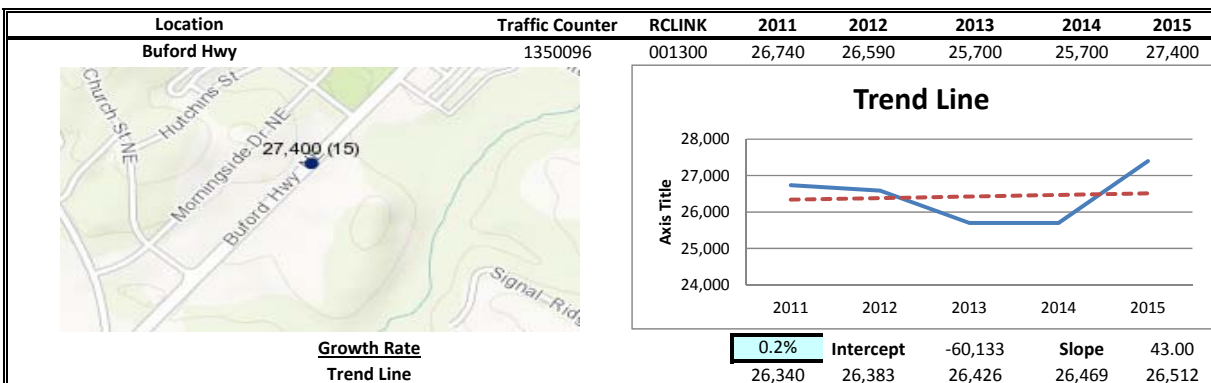
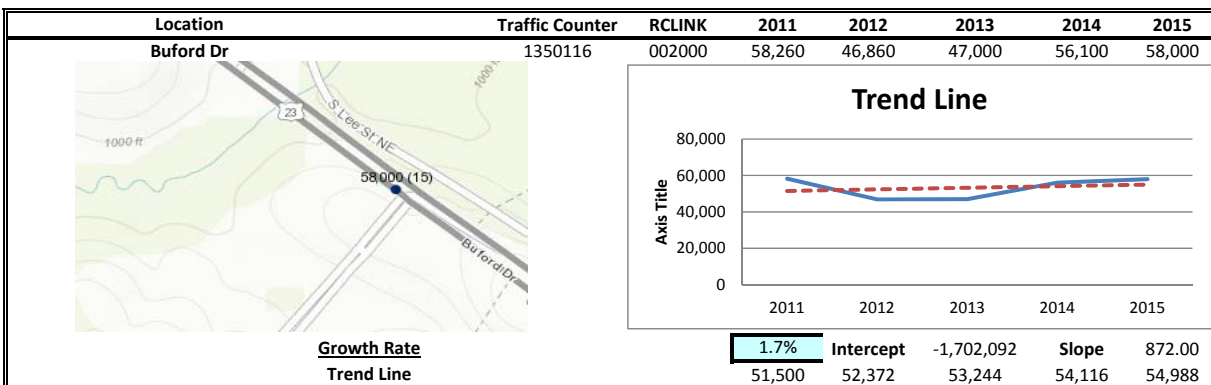
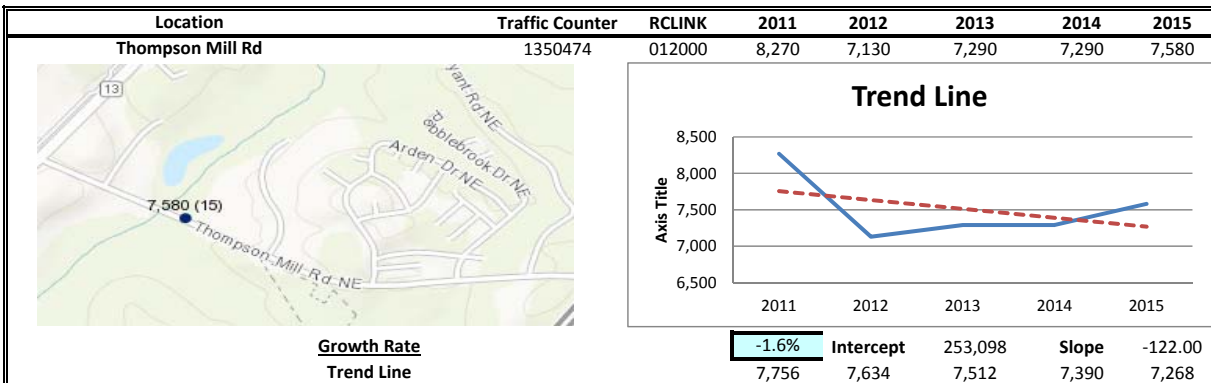
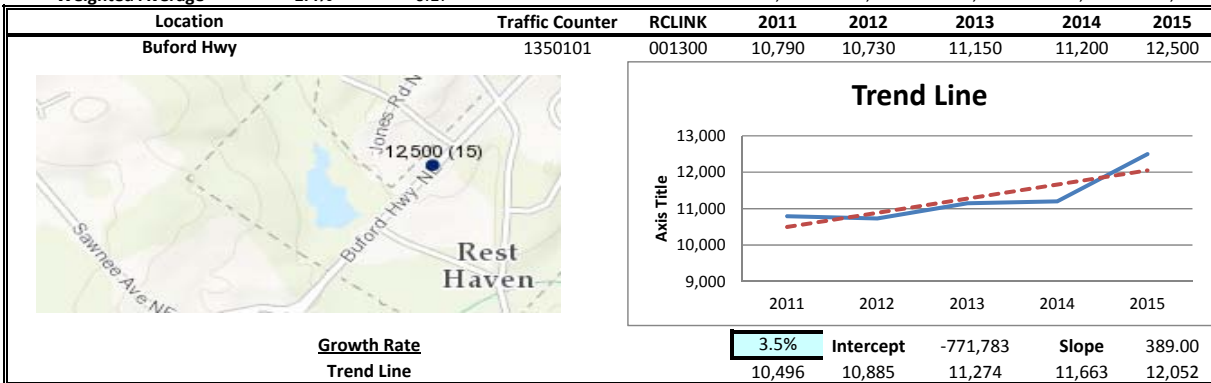
cc:

Jon West, DCA  
Andrew Smith, ARC  
Shane Giles, GDOT District 1  
Michael Johnson, Gwinnett Co DOT  
Lewis Cooksey, Gwinnett Co DOT

Kim Wolfe, City of Buford  
Matt Dunagin, City of Buford  
Jason Bennett, Prologis  
Abdul Amer, A & R Engineering  
Brian Brumfield, Eberly & Associates

## **Linear Regression of Daily Traffic**

| Location                | Growth Rate | R Squared   | Station ID              | Route  | 2011    | 2012    | 2013    | 2014    | 2015    |
|-------------------------|-------------|-------------|-------------------------|--------|---------|---------|---------|---------|---------|
| Buford Hwy              | 3.5%        | 0.74        | 1350101                 | 001300 | 10,790  | 10,730  | 11,150  | 11,200  | 12,500  |
| Thompson Mill Rd        | -1.6%       | 0.18        | 1350474                 | 012000 | 8,270   | 7,130   | 7,290   | 7,290   | 7,580   |
| Buford Dr               | 1.7%        | 0.06        | 1350116                 | 002000 | 58,260  | 46,860  | 47,000  | 56,100  | 58,000  |
| Buford Hwy              | 0.2%        | 0.01        | 1350096                 | 001300 | 26,740  | 26,590  | 25,700  | 25,700  | 27,400  |
| SR 347                  | 2.2%        | 0.23        | 1390405                 | 034700 | 16,520  | 19,870  | 19,740  | 18,600  | 19,200  |
| <b>Weighted Average</b> | <b>1.4%</b> | <b>0.17</b> | Sum of Count Stations = |        | 120,580 | 111,180 | 110,880 | 118,890 | 124,680 |



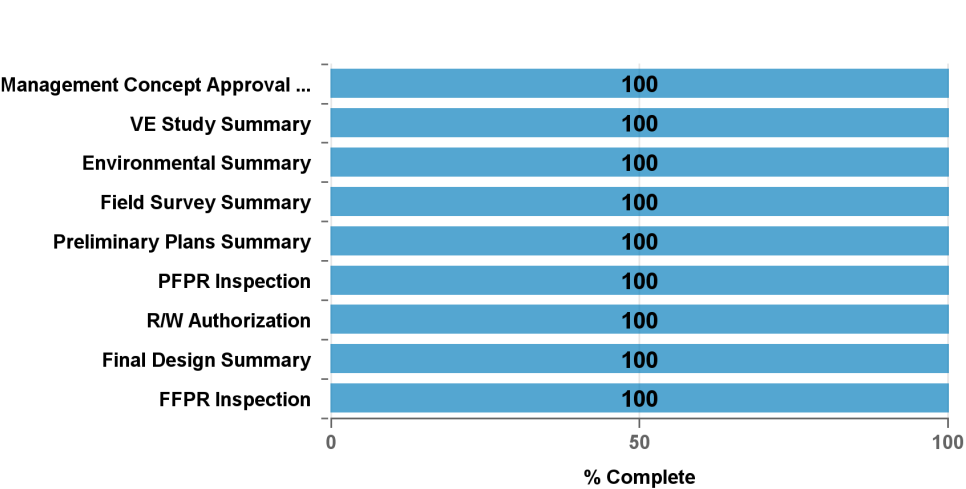
**Fact Sheets for Planned and Programmed  
Improvements**

| PROJ ID        | COUNTY    | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 132950-        | Hall      | SR 13 FROM CS 1120/SAWNEE AVE/GWINNETT TO SR 347/HALL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Mgmt Let Date: | 6/17/2016 | The proposed project would widen Buford Hwy (SR 13), an urban minor arterial, from Sawnee Avenue in Gwinnett County to Friendship Road in Hall County. The length of the project is approx. 1.53 miles. The existing roadway currently consists of two lanes with a variable width, with only a few locations with left turn and right turn lanes along the project length. The proposed project would widen Bufor Hwy (SR 13) to a 4-lane urban facility with a 20-foot raised median, 4-foot bike lanes, curb and gutter and a 5-foot sidewalk on both sides. |

|                           |                          |              |                   |
|---------------------------|--------------------------|--------------|-------------------|
| PROJ NO:                  | STP00-0013-01(063)       | SPONSOR:     | Buford            |
| MPO TIP#:                 | GW-099C                  | PROJ MGR:    | Njoku, lheanachor |
| MPO:                      | Atlanta TMA, Gainesville | DOT DIST:    | 1                 |
| PROJ LENGTH (MI):         | 1.65                     | CONG DIST:   | 007, 009          |
| TYPE WORK:                | Widening                 | TYPE WORK:   | Widening          |
| LET RESPONSIBILITY:       | GDOT Let                 | HOUSE DIST:  |                   |
| BIKE PROVISIONS INCLUDED? | N                        | SENATE DIST: |                   |

| Phase        | FY Approved | Approved FY Estimate * | Fund | Phase Status |
|--------------|-------------|------------------------|------|--------------|
| Engineering  | 2010        | \$85,500.00            | L240 | AUTHORIZED   |
| Engineering  | LOCL        | \$450,000.00           | LOC  | AUTHORIZED   |
| Right of Way | 2013        | \$880,000.00           | M240 | AUTHORIZED   |
| Right of Way | 2014        | \$2,000,000.00         | LOC  | AUTHORIZED   |
| Right of Way | 2014        | \$8,890,000.00         | M240 | AUTHORIZED   |
| Construction | 2016        | \$20,645,442.87        | Z240 | AUTHORIZED   |

\* Inflation Included in Estimate



| Activity                             | Actual Start Date | Actual Finish Date |
|--------------------------------------|-------------------|--------------------|
| Management Concept Approval Complete | 2/28/2008         | 2/28/2008          |
| VE Study Summary                     | 4/9/2009          | 9/17/2009          |
| Environmental Summary                | 4/2/2008          | 6/27/2013          |
| Field Survey Summary                 | 9/19/2009         | 1/20/2012          |
| Preliminary Plans Summary            | 6/1/2011          | 10/23/2013         |
| PFPR Inspection                      | 11/8/2012         | 11/12/2012         |
| R/W Authorization                    | 11/13/2013        | 11/13/2013         |
| Final Design Summary                 | 4/30/2012         | 4/6/2016           |
| FFPR Inspection                      | 2/2/2016          | 2/2/2016           |

Right of Way Acquisition Information:

|                           |    |                     |    |              |     |
|---------------------------|----|---------------------|----|--------------|-----|
| Preliminary Parcel Count: | 55 | Total Parcel Count: | 71 | Acquired by: | DOT |
|---------------------------|----|---------------------|----|--------------|-----|



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## I-85 @ 3 LOCS IN FRANKLIN; GWINNETT & JACKSON - BRIDGE REHAB

|                             |                             |                                                    |   |
|-----------------------------|-----------------------------|----------------------------------------------------|---|
| Project ID:                 | <b>M005567</b>              | Notice to Proceed Date:                            |   |
| Project Manager:            | Clayton B.G. Bennett        | Construction Percent Complete:                     | % |
| Office:                     | Bridge Design               | Current Completion Date:                           |   |
| County:                     | Franklin, Gwinnett, Jackson | Work Completion Date:                              |   |
| Congressional District:     | 007, 009                    | Construction Contract Amount:                      |   |
| State Senate District.:     | 45, 47, 50                  | Construction Contractor:                           |   |
| State House District:       | 103, 104, 31, 32, 98        | <a href="#">Preconstruction Status Report</a>      |   |
| Project Type:               | Maintenance                 | <a href="#">Construction Status Report</a>         |   |
| Project Status:             | Construction Work Program   |                                                    |   |
| Right of Way Authorization: |                             | <a href="#">Submit feedback to project manager</a> |   |

### Project Description:

Bridge rehabilitaiton project involving raising the bridges, strengthening caps, correction of spalls, delamination and cracks in the substructure and deck, correction of broken anchor bolts, joint replacement, painting of the steel superstructure and application of at polymer overlay to the bridge decks. Bridge Structure ID #s, Locations: 1. 157-0022-0, Plainview Road (CR 250) over I-85 (SR 403) 2. 119-0032-0, SR 328 over I-85 (SR403) 3. 135-0029-0, Thompson Mill Road (CR 120) over I-985 (SR 419)

| Activity | Program Year | Cost Estimate | Date of Last Estimate |
|----------|--------------|---------------|-----------------------|
|----------|--------------|---------------|-----------------------|

| PROJ ID | COUNTY | DESCRIPTION |
|---------|--------|-------------|
|---------|--------|-------------|

0010242

Gwinnett

CS 1178/SOUTH LEE ST FM SR 13 TO CS 1086/WEST MORENO STREET

Mgmt Let Date:

5/20/2016

The project will construct new or expanded sidewalks for 0.9 miles along both sides of the corridor using a combination of brick and concrete. In addition, these improvements would include planting street trees and shrubs within a 4' pedestrian buffer zone and a center median, and it would install raised curbs, defined pedestrian crossings and shared lane bicycle markings, pedestrian scale lighting and other street furnishings, and ADA-accessible curb ramps. Concurrent with this work, storm sewer upgrades would be completed with project funding, and existing overhead utilities would be buried by the City with local funds in order to enhance the corridor's aesthetics while removing other pedestrian impediments. Improving pedestrian facilities along South Lee Street would facilitate greater connectivity between historic commercial uses along Main Street, as well as the goods and services located along Buford Highway.

PROJ NO:

MPO TIP#:

MPO:

PROJ LENGTH (MI):

TYPE WORK:

LET RESPONSIBILITY:

BIKE PROVISIONS INCLUDED?

SPONSOR:

PROJ MGR:

DOT DIST:

CONG DIST:

TYPE WORK:

HOUSE DIST:

SENATE DIST:

Buford

Stolz, Janet

1

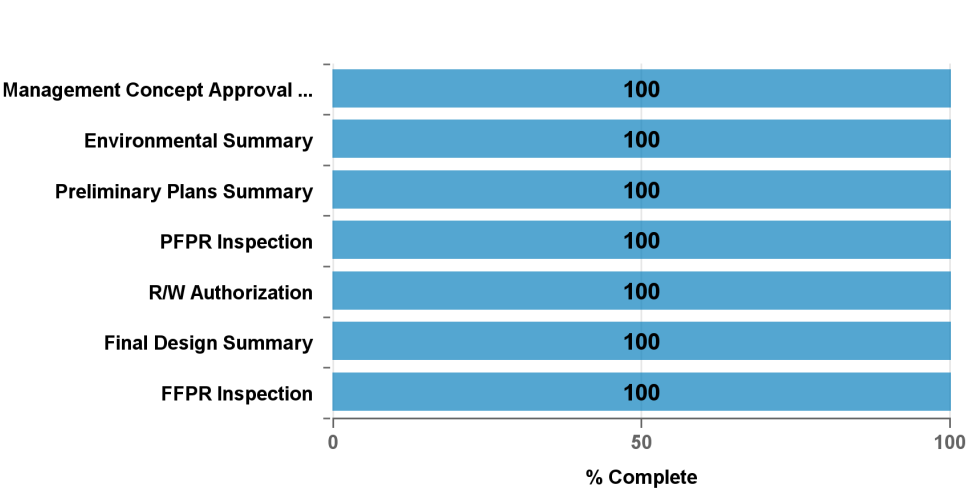
007

Bicycle/Ped. Facility

Local Let

N

| Phase                            | FY Approved | Approved FY Estimate * | Fund | Phase Status |
|----------------------------------|-------------|------------------------|------|--------------|
| Engineering                      | 2011        | \$283,000.00           | Q23  | AUTHORIZED   |
| Right of Way                     | 2014        | \$690,000.00           | 33C  | AUTHORIZED   |
| Construction                     | 2016        | \$3,895,980.35         | M230 | AUTHORIZED   |
| * Inflation Included in Estimate |             |                        |      |              |



| Activity                             | Actual Start Date | Actual Finish Date |
|--------------------------------------|-------------------|--------------------|
| Management Concept Approval Complete | 10/26/2012        | 10/26/2012         |
| Environmental Summary                | 11/1/2011         | 12/6/2013          |
| Preliminary Plans Summary            | 6/6/2006          | 11/25/2013         |
| PFPR Inspection                      | 9/4/2013          | 9/4/2013           |
| R/W Authorization                    | 6/20/2014         | 6/20/2014          |
| Final Design Summary                 | 6/30/2014         | 7/7/2015           |
| FFPR Inspection                      | 6/4/2015          | 6/4/2015           |

Right of Way Acquisition Information:

Preliminary Parcel Count:32

Total Parcel Count:30

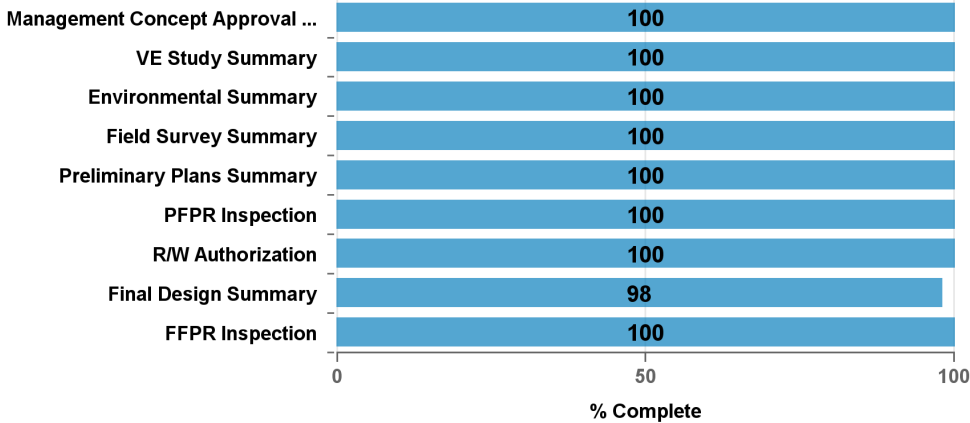
Acquired by:LOC



| PROJ ID        | COUNTY    | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0004430        | Gwinnett  | SR 20 FM E OF BURNETTE TRAIL TO PEACHTREE IND BLVD-GRTA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Mgmt Let Date: | 1/18/2013 | The proposed project would widen SR 20 from a two lane rural section to a four lane urban section from approximately 1,000 feet west of Mountain Ridge Road to Peachtree Industrial Boulevard in Gwinnett County. The typical section will include four- through lanes, a 44-foot grassed median, 16-foot shoulders, curb & gutter on the outside pavement edges, and five-foot concrete sidewalks on both sides of the roadway. Design will accommodate for the future widening of two additional lanes. Project length is 3.91 miles. |

|                           |                    |              |                                           |
|---------------------------|--------------------|--------------|-------------------------------------------|
| PROJ NO:                  | MSL00-0004-00(430) | SPONSOR:     | Georgia Regional Transportation Authority |
| MPO TIP#:                 | GW-020A1           | PROJ MGR:    | Patel, Hiral P.                           |
| MPO:                      | Atlanta TMA        | DOT DIST:    | 1                                         |
| PROJ LENGTH (MI):         | 3.71               | CONG DIST:   | 007                                       |
| TYPE WORK:                | Widening           | TYPE WORK:   | Widening                                  |
| LET RESPONSIBILITY:       | Local Let          | HOUSE DIST:  |                                           |
| BIKE PROVISIONS INCLUDED? | Y                  | SENATE DIST: |                                           |

| Phase        | FY Approved | Approved FY Estimate * | Fund | Phase Status |
|--------------|-------------|------------------------|------|--------------|
| Engineering  | 2003        | \$966,143.93           | CFTS | AUTHORIZED   |
| Engineering  | 2003        | \$1,228,829.43         | Q23  | AUTHORIZED   |
| Right of Way | 2011        | \$28,500,000.00        | L050 | AUTHORIZED   |
| Right of Way | 2011        | \$11,000,000.00        | L240 | AUTHORIZED   |
| Construction | 2013        | \$30,130,959.00        | M001 | AUTHORIZED   |
| UTL          | 2013        | \$4,725,769.74         | H17A | AUTHORIZED   |
| UTL          | 2013        | \$491,965.00           | H66A | AUTHORIZED   |



| Activity                             | Actual Start Date | Actual Finish Date |
|--------------------------------------|-------------------|--------------------|
| Management Concept Approval Complete | 2/17/2006         | 2/17/2006          |
| VE Study Summary                     | 8/8/2007          | 6/26/2008          |
| Environmental Summary                | 3/15/2005         | 6/2/2010           |
| Field Survey Summary                 | 7/12/2005         |                    |
| Preliminary Plans Summary            | 2/28/2006         | 6/21/2010          |
| PFPR Inspection                      | 3/26/2008         | 3/26/2008          |
| R/W Authorization                    | 12/10/2010        | 12/10/2010         |
| Final Design Summary                 | 12/1/2010         |                    |
| FFPR Inspection                      | 6/19/2012         | 6/20/2012          |

Right of Way Acquisition Information:

|                           |     |                     |     |              |     |
|---------------------------|-----|---------------------|-----|--------------|-----|
| Preliminary Parcel Count: | 173 | Total Parcel Count: | 208 | Acquired by: | LOC |
|---------------------------|-----|---------------------|-----|--------------|-----|



## I-985 FROM I-85/GWINNETT TO SR 369/HALL

|                             |                           |                                                    |   |
|-----------------------------|---------------------------|----------------------------------------------------|---|
| Project ID:                 | <b>M005451</b>            | Notice to Proceed Date:                            |   |
| Project Manager:            | E. Reid Mathews           | Construction Percent Complete:                     | % |
| Office:                     | Maintenance               | Current Completion Date:                           |   |
| County:                     | Gwinnett, Hall            | Work Completion Date:                              |   |
| Congressional District:     | 007, 009                  | Construction Contract Amount:                      |   |
| State Senate District.:     | 045, 049                  | Construction Contractor:                           |   |
| State House District:       | 029, 030, 098, 102, 103   | <a href="#">Preconstruction Status Report</a>      |   |
| Project Type:               | Maintenance               | <a href="#">Construction Status Report</a>         |   |
| Project Status:             | Construction Work Program |                                                    |   |
| Right of Way Authorization: |                           | <a href="#">Submit feedback to project manager</a> |   |

### Project Description:

This project is the restriping of I-985 because the existing striping is deteriorating.

| Activity                        | Program Year | Cost Estimate  | Date of Last Estimate |
|---------------------------------|--------------|----------------|-----------------------|
| MCST (Maintenance Construction) | 2017         | \$3,094,833.06 |                       |

## **Existing Intersection Analysis**

## Queues

Existing AM

## 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)

11/15/2016



| Lane Group              | EBL   | EBT   | WBT   | WBR   | NBL   | NBT   | NBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↰     | ↱↱    | ↰↰↰   | ↱     | ↰     | ↱     | ↰     |
| Traffic Volume (vph)    | 355   | 387   | 1203  | 312   | 303   | 4     | 83    |
| Future Volume (vph)     | 355   | 387   | 1203  | 312   | 303   | 4     | 83    |
| Lane Group Flow (vph)   | 418   | 412   | 1399  | 405   | 180   | 180   | 115   |
| Turn Type               | Prot  | NA    | NA    | Perm  | Perm  | NA    | Perm  |
| Protected Phases        | 5     | 2     | 6     |       |       | 8     |       |
| Permitted Phases        |       |       |       | 6     | 8     |       | 8     |
| Detector Phase          | 5     | 2     | 6     | 6     | 8     | 8     | 8     |
| Switch Phase            |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 4.0   | 15.0  | 15.0  | 15.0  | 6.0   | 6.0   | 6.0   |
| Minimum Split (s)       | 11.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 46.0  | 95.0  | 49.0  | 49.0  | 25.0  | 25.0  | 25.0  |
| Total Split (%)         | 38.3% | 79.2% | 40.8% | 40.8% | 20.8% | 20.8% | 20.8% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  |
| Total Lost Time (s)     | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| Lead/Lag                | Lead  |       | Lag   | Lag   |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |
| Recall Mode             | None  | C-Min | C-Min | C-Min | None  | None  | None  |
| v/c Ratio               | 0.81  | 0.15  | 0.59  | 0.43  | 0.69  | 0.69  | 0.33  |
| Control Delay           | 34.8  | 10.2  | 27.1  | 3.9   | 61.7  | 61.5  | 10.4  |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 34.8  | 10.2  | 27.1  | 3.9   | 61.7  | 61.5  | 10.4  |
| Queue Length 50th (ft)  | 308   | 139   | 299   | 0     | 138   | 138   | 0     |
| Queue Length 95th (ft)  | 401   | 147   | 368   | 23    | 207   | 112   | 25    |
| Internal Link Dist (ft) |       | 591   | 1139  |       |       | 825   |       |
| Turn Bay Length (ft)    |       |       |       | 840   |       |       | 510   |
| Base Capacity (vph)     | 625   | 2812  | 2362  | 948   | 297   | 298   | 377   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.67  | 0.15  | 0.59  | 0.43  | 0.61  | 0.60  | 0.31  |

## Intersection Summary

Cycle Length: 120

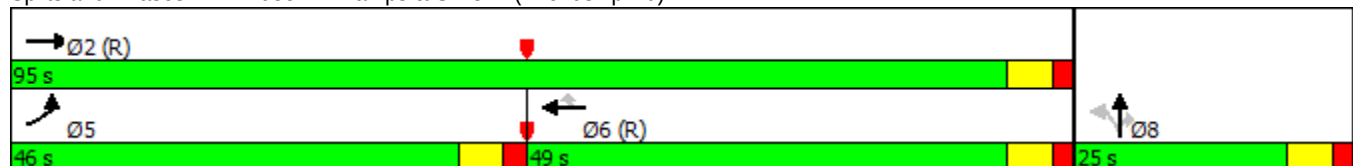
Actuated Cycle Length: 120

Offset: 90 (75%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Splits and Phases: 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)



# HCM Signalized Intersection Capacity Analysis

## 1: I-985 NB Ramps & SR 347 (Friendship Rd)

Existing AM  
11/15/2016

|                                   |  |                                                                                    |  |  |                                                                                                                                                                      |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                                                                                                                 | EBR                                                                               | WBL                                                                               | WBT                                                                                                                                                                                                                                                   | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |   |                                                                                   |                                                                                   |    |  |  |  |  |                                                                                     |                                                                                     |                                                                                     |
| Traffic Volume (vph)              | 355                                                                               | 387                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1203                                                                                                                                                                                                                                                  | 312                                                                               | 303                                                                                 | 4                                                                                   | 83                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Future Volume (vph)               | 355                                                                               | 387                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1203                                                                                                                                                                                                                                                  | 312                                                                               | 303                                                                                 | 4                                                                                   | 83                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                                                                                                                | 1900                                                                              | 1900                                                                              | 1900                                                                                                                                                                                                                                                  | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 4.0                                                                               | 4.0                                                                                                                                                                 |                                                                                   |                                                                                   | 4.0                                                                                                                                                                                                                                                   | 4.0                                                                               | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Util. Factor                 | 1.00                                                                              | 0.95                                                                                                                                                                |                                                                                   |                                                                                   | 0.91                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Frt                               | 1.00                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (prot)                 | 1787                                                                              | 3610                                                                                                                                                                |                                                                                   |                                                                                   | 5187                                                                                                                                                                                                                                                  | 1599                                                                              | 1698                                                                                | 1706                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Permitted                     | 0.95                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (perm)                 | 1787                                                                              | 3610                                                                                                                                                                |                                                                                   |                                                                                   | 5187                                                                                                                                                                                                                                                  | 1599                                                                              | 1698                                                                                | 1706                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Peak-hour factor, PHF             | 0.85                                                                              | 0.94                                                                                                                                                                | 0.92                                                                              | 0.92                                                                              | 0.86                                                                                                                                                                                                                                                  | 0.77                                                                              | 0.86                                                                                | 0.50                                                                                | 0.72                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Adj. Flow (vph)                   | 418                                                                               | 412                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1399                                                                                                                                                                                                                                                  | 405                                                                               | 352                                                                                 | 8                                                                                   | 115                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                                                                                                                                                                                     | 220                                                                               | 0                                                                                   | 0                                                                                   | 97                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 418                                                                               | 412                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1399                                                                                                                                                                                                                                                  | 185                                                                               | 180                                                                                 | 180                                                                                 | 18                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Heavy Vehicles (%)                | 1%                                                                                | 0%                                                                                                                                                                  | 0%                                                                                | 0%                                                                                | 0%                                                                                                                                                                                                                                                    | 1%                                                                                | 1%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  |
| Turn Type                         | Prot                                                                              | NA                                                                                                                                                                  |                                                                                   |                                                                                   | NA                                                                                                                                                                                                                                                    | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Protected Phases                  | 5                                                                                 | 2                                                                                                                                                                   |                                                                                   |                                                                                   | 6                                                                                                                                                                                                                                                     |                                                                                   |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Permitted Phases                  |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Actuated Green, G (s)             | 32.8                                                                              | 91.5                                                                                                                                                                |                                                                                   |                                                                                   | 52.7                                                                                                                                                                                                                                                  | 52.7                                                                              | 16.5                                                                                | 16.5                                                                                | 16.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Effective Green, g (s)            | 34.8                                                                              | 93.5                                                                                                                                                                |                                                                                   |                                                                                   | 54.7                                                                                                                                                                                                                                                  | 54.7                                                                              | 18.5                                                                                | 18.5                                                                                | 18.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Actuated g/C Ratio                | 0.29                                                                              | 0.78                                                                                                                                                                |                                                                                   |                                                                                   | 0.46                                                                                                                                                                                                                                                  | 0.46                                                                              | 0.15                                                                                | 0.15                                                                                | 0.15                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                                                                                                                 |                                                                                   |                                                                                   | 6.0                                                                                                                                                                                                                                                   | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Vehicle Extension (s)             | 3.0                                                                               | 5.0                                                                                                                                                                 |                                                                                   |                                                                                   | 5.0                                                                                                                                                                                                                                                   | 5.0                                                                               | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Grp Cap (vph)                | 518                                                                               | 2812                                                                                                                                                                |                                                                                   |                                                                                   | 2364                                                                                                                                                                                                                                                  | 728                                                                               | 261                                                                                 | 263                                                                                 | 248                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Prot                    | c0.23                                                                             | 0.11                                                                                                                                                                |                                                                                   |                                                                                   | c0.27                                                                                                                                                                                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       | 0.12                                                                              | c0.11                                                                               | 0.11                                                                                | 0.01                                                                                |                                                                                     |                                                                                     |                                                                                     |
| v/c Ratio                         | 0.81                                                                              | 0.15                                                                                                                                                                |                                                                                   |                                                                                   | 0.59                                                                                                                                                                                                                                                  | 0.25                                                                              | 0.69                                                                                | 0.68                                                                                | 0.07                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Uniform Delay, d1                 | 39.5                                                                              | 3.3                                                                                                                                                                 |                                                                                   |                                                                                   | 24.3                                                                                                                                                                                                                                                  | 20.1                                                                              | 48.0                                                                                | 48.0                                                                                | 43.4                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Progression Factor                | 0.59                                                                              | 2.85                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Incremental Delay, d2             | 8.5                                                                               | 0.1                                                                                                                                                                 |                                                                                   |                                                                                   | 1.1                                                                                                                                                                                                                                                   | 0.8                                                                               | 7.4                                                                                 | 7.2                                                                                 | 0.1                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Delay (s)                         | 31.6                                                                              | 9.5                                                                                                                                                                 |                                                                                   |                                                                                   | 25.4                                                                                                                                                                                                                                                  | 20.9                                                                              | 55.4                                                                                | 55.2                                                                                | 43.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  | C                                                                                 | A                                                                                                                                                                   |                                                                                   |                                                                                   | C                                                                                                                                                                                                                                                     | C                                                                                 | E                                                                                   | E                                                                                   | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                |                                                                                   | 20.7                                                                                                                                                                |                                                                                   |                                                                                   | 24.4                                                                                                                                                                                                                                                  |                                                                                   |                                                                                     | 52.4                                                                                |                                                                                     |                                                                                     | 0.0                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                                                                                                   |                                                                                   |                                                                                   | C                                                                                                                                                                                                                                                     |                                                                                   |                                                                                     | D                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                                                                                                     | 27.7                                                                              |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   | HCM 2000 Level of Service                                                           |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                                                                                                     | 0.68                                                                              |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                                                                                                     | 120.0                                                                             |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   | Sum of lost time (s)                                                                |                                                                                     |                                                                                     | 12.0                                                                                |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                                                                                                     | 62.9%                                                                             |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   | ICU Level of Service                                                                |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                                                                                                     | 15                                                                                |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

Existing AM

## 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)

11/15/2016



| Lane Group              | EBT   | EBR   | WBL   | WBT   | SBL   | SBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↑↑↑   | ↑     | ↵     | ↑↑    | ↵     | ↑     |
| Traffic Volume (vph)    | 627   | 382   | 472   | 1061  | 112   | 435   |
| Future Volume (vph)     | 627   | 382   | 472   | 1061  | 112   | 435   |
| Lane Group Flow (vph)   | 729   | 424   | 543   | 1294  | 132   | 518   |
| Turn Type               | NA    | Perm  | Prot  | NA    | Perm  | Perm  |
| Protected Phases        | 2     |       | 1     | 6     |       |       |
| Permitted Phases        |       | 2     |       |       | 4     | 4     |
| Detector Phase          | 2     | 2     | 1     | 6     | 4     | 4     |
| Switch Phase            |       |       |       |       |       |       |
| Minimum Initial (s)     | 15.0  | 15.0  | 4.0   | 15.0  | 6.0   | 6.0   |
| Minimum Split (s)       | 24.0  | 24.0  | 11.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 36.0  | 36.0  | 30.0  | 66.0  | 54.0  | 54.0  |
| Total Split (%)         | 30.0% | 30.0% | 25.0% | 55.0% | 45.0% | 45.0% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  |
| Total Lost Time (s)     | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| Lead/Lag                | Lag   | Lag   | Lead  |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |
| Recall Mode             | C-Min | C-Min | None  | C-Min | None  | None  |
| v/c Ratio               | 0.41  | 0.51  | 0.77  | 0.62  | 0.21  | 0.85  |
| Control Delay           | 24.9  | 3.9   | 37.9  | 8.9   | 26.7  | 43.8  |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.3   | 0.0   | 0.0   |
| Total Delay             | 24.9  | 3.9   | 37.9  | 9.1   | 26.7  | 43.8  |
| Queue Length 50th (ft)  | 99    | 25    | 177   | 375   | 70    | 313   |
| Queue Length 95th (ft)  | 117   | 37    | 184   | 427   | 101   | 371   |
| Internal Link Dist (ft) | 904   |       |       | 591   |       |       |
| Turn Bay Length (ft)    |       | 375   | 380   |       |       |       |
| Base Capacity (vph)     | 1800  | 830   | 751   | 2096  | 752   | 714   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 258   | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.41  | 0.51  | 0.72  | 0.70  | 0.18  | 0.73  |

## Intersection Summary

Cycle Length: 120

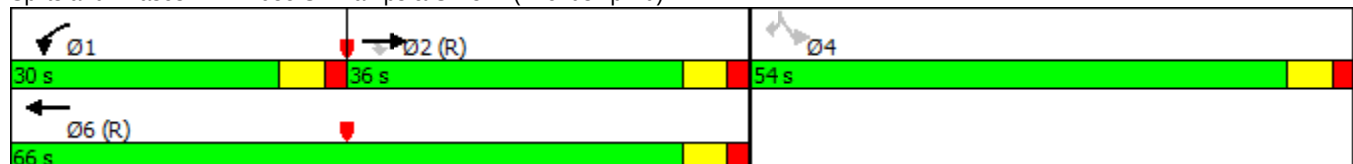
Actuated Cycle Length: 120

Offset: 19 (16%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)



# HCM Signalized Intersection Capacity Analysis

## 2: I-985 SB Ramps & SR 347 (Friendship Rd)

Existing AM

11/15/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   | ↑↑↑                                                                               | ↑                                                                                 | ↑↑                                                                                | ↑↑                                                                                |                                                                                   |                                                                                    |                                                                                     |                                                                                     | ↑                                                                                   |                                                                                     | ↑                                                                                   |
| Traffic Volume (vph)              | 0                                                                                 | 627                                                                               | 382                                                                               | 472                                                                               | 1061                                                                              | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 112                                                                                 | 0                                                                                   | 435                                                                                 |
| Future Volume (vph)               | 0                                                                                 | 627                                                                               | 382                                                                               | 472                                                                               | 1061                                                                              | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 112                                                                                 | 0                                                                                   | 435                                                                                 |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 4.0                                                                                 |                                                                                     | 4.0                                                                                 |
| Lane Util. Factor                 |                                                                                   | 0.91                                                                              | 1.00                                                                              | 0.97                                                                              | 0.95                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Frt                               |                                                                                   | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     | 0.85                                                                                |
| Flt Protected                     |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.95                                                                                |                                                                                     | 1.00                                                                                |
| Satd. Flow (prot)                 |                                                                                   | 5136                                                                              | 1583                                                                              | 3467                                                                              | 3574                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 1805                                                                                |                                                                                     | 1599                                                                                |
| Flt Permitted                     |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.95                                                                                |                                                                                     | 1.00                                                                                |
| Satd. Flow (perm)                 |                                                                                   | 5136                                                                              | 1583                                                                              | 3467                                                                              | 3574                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 1805                                                                                |                                                                                     | 1599                                                                                |
| Peak-hour factor, PHF             | 0.92                                                                              | 0.86                                                                              | 0.90                                                                              | 0.87                                                                              | 0.82                                                                              | 0.92                                                                              | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.85                                                                                | 0.92                                                                                | 0.84                                                                                |
| Adj. Flow (vph)                   | 0                                                                                 | 729                                                                               | 424                                                                               | 543                                                                               | 1294                                                                              | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 132                                                                                 | 0                                                                                   | 518                                                                                 |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 275                                                                               | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 54                                                                                  |
| Lane Group Flow (vph)             | 0                                                                                 | 729                                                                               | 149                                                                               | 543                                                                               | 1294                                                                              | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 132                                                                                 | 0                                                                                   | 464                                                                                 |
| Heavy Vehicles (%)                | 0%                                                                                | 1%                                                                                | 2%                                                                                | 1%                                                                                | 1%                                                                                | 0%                                                                                | 0%                                                                                 | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 1%                                                                                  |
| Turn Type                         |                                                                                   | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                |                                                                                   |                                                                                    |                                                                                     |                                                                                     | Perm                                                                                |                                                                                     | Perm                                                                                |
| Protected Phases                  |                                                                                   | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Permitted Phases                  |                                                                                   |                                                                                   | 2                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 4                                                                                   |                                                                                     | 4                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 40.1                                                                              | 40.1                                                                              | 22.3                                                                              | 68.4                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 39.6                                                                                |                                                                                     | 39.6                                                                                |
| Effective Green, g (s)            |                                                                                   | 42.1                                                                              | 42.1                                                                              | 24.3                                                                              | 70.4                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 41.6                                                                                |                                                                                     | 41.6                                                                                |
| Actuated g/C Ratio                |                                                                                   | 0.35                                                                              | 0.35                                                                              | 0.20                                                                              | 0.59                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.35                                                                                |                                                                                     | 0.35                                                                                |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 6.0                                                                                 |                                                                                     | 6.0                                                                                 |
| Vehicle Extension (s)             |                                                                                   | 5.0                                                                               | 5.0                                                                               | 3.0                                                                               | 5.0                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 3.0                                                                                 |                                                                                     | 3.0                                                                                 |
| Lane Grp Cap (vph)                |                                                                                   | 1801                                                                              | 555                                                                               | 702                                                                               | 2096                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 625                                                                                 |                                                                                     | 554                                                                                 |
| v/s Ratio Prot                    |                                                                                   | 0.14                                                                              |                                                                                   | c0.16                                                                             | c0.36                                                                             |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                   | 0.09                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.07                                                                                |                                                                                     | c0.29                                                                               |
| v/c Ratio                         |                                                                                   | 0.40                                                                              | 0.27                                                                              | 0.77                                                                              | 0.62                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.21                                                                                |                                                                                     | 0.84                                                                                |
| Uniform Delay, d1                 |                                                                                   | 29.5                                                                              | 27.9                                                                              | 45.2                                                                              | 16.1                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 27.6                                                                                |                                                                                     | 36.1                                                                                |
| Progression Factor                |                                                                                   | 0.77                                                                              | 0.56                                                                              | 0.69                                                                              | 0.44                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Incremental Delay, d2             |                                                                                   | 0.6                                                                               | 1.1                                                                               | 4.4                                                                               | 1.1                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.2                                                                                 |                                                                                     | 10.7                                                                                |
| Delay (s)                         |                                                                                   | 23.3                                                                              | 16.8                                                                              | 35.6                                                                              | 8.2                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 27.8                                                                                |                                                                                     | 46.8                                                                                |
| Level of Service                  |                                                                                   | C                                                                                 | B                                                                                 | D                                                                                 | A                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     | C                                                                                   |                                                                                     | D                                                                                   |
| Approach Delay (s)                |                                                                                   | 20.9                                                                              |                                                                                   |                                                                                   | 16.3                                                                              |                                                                                   |                                                                                    | 0.0                                                                                 |                                                                                     |                                                                                     | 42.9                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                    | A                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 22.5                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                    |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.77                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                    |                                                                                     |                                                                                     | 14.0                                                                                |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 62.9%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                    |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

Existing AM

## 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)

11/15/2016

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations     |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 135                                                                               | 570                                                                               | 94                                                                                | 389                                                                               | 577                                                                               | 74                                                                                | 87                                                                                 | 131                                                                                 | 161                                                                                 | 232                                                                                 | 268                                                                                 | 123                                                                                 |
| Future Volume (vph)     | 135                                                                               | 570                                                                               | 94                                                                                | 389                                                                               | 577                                                                               | 74                                                                                | 87                                                                                 | 131                                                                                 | 161                                                                                 | 232                                                                                 | 268                                                                                 | 123                                                                                 |
| Lane Group Flow (vph)   | 157                                                                               | 655                                                                               | 124                                                                               | 423                                                                               | 687                                                                               | 104                                                                               | 112                                                                                | 147                                                                                 | 187                                                                                 | 239                                                                                 | 312                                                                                 | 152                                                                                 |
| Turn Type               | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                              | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases        | 5                                                                                 | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   | 3                                                                                  | 8                                                                                   |                                                                                     | 7                                                                                   | 4                                                                                   |                                                                                     |
| Permitted Phases        | 2                                                                                 |                                                                                   | 2                                                                                 | 6                                                                                 |                                                                                   | 6                                                                                 | 8                                                                                  |                                                                                     | 8                                                                                   | 4                                                                                   |                                                                                     | 4                                                                                   |
| Detector Phase          | 5                                                                                 | 2                                                                                 | 2                                                                                 | 1                                                                                 | 6                                                                                 | 6                                                                                 | 3                                                                                  | 8                                                                                   | 8                                                                                   | 7                                                                                   | 4                                                                                   | 4                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 4.0                                                                               | 15.0                                                                              | 15.0                                                                              | 4.0                                                                               | 15.0                                                                              | 15.0                                                                              | 4.0                                                                                | 6.0                                                                                 | 6.0                                                                                 | 4.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Minimum Split (s)       | 11.0                                                                              | 37.0                                                                              | 37.0                                                                              | 11.0                                                                              | 37.0                                                                              | 37.0                                                                              | 11.0                                                                               | 42.0                                                                                | 42.0                                                                                | 11.0                                                                                | 42.0                                                                                | 42.0                                                                                |
| Total Split (s)         | 14.0                                                                              | 38.0                                                                              | 38.0                                                                              | 29.0                                                                              | 53.0                                                                              | 53.0                                                                              | 11.0                                                                               | 42.0                                                                                | 42.0                                                                                | 11.0                                                                                | 42.0                                                                                | 42.0                                                                                |
| Total Split (%)         | 11.7%                                                                             | 31.7%                                                                             | 31.7%                                                                             | 24.2%                                                                             | 44.2%                                                                             | 44.2%                                                                             | 9.2%                                                                               | 35.0%                                                                               | 35.0%                                                                               | 9.2%                                                                                | 35.0%                                                                               | 35.0%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    | -2.0                                                                              | -2.0                                                                              | -2.0                                                                              | -2.0                                                                              | -2.0                                                                              | -2.0                                                                              | -2.0                                                                               | -2.0                                                                                | -2.0                                                                                | -2.0                                                                                | -2.0                                                                                | -2.0                                                                                |
| Total Lost Time (s)     | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| Lead/Lag                | Lead                                                                              | Lag                                                                               | Lag                                                                               | Lead                                                                              | Lag                                                                               | Lag                                                                               | Lead                                                                               | Lag                                                                                 | Lag                                                                                 | Lead                                                                                | Lag                                                                                 | Lag                                                                                 |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | C-Min                                                                             | C-Min                                                                             | None                                                                              | C-Min                                                                             | C-Min                                                                             | None                                                                               | None                                                                                | None                                                                                | None                                                                                | None                                                                                | None                                                                                |
| v/c Ratio               | 0.37                                                                              | 0.48                                                                              | 0.17                                                                              | 0.75                                                                              | 0.38                                                                              | 0.12                                                                              | 0.54                                                                               | 0.34                                                                                | 0.37                                                                                | 0.71                                                                                | 0.73                                                                                | 0.30                                                                                |
| Control Delay           | 15.5                                                                              | 31.1                                                                              | 1.0                                                                               | 23.3                                                                              | 12.1                                                                              | 0.3                                                                               | 29.5                                                                               | 31.1                                                                                | 10.5                                                                                | 46.5                                                                                | 52.8                                                                                | 3.5                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 15.5                                                                              | 31.1                                                                              | 1.0                                                                               | 23.3                                                                              | 12.1                                                                              | 0.3                                                                               | 29.5                                                                               | 31.1                                                                                | 10.5                                                                                | 46.5                                                                                | 52.8                                                                                | 3.5                                                                                 |
| Queue Length 50th (ft)  | 48                                                                                | 202                                                                               | 0                                                                                 | 101                                                                               | 106                                                                               | 0                                                                                 | 63                                                                                 | 93                                                                                  | 36                                                                                  | 146                                                                                 | 225                                                                                 | 0                                                                                   |
| Queue Length 95th (ft)  | 89                                                                                | 275                                                                               | 0                                                                                 | #258                                                                              | 141                                                                               | 0                                                                                 | 85                                                                                 | 150                                                                                 | 96                                                                                  | 200                                                                                 | 284                                                                                 | 12                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 1576                                                                              |                                                                                   |                                                                                   | 3513                                                                              |                                                                                   |                                                                                    | 1183                                                                                |                                                                                     |                                                                                     | 1183                                                                                |                                                                                     |
| Turn Bay Length (ft)    | 250                                                                               |                                                                                   | 370                                                                               | 300                                                                               |                                                                                   | 310                                                                               | 240                                                                                |                                                                                     | 250                                                                                 | 300                                                                                 |                                                                                     | 215                                                                                 |
| Base Capacity (vph)     | 426                                                                               | 1363                                                                              | 716                                                                               | 569                                                                               | 1803                                                                              | 836                                                                               | 209                                                                                | 595                                                                                 | 627                                                                                 | 336                                                                                 | 595                                                                                 | 631                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.37                                                                              | 0.48                                                                              | 0.17                                                                              | 0.74                                                                              | 0.38                                                                              | 0.12                                                                              | 0.54                                                                               | 0.25                                                                                | 0.30                                                                                | 0.71                                                                                | 0.52                                                                                | 0.24                                                                                |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 80 (67%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

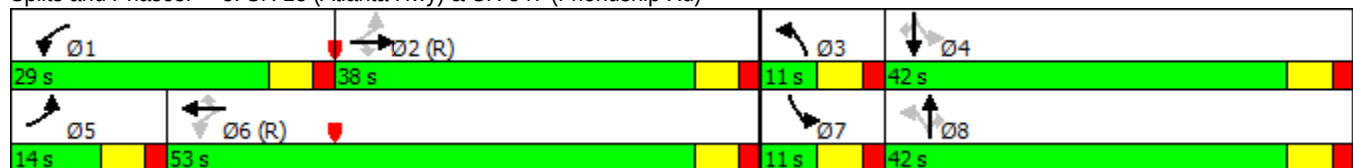
Natural Cycle: 105

Control Type: Actuated-Coordinated

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

## Splits and Phases: 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)





# HCM Signalized Intersection Capacity Analysis

## 3: SR 13 (Atlanta Hwy) & SR 347 (Friendship Rd)

Existing AM  
11/15/2016

|                        |  |  |  |  |  |  |   |  |  |  |  |  |
|------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement               | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations    |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)   | 135                                                                               | 570                                                                               | 94                                                                                | 389                                                                               | 577                                                                               | 74                                                                                | 87                                                                                  | 131                                                                                 | 161                                                                                 | 232                                                                                 | 268                                                                                 | 123                                                                                 |
| Future Volume (vph)    | 135                                                                               | 570                                                                               | 94                                                                                | 389                                                                               | 577                                                                               | 74                                                                                | 87                                                                                  | 131                                                                                 | 161                                                                                 | 232                                                                                 | 268                                                                                 | 123                                                                                 |
| Ideal Flow (vphpl)     | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)    | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| Lane Util. Factor      | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Frt                    | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected          | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)      | 1787                                                                              | 3610                                                                              | 1583                                                                              | 1787                                                                              | 3610                                                                              | 1538                                                                              | 1787                                                                                | 1881                                                                                | 1568                                                                                | 1752                                                                                | 1881                                                                                | 1583                                                                                |
| Flt Permitted          | 0.39                                                                              | 1.00                                                                              | 1.00                                                                              | 0.26                                                                              | 1.00                                                                              | 1.00                                                                              | 0.25                                                                                | 1.00                                                                                | 1.00                                                                                | 0.56                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)      | 734                                                                               | 3610                                                                              | 1583                                                                              | 487                                                                               | 3610                                                                              | 1538                                                                              | 463                                                                                 | 1881                                                                                | 1568                                                                                | 1032                                                                                | 1881                                                                                | 1583                                                                                |
| Peak-hour factor, PHF  | 0.86                                                                              | 0.87                                                                              | 0.76                                                                              | 0.92                                                                              | 0.84                                                                              | 0.71                                                                              | 0.78                                                                                | 0.89                                                                                | 0.86                                                                                | 0.97                                                                                | 0.86                                                                                | 0.81                                                                                |
| Adj. Flow (vph)        | 157                                                                               | 655                                                                               | 124                                                                               | 423                                                                               | 687                                                                               | 104                                                                               | 112                                                                                 | 147                                                                                 | 187                                                                                 | 239                                                                                 | 312                                                                                 | 152                                                                                 |
| RTOR Reduction (vph)   | 0                                                                                 | 0                                                                                 | 77                                                                                | 0                                                                                 | 0                                                                                 | 52                                                                                | 0                                                                                   | 0                                                                                   | 145                                                                                 | 0                                                                                   | 0                                                                                   | 118                                                                                 |
| Lane Group Flow (vph)  | 157                                                                               | 655                                                                               | 47                                                                                | 423                                                                               | 687                                                                               | 52                                                                                | 112                                                                                 | 147                                                                                 | 42                                                                                  | 239                                                                                 | 312                                                                                 | 34                                                                                  |
| Heavy Vehicles (%)     | 1%                                                                                | 0%                                                                                | 2%                                                                                | 1%                                                                                | 0%                                                                                | 5%                                                                                | 1%                                                                                  | 1%                                                                                  | 3%                                                                                  | 3%                                                                                  | 1%                                                                                  | 2%                                                                                  |
| Turn Type              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                               | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases       | 5                                                                                 | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   | 3                                                                                   | 8                                                                                   |                                                                                     | 7                                                                                   | 4                                                                                   |                                                                                     |
| Permitted Phases       | 2                                                                                 |                                                                                   | 2                                                                                 | 6                                                                                 |                                                                                   | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   | 4                                                                                   |                                                                                     | 4                                                                                   |
| Actuated Green, G (s)  | 51.2                                                                              | 43.4                                                                              | 43.4                                                                              | 71.8                                                                              | 58.0                                                                              | 58.0                                                                              | 30.2                                                                                | 25.2                                                                                | 25.2                                                                                | 30.2                                                                                | 25.2                                                                                | 25.2                                                                                |
| Effective Green, g (s) | 55.2                                                                              | 45.4                                                                              | 45.4                                                                              | 73.8                                                                              | 60.0                                                                              | 60.0                                                                              | 34.2                                                                                | 27.2                                                                                | 27.2                                                                                | 34.2                                                                                | 27.2                                                                                | 27.2                                                                                |
| Actuated g/C Ratio     | 0.46                                                                              | 0.38                                                                              | 0.38                                                                              | 0.61                                                                              | 0.50                                                                              | 0.50                                                                              | 0.29                                                                                | 0.23                                                                                | 0.23                                                                                | 0.29                                                                                | 0.23                                                                                | 0.23                                                                                |
| Clearance Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)  | 3.0                                                                               | 5.0                                                                               | 5.0                                                                               | 3.0                                                                               | 5.0                                                                               | 5.0                                                                               | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 |
| Lane Grp Cap (vph)     | 423                                                                               | 1365                                                                              | 598                                                                               | 563                                                                               | 1805                                                                              | 769                                                                               | 209                                                                                 | 426                                                                                 | 355                                                                                 | 336                                                                                 | 426                                                                                 | 358                                                                                 |
| v/s Ratio Prot         | 0.03                                                                              | 0.18                                                                              |                                                                                   | c0.15                                                                             | 0.19                                                                              |                                                                                   | 0.03                                                                                | 0.08                                                                                |                                                                                     | c0.04                                                                               | c0.17                                                                               |                                                                                     |
| v/s Ratio Perm         | 0.14                                                                              |                                                                                   | 0.03                                                                              | c0.31                                                                             |                                                                                   | 0.03                                                                              | 0.12                                                                                |                                                                                     | 0.03                                                                                | 0.16                                                                                |                                                                                     | 0.02                                                                                |
| v/c Ratio              | 0.37                                                                              | 0.48                                                                              | 0.08                                                                              | 0.75                                                                              | 0.38                                                                              | 0.07                                                                              | 0.54                                                                                | 0.35                                                                                | 0.12                                                                                | 0.71                                                                                | 0.73                                                                                | 0.10                                                                                |
| Uniform Delay, d1      | 19.2                                                                              | 28.3                                                                              | 23.9                                                                              | 14.6                                                                              | 18.5                                                                              | 15.5                                                                              | 33.8                                                                                | 38.9                                                                                | 36.9                                                                                | 38.0                                                                                | 43.0                                                                                | 36.7                                                                                |
| Progression Factor     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.16                                                                              | 0.59                                                                              | 0.02                                                                              | 0.70                                                                                | 0.77                                                                                | 1.90                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Incremental Delay, d2  | 0.6                                                                               | 1.2                                                                               | 0.3                                                                               | 4.3                                                                               | 0.5                                                                               | 0.1                                                                               | 2.6                                                                                 | 0.5                                                                                 | 0.1                                                                                 | 6.9                                                                                 | 6.4                                                                                 | 0.1                                                                                 |
| Delay (s)              | 19.7                                                                              | 29.5                                                                              | 24.2                                                                              | 21.3                                                                              | 11.4                                                                              | 0.5                                                                               | 26.1                                                                                | 30.4                                                                                | 70.2                                                                                | 45.0                                                                                | 49.4                                                                                | 36.8                                                                                |
| Level of Service       | B                                                                                 | C                                                                                 | C                                                                                 | C                                                                                 | B                                                                                 | A                                                                                 | C                                                                                   | C                                                                                   | E                                                                                   | D                                                                                   | D                                                                                   | D                                                                                   |
| Approach Delay (s)     |                                                                                   | 27.2                                                                              |                                                                                   |                                                                                   | 13.9                                                                              |                                                                                   |                                                                                     | 46.0                                                                                |                                                                                     |                                                                                     | 45.2                                                                                |                                                                                     |
| Approach LOS           |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                     | D                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |

### Intersection Summary

|                                   |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 28.7  | HCM 2000 Level of Service | C    |
| HCM 2000 Volume to Capacity ratio | 0.76  |                           |      |
| Actuated Cycle Length (s)         | 120.0 | Sum of lost time (s)      | 16.0 |
| Intersection Capacity Utilization | 70.4% | ICU Level of Service      | C    |
| Analysis Period (min)             | 15    |                           |      |
| c Critical Lane Group             |       |                           |      |

# HCM Unsignalized Intersection Capacity Analysis

## 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) & Roy Carlson Blvd

Existing AM

11/15/2016



| Movement                          | WBL  | WBR  | NBT   | NBR  | SBL                  | SBT  |
|-----------------------------------|------|------|-------|------|----------------------|------|
| Lane Configurations               |      |      |       |      |                      |      |
| Traffic Volume (veh/h)            | 7    | 5    | 379   | 49   | 35                   | 703  |
| Future Volume (Veh/h)             | 7    | 5    | 379   | 49   | 35                   | 703  |
| Sign Control                      | Stop |      | Free  |      |                      | Free |
| Grade                             | 0%   |      | 0%    |      |                      | 0%   |
| Peak Hour Factor                  | 0.44 | 0.42 | 0.89  | 0.72 | 0.52                 | 0.86 |
| Hourly flow rate (vph)            | 16   | 12   | 426   | 68   | 67                   | 817  |
| Pedestrians                       |      |      |       |      |                      |      |
| Lane Width (ft)                   |      |      |       |      |                      |      |
| Walking Speed (ft/s)              |      |      |       |      |                      |      |
| Percent Blockage                  |      |      |       |      |                      |      |
| Right turn flare (veh)            |      |      |       |      |                      |      |
| Median type                       |      |      | None  |      |                      | None |
| Median storage veh                |      |      |       |      |                      |      |
| Upstream signal (ft)              |      |      |       |      |                      |      |
| pX, platoon unblocked             |      |      |       |      |                      |      |
| vC, conflicting volume            | 1377 | 426  |       |      | 494                  |      |
| vC1, stage 1 conf vol             |      |      |       |      |                      |      |
| vC2, stage 2 conf vol             |      |      |       |      |                      |      |
| vCu, unblocked vol                | 1377 | 426  |       |      | 494                  |      |
| tC, single (s)                    | 6.4  | 6.2  |       |      | 4.1                  |      |
| tC, 2 stage (s)                   |      |      |       |      |                      |      |
| tF (s)                            | 3.5  | 3.3  |       |      | 2.2                  |      |
| p0 queue free %                   | 89   | 98   |       |      | 94                   |      |
| cM capacity (veh/h)               | 151  | 633  |       |      | 1064                 |      |
| Direction, Lane #                 | WB 1 | WB 2 | NB 1  | NB 2 | SB 1                 |      |
| Volume Total                      | 16   | 12   | 426   | 68   | 884                  |      |
| Volume Left                       | 16   | 0    | 0     | 0    | 67                   |      |
| Volume Right                      | 0    | 12   | 0     | 68   | 0                    |      |
| cSH                               | 151  | 633  | 1700  | 1700 | 1064                 |      |
| Volume to Capacity                | 0.11 | 0.02 | 0.25  | 0.04 | 0.06                 |      |
| Queue Length 95th (ft)            | 9    | 1    | 0     | 0    | 5                    |      |
| Control Delay (s)                 | 31.6 | 10.8 | 0.0   | 0.0  | 1.6                  |      |
| Lane LOS                          | D    | B    |       |      | A                    |      |
| Approach Delay (s)                | 22.7 |      | 0.0   |      | 1.6                  |      |
| Approach LOS                      | C    |      |       |      |                      |      |
| Intersection Summary              |      |      |       |      |                      |      |
| Average Delay                     |      |      | 1.5   |      |                      |      |
| Intersection Capacity Utilization |      |      | 72.2% |      | ICU Level of Service | C    |
| Analysis Period (min)             |      |      | 15    |      |                      |      |

## Queues

Existing AM

## 5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd

11/15/2016



| Lane Group              | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↰     | ↱     |       | ↰     | ↱     | ↰     | ↱     | ↱     | ↰     | ↱     | ↰     |
| Traffic Volume (vph)    | 1     | 6     | 396   | 25    | 223   | 21    | 442   | 176   | 113   | 594   | 38    |
| Future Volume (vph)     | 1     | 6     | 396   | 25    | 223   | 21    | 442   | 176   | 113   | 594   | 38    |
| Lane Group Flow (vph)   | 4     | 12    | 0     | 462   | 251   | 36    | 470   | 191   | 153   | 660   | 52    |
| Turn Type               | NA    | Perm  | Perm  | NA    | Perm  | Perm  | NA    | Perm  | Perm  | NA    | Perm  |
| Protected Phases        | 4     |       |       | 8     |       |       | 2     |       |       | 6     |       |
| Permitted Phases        |       | 4     | 8     |       | 8     | 2     |       | 2     | 6     |       | 6     |
| Detector Phase          | 4     | 4     | 8     | 8     | 8     | 2     | 2     | 2     | 6     | 6     | 6     |
| Switch Phase            |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 15.0  | 15.0  | 15.0  | 15.0  | 15.0  | 15.0  |
| Minimum Split (s)       | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 67.0  | 67.0  | 67.0  | 67.0  | 67.0  | 53.0  | 53.0  | 53.0  | 53.0  | 53.0  | 53.0  |
| Total Split (%)         | 55.8% | 55.8% | 55.8% | 55.8% | 55.8% | 44.2% | 44.2% | 44.2% | 44.2% | 44.2% | 44.2% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | -2.0  | -2.0  |       | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  |
| Total Lost Time (s)     | 4.0   | 4.0   |       | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| Lead/Lag                |       |       |       |       |       |       |       |       |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |       |       |       |       |
| Recall Mode             | None  | None  | None  | None  | None  | C-Min | C-Min | C-Min | C-Min | C-Min | C-Min |
| v/c Ratio               | 0.01  | 0.02  |       | 0.80  | 0.31  | 0.11  | 0.26  | 0.21  | 0.35  | 0.36  | 0.06  |
| Control Delay           | 16.0  | 1.8   |       | 40.6  | 3.4   | 16.9  | 15.2  | 6.6   | 16.8  | 13.8  | 2.8   |
| Queue Delay             | 0.0   | 0.0   |       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 16.0  | 1.8   |       | 40.6  | 3.4   | 16.9  | 15.2  | 6.6   | 16.8  | 13.8  | 2.8   |
| Queue Length 50th (ft)  | 2     | 0     |       | 304   | 4     | 16    | 116   | 43    | 71    | 161   | 5     |
| Queue Length 95th (ft)  | 2     | 0     |       | 243   | 42    | 30    | 194   | 98    | 92    | 199   | m11   |
| Internal Link Dist (ft) | 275   |       |       | 4179  |       |       | 3868  |       |       | 2104  |       |
| Turn Bay Length (ft)    |       | 105   |       |       | 250   | 230   |       | 230   | 200   |       | 185   |
| Base Capacity (vph)     | 997   | 737   |       | 738   | 963   | 334   | 1841  | 923   | 432   | 1841  | 865   |
| Starvation Cap Reductn  | 0     | 0     |       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     |       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     |       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.00  | 0.02  |       | 0.63  | 0.26  | 0.11  | 0.26  | 0.21  | 0.35  | 0.36  | 0.06  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

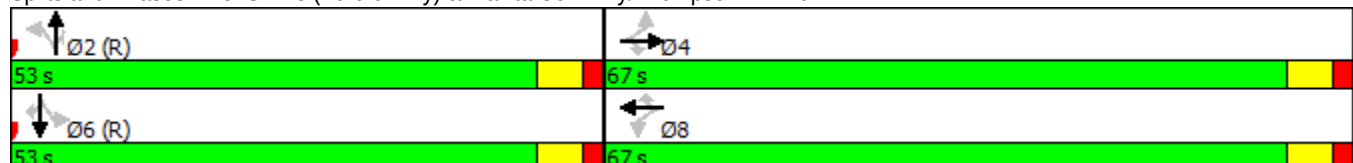
Offset: 72 (60%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd



# HCM Signalized Intersection Capacity Analysis

## 5: SR 13 (Buford Hwy) & Makita Co. Drwy/Thompson Mill Rd

Existing AM

11/15/2016

|                                   |  |  |  |  |  |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)              | 0                                                                                 | 1                                                                                 | 6                                                                                 | 396                                                                               | 25                                                                                | 223                                                                               | 21                                                                                  | 442                                                                                 | 176                                                                                 | 113                                                                                 | 594                                                                                 | 38                                                                                  |
| Future Volume (vph)               | 0                                                                                 | 1                                                                                 | 6                                                                                 | 396                                                                               | 25                                                                                | 223                                                                               | 21                                                                                  | 442                                                                                 | 176                                                                                 | 113                                                                                 | 594                                                                                 | 38                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 4.0                                                                               | 4.0                                                                               |                                                                                   | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| Lane Util. Factor                 |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |
| Frt                               |                                                                                   | 1.00                                                                              | 0.85                                                                              |                                                                                   | 1.00                                                                              | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected                     |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.96                                                                              | 1.00                                                                              | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)                 |                                                                                   | 1900                                                                              | 1380                                                                              |                                                                                   | 1816                                                                              | 1615                                                                              | 1805                                                                                | 3539                                                                                | 1599                                                                                | 1787                                                                                | 3539                                                                                | 1615                                                                                |
| Flt Permitted                     |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.74                                                                              | 1.00                                                                              | 0.34                                                                                | 1.00                                                                                | 1.00                                                                                | 0.44                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)                 |                                                                                   | 1900                                                                              | 1380                                                                              |                                                                                   | 1406                                                                              | 1615                                                                              | 642                                                                                 | 3539                                                                                | 1599                                                                                | 832                                                                                 | 3539                                                                                | 1615                                                                                |
| Peak-hour factor, PHF             | 0.54                                                                              | 0.25                                                                              | 0.50                                                                              | 0.93                                                                              | 0.69                                                                              | 0.89                                                                              | 0.58                                                                                | 0.94                                                                                | 0.92                                                                                | 0.74                                                                                | 0.90                                                                                | 0.73                                                                                |
| Adj. Flow (vph)                   | 0                                                                                 | 4                                                                                 | 12                                                                                | 426                                                                               | 36                                                                                | 251                                                                               | 36                                                                                  | 470                                                                                 | 191                                                                                 | 153                                                                                 | 660                                                                                 | 52                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 7                                                                                 | 0                                                                                 | 0                                                                                 | 143                                                                               | 0                                                                                   | 0                                                                                   | 92                                                                                  | 0                                                                                   | 0                                                                                   | 25                                                                                  |
| Lane Group Flow (vph)             | 0                                                                                 | 4                                                                                 | 5                                                                                 | 0                                                                                 | 462                                                                               | 108                                                                               | 36                                                                                  | 470                                                                                 | 99                                                                                  | 153                                                                                 | 660                                                                                 | 27                                                                                  |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 17%                                                                               | 0%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                  | 2%                                                                                  | 1%                                                                                  | 1%                                                                                  | 2%                                                                                  | 0%                                                                                  |
| Turn Type                         |                                                                                   | NA                                                                                | Perm                                                                              | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                | Perm                                                                                | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   | 4                                                                                 | 8                                                                                 |                                                                                   | 8                                                                                 | 2                                                                                   |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 47.6                                                                              | 47.6                                                                              |                                                                                   | 47.6                                                                              | 47.6                                                                              | 60.4                                                                                | 60.4                                                                                | 60.4                                                                                | 60.4                                                                                | 60.4                                                                                | 60.4                                                                                |
| Effective Green, g (s)            |                                                                                   | 49.6                                                                              | 49.6                                                                              |                                                                                   | 49.6                                                                              | 49.6                                                                              | 62.4                                                                                | 62.4                                                                                | 62.4                                                                                | 62.4                                                                                | 62.4                                                                                | 62.4                                                                                |
| Actuated g/C Ratio                |                                                                                   | 0.41                                                                              | 0.41                                                                              |                                                                                   | 0.41                                                                              | 0.41                                                                              | 0.52                                                                                | 0.52                                                                                | 0.52                                                                                | 0.52                                                                                | 0.52                                                                                | 0.52                                                                                |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)             |                                                                                   | 3.0                                                                               | 3.0                                                                               |                                                                                   | 3.0                                                                               | 3.0                                                                               | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |
| Lane Grp Cap (vph)                |                                                                                   | 785                                                                               | 570                                                                               |                                                                                   | 581                                                                               | 667                                                                               | 333                                                                                 | 1840                                                                                | 831                                                                                 | 432                                                                                 | 1840                                                                                | 839                                                                                 |
| v/s Ratio Prot                    |                                                                                   | 0.00                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     | 0.13                                                                                |                                                                                     |                                                                                     | c0.19                                                                               |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                   | 0.00                                                                              |                                                                                   | c0.33                                                                             | 0.07                                                                              | 0.06                                                                                |                                                                                     | 0.06                                                                                | 0.18                                                                                |                                                                                     | 0.02                                                                                |
| v/c Ratio                         |                                                                                   | 0.01                                                                              | 0.01                                                                              |                                                                                   | 0.80                                                                              | 0.16                                                                              | 0.11                                                                                | 0.26                                                                                | 0.12                                                                                | 0.35                                                                                | 0.36                                                                                | 0.03                                                                                |
| Uniform Delay, d1                 |                                                                                   | 20.7                                                                              | 20.7                                                                              |                                                                                   | 30.8                                                                              | 22.1                                                                              | 14.6                                                                                | 15.9                                                                                | 14.7                                                                                | 16.9                                                                                | 17.0                                                                                | 14.1                                                                                |
| Progression Factor                |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.86                                                                                | 0.84                                                                                | 2.08                                                                                | 0.72                                                                                | 0.71                                                                                | 0.48                                                                                |
| Incremental Delay, d2             |                                                                                   | 0.0                                                                               | 0.0                                                                               |                                                                                   | 7.4                                                                               | 0.1                                                                               | 0.6                                                                                 | 0.3                                                                                 | 0.3                                                                                 | 1.9                                                                                 | 0.5                                                                                 | 0.1                                                                                 |
| Delay (s)                         |                                                                                   | 20.7                                                                              | 20.7                                                                              |                                                                                   | 38.2                                                                              | 22.3                                                                              | 13.1                                                                                | 13.8                                                                                | 30.9                                                                                | 14.2                                                                                | 12.5                                                                                | 6.8                                                                                 |
| Level of Service                  |                                                                                   | C                                                                                 | C                                                                                 |                                                                                   | D                                                                                 | C                                                                                 | B                                                                                   | B                                                                                   | C                                                                                   | B                                                                                   | B                                                                                   | A                                                                                   |
| Approach Delay (s)                |                                                                                   | 20.7                                                                              |                                                                                   |                                                                                   | 32.6                                                                              |                                                                                   |                                                                                     | 18.4                                                                                |                                                                                     |                                                                                     | 12.5                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                     | B                                                                                   |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 20.6                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     | C                                                                                   |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.55                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     | 8.0                                                                                 |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 68.8%                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     | C                                                                                   |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

Existing AM

## 6: SR 13 (Buford Hwy) &amp; S. Hill St/Hamilton Mill Rd

11/15/2016



| Lane Group              | EBL   | EBT   | EBR   | WBL   | WBT   | NBL   | NBT   | NBR  | SBL   | SBT   | SBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|
| Lane Configurations     |       |       |       |       |       |       |       |      |       |       |       |
| Traffic Volume (vph)    | 28    | 158   | 65    | 484   | 238   | 42    | 432   | 304  | 222   | 741   | 51    |
| Future Volume (vph)     | 28    | 158   | 65    | 484   | 238   | 42    | 432   | 304  | 222   | 741   | 51    |
| Lane Group Flow (vph)   | 52    | 251   | 92    | 526   | 551   | 56    | 470   | 411  | 313   | 797   | 56    |
| Turn Type               | Perm  | NA    | Perm  | Prot  | NA    | pm+pt | NA    | Free | pm+pt | NA    | Perm  |
| Protected Phases        |       | 4     |       | 3     | 8     | 5     | 2     |      | 1     | 6     |       |
| Permitted Phases        | 4     |       | 4     |       |       | 2     |       | Free | 6     |       | 6     |
| Detector Phase          | 4     | 4     | 4     | 3     | 8     | 5     | 2     |      | 1     | 6     | 6     |
| Switch Phase            |       |       |       |       |       |       |       |      |       |       |       |
| Minimum Initial (s)     | 6.0   | 6.0   | 6.0   | 4.0   | 6.0   | 4.0   | 15.0  |      | 4.0   | 15.0  | 15.0  |
| Minimum Split (s)       | 41.0  | 41.0  | 41.0  | 11.0  | 46.0  | 11.0  | 37.0  |      | 11.0  | 40.0  | 40.0  |
| Total Split (s)         | 41.0  | 41.0  | 41.0  | 25.0  | 66.0  | 11.0  | 37.0  |      | 17.0  | 43.0  | 43.0  |
| Total Split (%)         | 34.2% | 34.2% | 34.2% | 20.8% | 55.0% | 9.2%  | 30.8% |      | 14.2% | 35.8% | 35.8% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |      | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |      | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  |      | -2.0  | -2.0  | -2.0  |
| Total Lost Time (s)     | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |      | 4.0   | 4.0   | 4.0   |
| Lead/Lag                | Lag   | Lag   | Lag   | Lead  |       | Lead  | Lag   |      | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |      |       |       |       |
| Recall Mode             | None  | None  | None  | None  | None  | None  | C-Min |      | None  | C-Min | C-Min |
| v/c Ratio               | 0.35  | 0.68  | 0.22  | 0.90  | 0.76  | 0.18  | 0.34  | 0.27 | 0.66  | 0.49  | 0.07  |
| Control Delay           | 46.3  | 53.5  | 2.8   | 68.5  | 34.3  | 17.4  | 27.8  | 0.4  | 22.0  | 17.7  | 0.2   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   |
| Total Delay             | 46.3  | 53.5  | 2.8   | 68.5  | 34.3  | 17.4  | 27.8  | 0.4  | 22.0  | 17.7  | 0.2   |
| Queue Length 50th (ft)  | 35    | 182   | 0     | 208   | 330   | 20    | 133   | 0    | 111   | 167   | 0     |
| Queue Length 95th (ft)  | 40    | 164   | 0     | #306  | 349   | 39    | 197   | 0    | 125   | 215   | m0    |
| Internal Link Dist (ft) |       | 657   |       |       | 1618  |       | 1320  |      |       | 3868  |       |
| Turn Bay Length (ft)    | 180   |       | 300   | 250   |       | 240   |       | 1000 | 400   |       | 280   |
| Base Capacity (vph)     | 238   | 585   | 592   | 583   | 917   | 306   | 1373  | 1538 | 477   | 1615  | 796   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0    | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0    | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0    | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.22  | 0.43  | 0.16  | 0.90  | 0.60  | 0.18  | 0.34  | 0.27 | 0.66  | 0.49  | 0.07  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 105

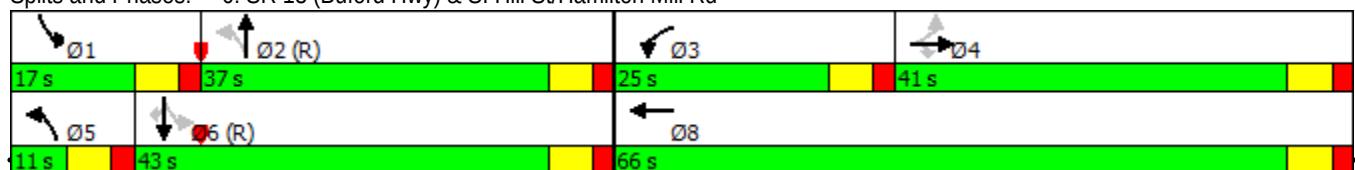
Control Type: Actuated-Coordinated

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 6: SR 13 (Buford Hwy) &amp; S. Hill St/Hamilton Mill Rd



Baseline

Synchro 9 Report

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# HCM Signalized Intersection Capacity Analysis

## 6: SR 13 (Buford Hwy) & S. Hill St/Hamilton Mill Rd

Existing AM  
11/15/2016

|                        |  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |      |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement               | EBL                                                                                | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR  | NBL                                                                               | NBT                                                                               | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations    |   |  |  |  |  |      |  |  |  |  |  |  |
| Traffic Volume (vph)   | 28                                                                                 | 158                                                                               | 65                                                                                | 484                                                                               | 238                                                                               | 195  | 42                                                                                | 432                                                                               | 304                                                                                 | 222                                                                                 | 741                                                                                 | 51                                                                                  |
| Future Volume (vph)    | 28                                                                                 | 158                                                                               | 65                                                                                | 484                                                                               | 238                                                                               | 195  | 42                                                                                | 432                                                                               | 304                                                                                 | 222                                                                                 | 741                                                                                 | 51                                                                                  |
| Ideal Flow (vphpl)     | 1900                                                                               | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900 | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)    | 4.0                                                                                | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               |      | 4.0                                                                               | 4.0                                                                               | 2.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| Lane Util. Factor      | 1.00                                                                               | 1.00                                                                              | 1.00                                                                              | 0.97                                                                              | 1.00                                                                              |      | 1.00                                                                              | 0.95                                                                              | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |
| Frt                    | 1.00                                                                               | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 0.93                                                                              |      | 1.00                                                                              | 1.00                                                                              | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected          | 0.95                                                                               | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |      | 0.95                                                                              | 1.00                                                                              | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)      | 1805                                                                               | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1726                                                                              |      | 1770                                                                              | 3539                                                                              | 1538                                                                                | 1752                                                                                | 3539                                                                                | 1583                                                                                |
| Flt Permitted          | 0.41                                                                               | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |      | 0.28                                                                              | 1.00                                                                              | 1.00                                                                                | 0.37                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)      | 774                                                                                | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1726                                                                              |      | 524                                                                               | 3539                                                                              | 1538                                                                                | 684                                                                                 | 3539                                                                                | 1583                                                                                |
| Peak-hour factor, PHF  | 0.54                                                                               | 0.63                                                                              | 0.71                                                                              | 0.92                                                                              | 0.81                                                                              | 0.76 | 0.75                                                                              | 0.92                                                                              | 0.74                                                                                | 0.71                                                                                | 0.93                                                                                | 0.91                                                                                |
| Adj. Flow (vph)        | 52                                                                                 | 251                                                                               | 92                                                                                | 526                                                                               | 294                                                                               | 257  | 56                                                                                | 470                                                                               | 411                                                                                 | 313                                                                                 | 797                                                                                 | 56                                                                                  |
| RTOR Reduction (vph)   | 0                                                                                  | 0                                                                                 | 74                                                                                | 0                                                                                 | 32                                                                                | 0    | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 31                                                                                  |
| Lane Group Flow (vph)  | 52                                                                                 | 251                                                                               | 18                                                                                | 526                                                                               | 519                                                                               | 0    | 56                                                                                | 470                                                                               | 411                                                                                 | 313                                                                                 | 797                                                                                 | 25                                                                                  |
| Heavy Vehicles (%)     | 0%                                                                                 | 0%                                                                                | 0%                                                                                | 5%                                                                                | 1%                                                                                | 4%   | 2%                                                                                | 2%                                                                                | 5%                                                                                  | 3%                                                                                  | 2%                                                                                  | 2%                                                                                  |
| Turn Type              | Perm                                                                               | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                |      | pm+pt                                                                             | NA                                                                                | Free                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases       |                                                                                    | 4                                                                                 |                                                                                   | 3                                                                                 | 8                                                                                 |      | 5                                                                                 | 2                                                                                 |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases       | 4                                                                                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   |      | 2                                                                                 |                                                                                   | Free                                                                                | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)  | 21.4                                                                               | 21.4                                                                              | 21.4                                                                              | 19.0                                                                              | 46.4                                                                              |      | 48.6                                                                              | 44.6                                                                              | 120.0                                                                               | 61.6                                                                                | 51.6                                                                                | 51.6                                                                                |
| Effective Green, g (s) | 23.4                                                                               | 23.4                                                                              | 23.4                                                                              | 21.0                                                                              | 48.4                                                                              |      | 52.6                                                                              | 46.6                                                                              | 120.0                                                                               | 63.6                                                                                | 53.6                                                                                | 53.6                                                                                |
| Actuated g/C Ratio     | 0.19                                                                               | 0.19                                                                              | 0.19                                                                              | 0.18                                                                              | 0.40                                                                              |      | 0.44                                                                              | 0.39                                                                              | 1.00                                                                                | 0.53                                                                                | 0.45                                                                                | 0.45                                                                                |
| Clearance Time (s)     | 6.0                                                                                | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |      | 6.0                                                                               | 6.0                                                                               |                                                                                     | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)  | 3.0                                                                                | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               |      | 3.0                                                                               | 5.0                                                                               |                                                                                     | 3.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |
| Lane Grp Cap (vph)     | 150                                                                                | 370                                                                               | 314                                                                               | 583                                                                               | 696                                                                               |      | 291                                                                               | 1374                                                                              | 1538                                                                                | 478                                                                                 | 1580                                                                                | 707                                                                                 |
| v/s Ratio Prot         |                                                                                    | 0.13                                                                              |                                                                                   | c0.16                                                                             | c0.30                                                                             |      | 0.01                                                                              | 0.13                                                                              |                                                                                     | c0.07                                                                               | 0.23                                                                                |                                                                                     |
| v/s Ratio Perm         | 0.07                                                                               |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   |      | 0.07                                                                              |                                                                                   | 0.27                                                                                | c0.28                                                                               |                                                                                     | 0.02                                                                                |
| v/c Ratio              | 0.35                                                                               | 0.68                                                                              | 0.06                                                                              | 0.90                                                                              | 0.75                                                                              |      | 0.19                                                                              | 0.34                                                                              | 0.27                                                                                | 0.65                                                                                | 0.50                                                                                | 0.04                                                                                |
| Uniform Delay, d1      | 41.7                                                                               | 44.8                                                                              | 39.3                                                                              | 48.5                                                                              | 30.5                                                                              |      | 19.9                                                                              | 25.9                                                                              | 0.0                                                                                 | 17.0                                                                                | 23.7                                                                                | 18.7                                                                                |
| Progression Factor     | 1.00                                                                               | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |      | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.84                                                                                | 0.68                                                                                | 1.00                                                                                |
| Incremental Delay, d2  | 1.4                                                                                | 4.9                                                                               | 0.1                                                                               | 17.2                                                                              | 4.3                                                                               |      | 0.3                                                                               | 0.7                                                                               | 0.4                                                                                 | 3.0                                                                                 | 1.1                                                                                 | 0.1                                                                                 |
| Delay (s)              | 43.1                                                                               | 49.7                                                                              | 39.4                                                                              | 65.7                                                                              | 34.9                                                                              |      | 20.3                                                                              | 26.6                                                                              | 0.4                                                                                 | 17.2                                                                                | 17.1                                                                                | 18.8                                                                                |
| Level of Service       | D                                                                                  | D                                                                                 | D                                                                                 | E                                                                                 | C                                                                                 |      | C                                                                                 | C                                                                                 | A                                                                                   | B                                                                                   | B                                                                                   | B                                                                                   |
| Approach Delay (s)     |                                                                                    | 46.4                                                                              |                                                                                   |                                                                                   | 49.9                                                                              |      |                                                                                   | 14.7                                                                              |                                                                                     |                                                                                     | 17.2                                                                                |                                                                                     |
| Approach LOS           |                                                                                    | D                                                                                 |                                                                                   |                                                                                   | D                                                                                 |      |                                                                                   | B                                                                                 |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |

### Intersection Summary

|                                   |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 29.6  | HCM 2000 Level of Service | C    |
| HCM 2000 Volume to Capacity ratio | 0.76  |                           |      |
| Actuated Cycle Length (s)         | 120.0 | Sum of lost time (s)      | 16.0 |
| Intersection Capacity Utilization | 67.6% | ICU Level of Service      | C    |
| Analysis Period (min)             | 15    |                           |      |
| c Critical Lane Group             |       |                           |      |

# HCM Unsignalized Intersection Capacity Analysis

## 7: Pvt. Drwy/Bryant Rd & Thompson Mill Rd

Existing AM  
11/15/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                     |  |                                                                                     |                                                                                     |  |                                                                                     |
| Traffic Volume (veh/h)            | 5                                                                                 | 202                                                                               | 1                                                                                 | 0                                                                                 | 589                                                                               | 27                                                                                | 0                                                                                   | 0                                                                                   | 0                                                                                   | 12                                                                                  | 0                                                                                   | 6                                                                                   |
| Future Volume (Veh/h)             | 5                                                                                 | 202                                                                               | 1                                                                                 | 0                                                                                 | 589                                                                               | 27                                                                                | 0                                                                                   | 0                                                                                   | 0                                                                                   | 12                                                                                  | 0                                                                                   | 6                                                                                   |
| Sign Control                      |                                                                                   | Free                                                                              |                                                                                   |                                                                                   | Free                                                                              |                                                                                   |                                                                                     | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Grade                             |                                                                                   | 0%                                                                                |                                                                                   |                                                                                   | 0%                                                                                |                                                                                   |                                                                                     | 0%                                                                                  |                                                                                     |                                                                                     | 0%                                                                                  |                                                                                     |
| Peak Hour Factor                  | 0.42                                                                              | 0.83                                                                              | 0.25                                                                              | 0.92                                                                              | 0.94                                                                              | 0.68                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.60                                                                                | 0.92                                                                                | 0.75                                                                                |
| Hourly flow rate (vph)            | 12                                                                                | 243                                                                               | 4                                                                                 | 0                                                                                 | 627                                                                               | 40                                                                                | 0                                                                                   | 0                                                                                   | 0                                                                                   | 20                                                                                  | 0                                                                                   | 8                                                                                   |
| Pedestrians                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane Width (ft)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Walking Speed (ft/s)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Percent Blockage                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Right turn flare (veh)            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median type                       | None                                                                              |                                                                                   |                                                                                   |                                                                                   | None                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median storage (veh)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Upstream signal (ft)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| pX, platoon unblocked             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC, conflicting volume            | 667                                                                               |                                                                                   |                                                                                   | 247                                                                               |                                                                                   |                                                                                   | 924                                                                                 | 936                                                                                 | 245                                                                                 | 916                                                                                 | 918                                                                                 | 647                                                                                 |
| vC1, stage 1 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC2, stage 2 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vCu, unblocked vol                | 667                                                                               |                                                                                   |                                                                                   | 247                                                                               |                                                                                   |                                                                                   | 924                                                                                 | 936                                                                                 | 245                                                                                 | 916                                                                                 | 918                                                                                 | 647                                                                                 |
| tC, single (s)                    | 4.1                                                                               |                                                                                   |                                                                                   | 4.1                                                                               |                                                                                   |                                                                                   | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 |
| tC, 2 stage (s)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| tF (s)                            | 2.2                                                                               |                                                                                   |                                                                                   | 2.2                                                                               |                                                                                   |                                                                                   | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 |
| p0 queue free %                   | 99                                                                                |                                                                                   |                                                                                   | 100                                                                               |                                                                                   |                                                                                   | 100                                                                                 | 100                                                                                 | 100                                                                                 | 92                                                                                  | 100                                                                                 | 98                                                                                  |
| cM capacity (veh/h)               | 932                                                                               |                                                                                   |                                                                                   | 1331                                                                              |                                                                                   |                                                                                   | 245                                                                                 | 264                                                                                 | 799                                                                                 | 253                                                                                 | 270                                                                                 | 475                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total                      | 259                                                                               | 667                                                                               | 0                                                                                 | 28                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left                       | 12                                                                                | 0                                                                                 | 0                                                                                 | 20                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right                      | 4                                                                                 | 40                                                                                | 0                                                                                 | 8                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| cSH                               | 932                                                                               | 1331                                                                              | 1700                                                                              | 292                                                                               |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume to Capacity                | 0.01                                                                              | 0.00                                                                              | 0.00                                                                              | 0.10                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Queue Length 95th (ft)            | 1                                                                                 | 0                                                                                 | 0                                                                                 | 8                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 0.5                                                                               | 0.0                                                                               | 0.0                                                                               | 18.7                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane LOS                          | A                                                                                 |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 0.5                                                                               | 0.0                                                                               | 0.0                                                                               | 18.7                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Average Delay                     |                                                                                   |                                                                                   | 0.7                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 42.6%                                                                             |                                                                                   | ICU Level of Service                                                              |                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM Unsignalized Intersection Capacity Analysis 8: N. Bogan Rd & Thompson Mill Rd

Existing AM  
11/15/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                    |  |                                                                                     |                                                                                     |  |                                                                                     |
| Sign Control                      |                                                                                   | Stop                                                                              |                                                                                   |                                                                                   | Stop                                                                              |                                                                                   |                                                                                    | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Traffic Volume (vph)              | 53                                                                                | 106                                                                               | 66                                                                                | 51                                                                                | 386                                                                               | 9                                                                                 | 113                                                                                | 66                                                                                  | 16                                                                                  | 8                                                                                   | 93                                                                                  | 121                                                                                 |
| Future Volume (vph)               | 53                                                                                | 106                                                                               | 66                                                                                | 51                                                                                | 386                                                                               | 9                                                                                 | 113                                                                                | 66                                                                                  | 16                                                                                  | 8                                                                                   | 93                                                                                  | 121                                                                                 |
| Peak Hour Factor                  | 0.74                                                                              | 0.80                                                                              | 0.75                                                                              | 0.85                                                                              | 0.95                                                                              | 0.45                                                                              | 0.72                                                                               | 0.87                                                                                | 0.80                                                                                | 0.50                                                                                | 0.93                                                                                | 0.78                                                                                |
| Hourly flow rate (vph)            | 72                                                                                | 133                                                                               | 88                                                                                | 60                                                                                | 406                                                                               | 20                                                                                | 157                                                                                | 76                                                                                  | 20                                                                                  | 16                                                                                  | 100                                                                                 | 155                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total (vph)                | 293                                                                               | 486                                                                               | 253                                                                               | 271                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left (vph)                 | 72                                                                                | 60                                                                                | 157                                                                               | 16                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right (vph)                | 88                                                                                | 20                                                                                | 20                                                                                | 155                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Hadj (s)                          | -0.12                                                                             | 0.00                                                                              | 0.08                                                                              | -0.33                                                                             |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Departure Headway (s)             | 7.0                                                                               | 6.6                                                                               | 7.5                                                                               | 7.1                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Degree Utilization, x             | 0.57                                                                              | 0.90                                                                              | 0.53                                                                              | 0.53                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Capacity (veh/h)                  | 476                                                                               | 526                                                                               | 444                                                                               | 471                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 19.0                                                                              | 43.1                                                                              | 18.6                                                                              | 17.8                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 19.0                                                                              | 43.1                                                                              | 18.6                                                                              | 17.8                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      | C                                                                                 | E                                                                                 | C                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Delay                             |                                                                                   |                                                                                   |                                                                                   | 27.6                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  |                                                                                   |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   |                                                                                   | 60.3%                                                                             | ICU Level of Service                                                              | B                                                                                 |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



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Intersection: 8: N. Bogan Rd & Thompson Mill Rd

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| Movement              | EB   | WB   | NB  | SB  |
|-----------------------|------|------|-----|-----|
| Directions Served     | LTR  | LTR  | LTR | LTR |
| Maximum Queue (ft)    | 97   | 188  | 55  | 71  |
| Average Queue (ft)    | 57   | 113  | 46  | 46  |
| 95th Queue (ft)       | 101  | 193  | 61  | 71  |
| Link Distance (ft)    | 2455 | 1031 | 846 | 592 |
| Upstream Blk Time (%) |      |      |     |     |
| Queuing Penalty (veh) |      |      |     |     |
| Storage Bay Dist (ft) |      |      |     |     |
| Storage Blk Time (%)  |      |      |     |     |
| Queuing Penalty (veh) |      |      |     |     |

## Queues

Existing PM

## 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)

11/15/2016



| Lane Group              | EBL   | EBT   | WBT   | WBR   | NBL   | NBT   | NBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     |       |       |       |       |       |       |       |
| Traffic Volume (vph)    | 449   | 1234  | 523   | 128   | 330   | 1     | 535   |
| Future Volume (vph)     | 449   | 1234  | 523   | 128   | 330   | 1     | 535   |
| Lane Group Flow (vph)   | 548   | 1387  | 539   | 164   | 200   | 197   | 588   |
| Turn Type               | Prot  | NA    | NA    | Perm  | Perm  | NA    | Perm  |
| Protected Phases        | 5     | 2     | 6     |       |       | 8     |       |
| Permitted Phases        |       |       |       | 6     | 8     |       | 8     |
| Detector Phase          | 5     | 2     | 6     | 6     | 8     | 8     | 8     |
| Switch Phase            |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 4.0   | 15.0  | 15.0  | 15.0  | 6.0   | 6.0   | 6.0   |
| Minimum Split (s)       | 11.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 47.0  | 71.0  | 24.0  | 24.0  | 49.0  | 49.0  | 49.0  |
| Total Split (%)         | 39.2% | 59.2% | 20.0% | 20.0% | 40.8% | 40.8% | 40.8% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  |
| Total Lost Time (s)     | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| Lead/Lag                | Lead  |       | Lag   | Lag   |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |
| Recall Mode             | None  | C-Min | C-Min | C-Min | None  | None  | None  |
| v/c Ratio               | 0.90  | 0.67  | 0.52  | 0.36  | 0.33  | 0.32  | 0.93  |
| Control Delay           | 43.7  | 13.7  | 46.3  | 9.1   | 29.1  | 29.0  | 54.0  |
| Queue Delay             | 0.0   | 1.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 43.7  | 14.8  | 46.3  | 9.1   | 29.1  | 29.0  | 54.0  |
| Queue Length 50th (ft)  | 393   | 423   | 143   | 0     | 114   | 112   | 376   |
| Queue Length 95th (ft)  | 435   | 506   | 184   | 37    | 165   | 43    | #598  |
| Internal Link Dist (ft) |       | 591   | 1139  |       |       | 825   |       |
| Turn Bay Length (ft)    |       |       |       | 840   |       |       | 510   |
| Base Capacity (vph)     | 640   | 2070  | 1027  | 451   | 636   | 638   | 656   |
| Starvation Cap Reductn  | 0     | 409   | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.86  | 0.84  | 0.52  | 0.36  | 0.31  | 0.31  | 0.90  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 38 (32%), Referenced to phase 2:EBT and 6:WBT, Start of Green

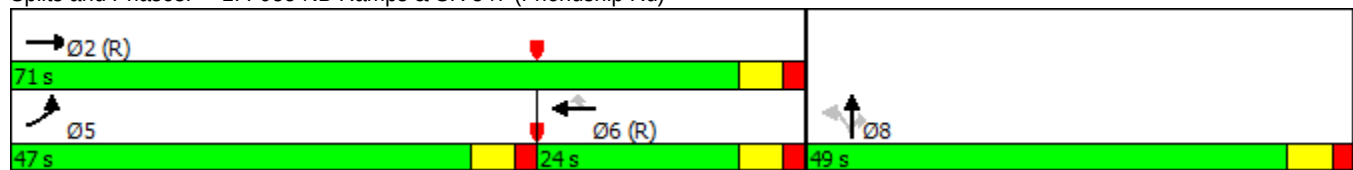
Natural Cycle: 90

Control Type: Actuated-Coordinated

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)



Baseline

Synchro 9 Report  
Page 1

# HCM Signalized Intersection Capacity Analysis

## 1: I-985 NB Ramps & SR 347 (Friendship Rd)

Existing PM  
11/15/2016

|                                   |  |                                                                                    |  |  |                                                                                                                                                                      |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                                                                                                                 | EBR                                                                               | WBL                                                                               | WBT                                                                                                                                                                                                                                                   | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |   |                                                                                   |                                                                                   |    |  |  |  |  |                                                                                     |                                                                                     |                                                                                     |
| Traffic Volume (vph)              | 449                                                                               | 1234                                                                                                                                                                | 0                                                                                 | 0                                                                                 | 523                                                                                                                                                                                                                                                   | 128                                                                               | 330                                                                                 | 1                                                                                   | 535                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Future Volume (vph)               | 449                                                                               | 1234                                                                                                                                                                | 0                                                                                 | 0                                                                                 | 523                                                                                                                                                                                                                                                   | 128                                                                               | 330                                                                                 | 1                                                                                   | 535                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                                                                                                                | 1900                                                                              | 1900                                                                              | 1900                                                                                                                                                                                                                                                  | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 4.0                                                                               | 4.0                                                                                                                                                                 |                                                                                   |                                                                                   | 4.0                                                                                                                                                                                                                                                   | 4.0                                                                               | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Util. Factor                 | 1.00                                                                              | 0.95                                                                                                                                                                |                                                                                   |                                                                                   | 0.91                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Frt                               | 1.00                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (prot)                 | 1787                                                                              | 3610                                                                                                                                                                |                                                                                   |                                                                                   | 5136                                                                                                                                                                                                                                                  | 1599                                                                              | 1698                                                                                | 1704                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Permitted                     | 0.95                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (perm)                 | 1787                                                                              | 3610                                                                                                                                                                |                                                                                   |                                                                                   | 5136                                                                                                                                                                                                                                                  | 1599                                                                              | 1698                                                                                | 1704                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Peak-hour factor, PHF             | 0.82                                                                              | 0.89                                                                                                                                                                | 0.92                                                                              | 0.92                                                                              | 0.97                                                                                                                                                                                                                                                  | 0.78                                                                              | 0.84                                                                                | 0.25                                                                                | 0.91                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Adj. Flow (vph)                   | 548                                                                               | 1387                                                                                                                                                                | 0                                                                                 | 0                                                                                 | 539                                                                                                                                                                                                                                                   | 164                                                                               | 393                                                                                 | 4                                                                                   | 588                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                                                                                                                                                                                     | 131                                                                               | 0                                                                                   | 0                                                                                   | 52                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 548                                                                               | 1387                                                                                                                                                                | 0                                                                                 | 0                                                                                 | 539                                                                                                                                                                                                                                                   | 33                                                                                | 200                                                                                 | 197                                                                                 | 536                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Heavy Vehicles (%)                | 1%                                                                                | 0%                                                                                                                                                                  | 0%                                                                                | 0%                                                                                | 1%                                                                                                                                                                                                                                                    | 1%                                                                                | 1%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  |
| Turn Type                         | Prot                                                                              | NA                                                                                                                                                                  |                                                                                   |                                                                                   | NA                                                                                                                                                                                                                                                    | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Protected Phases                  | 5                                                                                 | 2                                                                                                                                                                   |                                                                                   |                                                                                   | 6                                                                                                                                                                                                                                                     |                                                                                   |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Permitted Phases                  |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Actuated Green, G (s)             | 38.8                                                                              | 66.8                                                                                                                                                                |                                                                                   |                                                                                   | 22.0                                                                                                                                                                                                                                                  | 22.0                                                                              | 41.2                                                                                | 41.2                                                                                | 41.2                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Effective Green, g (s)            | 40.8                                                                              | 68.8                                                                                                                                                                |                                                                                   |                                                                                   | 24.0                                                                                                                                                                                                                                                  | 24.0                                                                              | 43.2                                                                                | 43.2                                                                                | 43.2                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Actuated g/C Ratio                | 0.34                                                                              | 0.57                                                                                                                                                                |                                                                                   |                                                                                   | 0.20                                                                                                                                                                                                                                                  | 0.20                                                                              | 0.36                                                                                | 0.36                                                                                | 0.36                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                                                                                                                 |                                                                                   |                                                                                   | 6.0                                                                                                                                                                                                                                                   | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Vehicle Extension (s)             | 3.0                                                                               | 5.0                                                                                                                                                                 |                                                                                   |                                                                                   | 5.0                                                                                                                                                                                                                                                   | 5.0                                                                               | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Grp Cap (vph)                | 607                                                                               | 2069                                                                                                                                                                |                                                                                   |                                                                                   | 1027                                                                                                                                                                                                                                                  | 319                                                                               | 611                                                                                 | 613                                                                                 | 581                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Prot                    | c0.31                                                                             | c0.38                                                                                                                                                               |                                                                                   |                                                                                   | 0.10                                                                                                                                                                                                                                                  |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       | 0.02                                                                              | 0.12                                                                                | 0.12                                                                                | c0.33                                                                               |                                                                                     |                                                                                     |                                                                                     |
| v/c Ratio                         | 0.90                                                                              | 0.67                                                                                                                                                                |                                                                                   |                                                                                   | 0.52                                                                                                                                                                                                                                                  | 0.10                                                                              | 0.33                                                                                | 0.32                                                                                | 0.92                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Uniform Delay, d1                 | 37.7                                                                              | 17.7                                                                                                                                                                |                                                                                   |                                                                                   | 42.9                                                                                                                                                                                                                                                  | 39.2                                                                              | 27.9                                                                                | 27.8                                                                                | 36.8                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Progression Factor                | 0.70                                                                              | 0.66                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Incremental Delay, d2             | 14.7                                                                              | 1.5                                                                                                                                                                 |                                                                                   |                                                                                   | 1.9                                                                                                                                                                                                                                                   | 0.6                                                                               | 0.3                                                                                 | 0.3                                                                                 | 20.2                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Delay (s)                         | 41.0                                                                              | 13.2                                                                                                                                                                |                                                                                   |                                                                                   | 44.8                                                                                                                                                                                                                                                  | 39.9                                                                              | 28.2                                                                                | 28.1                                                                                | 57.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  | D                                                                                 | B                                                                                                                                                                   |                                                                                   |                                                                                   | D                                                                                                                                                                                                                                                     | D                                                                                 | C                                                                                   | C                                                                                   | E                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                |                                                                                   | 21.1                                                                                                                                                                |                                                                                   |                                                                                   | 43.7                                                                                                                                                                                                                                                  |                                                                                   |                                                                                     | 45.4                                                                                |                                                                                     |                                                                                     | 0.0                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                                                                                                   |                                                                                   |                                                                                   | D                                                                                                                                                                                                                                                     |                                                                                   |                                                                                     | D                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                                                                                                     | 32.1                                                                              |                                                                                   | HCM 2000 Level of Service                                                                                                                                                                                                                             |                                                                                   |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                                                                                                     | 0.87                                                                              |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                                                                                                     | 120.0                                                                             |                                                                                   | Sum of lost time (s)                                                                                                                                                                                                                                  |                                                                                   |                                                                                     |                                                                                     | 12.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                                                                                                     | 73.9%                                                                             |                                                                                   | ICU Level of Service                                                                                                                                                                                                                                  |                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                                                                                                     | 15                                                                                |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

Existing PM

## 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)

11/15/2016



| Lane Group              | EBT   | EBR   | WBL   | WBT   | SBL   | SBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↑↑↑   | ↑     | ↵     | ↑↑    | ↵     | ↑     |
| Traffic Volume (vph)    | 1393  | 388   | 154   | 710   | 304   | 336   |
| Future Volume (vph)     | 1393  | 388   | 154   | 710   | 304   | 336   |
| Lane Group Flow (vph)   | 1466  | 479   | 188   | 780   | 400   | 400   |
| Turn Type               | NA    | Perm  | Prot  | NA    | Perm  | Perm  |
| Protected Phases        | 2     |       | 1     | 6     |       |       |
| Permitted Phases        |       | 2     |       |       | 4     | 4     |
| Detector Phase          | 2     | 2     | 1     | 6     | 4     | 4     |
| Switch Phase            |       |       |       |       |       |       |
| Minimum Initial (s)     | 15.0  | 15.0  | 4.0   | 15.0  | 6.0   | 6.0   |
| Minimum Split (s)       | 24.0  | 24.0  | 11.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 54.0  | 54.0  | 17.0  | 71.0  | 49.0  | 49.0  |
| Total Split (%)         | 45.0% | 45.0% | 14.2% | 59.2% | 40.8% | 40.8% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  |
| Total Lost Time (s)     | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| Lead/Lag                | Lag   | Lag   | Lead  |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |
| Recall Mode             | C-Min | C-Min | None  | C-Min | None  | None  |
| v/c Ratio               | 0.56  | 0.46  | 0.53  | 0.34  | 0.76  | 0.68  |
| Control Delay           | 13.7  | 1.4   | 36.3  | 16.5  | 47.7  | 26.0  |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 13.7  | 1.4   | 36.3  | 16.5  | 47.7  | 26.0  |
| Queue Length 50th (ft)  | 149   | 1     | 63    | 296   | 282   | 156   |
| Queue Length 95th (ft)  | m188  | m1    | 85    | 376   | 281   | 207   |
| Internal Link Dist (ft) | 904   |       |       | 591   |       |       |
| Turn Bay Length (ft)    |       | 375   | 380   |       |       |       |
| Base Capacity (vph)     | 2617  | 1036  | 375   | 2292  | 676   | 702   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 27    | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.57  | 0.46  | 0.50  | 0.34  | 0.59  | 0.57  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

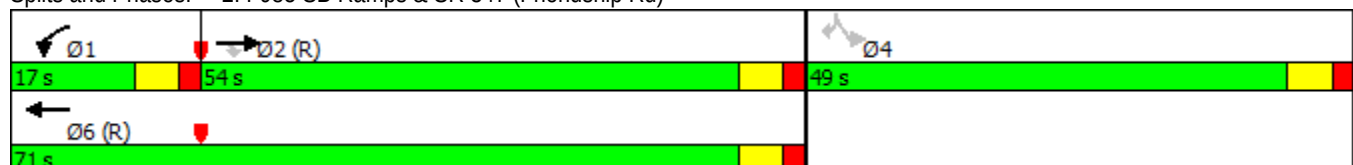
Offset: 93 (78%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)



# HCM Signalized Intersection Capacity Analysis

## 2: I-985 SB Ramps & SR 347 (Friendship Rd)

Existing PM  
11/15/2016

|                                   |  |       |       |       |      |                           |      |      |      |       |      |      |
|-----------------------------------|------------------------------------------------------------------------------------|-------|-------|-------|------|---------------------------|------|------|------|-------|------|------|
| Movement                          | EBL                                                                                | EBT   | EBR   | WBL   | WBT  | WBR                       | NBL  | NBT  | NBR  | SBL   | SBT  | SBR  |
| Lane Configurations               |                                                                                    | ↑↑↑   | ↑     | ↑↑    | ↑↑   |                           |      |      |      | ↑     |      | ↑    |
| Traffic Volume (vph)              | 0                                                                                  | 1393  | 388   | 154   | 710  | 0                         | 0    | 0    | 0    | 304   | 0    | 336  |
| Future Volume (vph)               | 0                                                                                  | 1393  | 388   | 154   | 710  | 0                         | 0    | 0    | 0    | 304   | 0    | 336  |
| Ideal Flow (vphpl)                | 1900                                                                               | 1900  | 1900  | 1900  | 1900 | 1900                      | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)               |                                                                                    | 4.0   | 4.0   | 4.0   | 4.0  |                           |      |      |      | 4.0   |      | 4.0  |
| Lane Util. Factor                 |                                                                                    | 0.91  | 1.00  | 0.97  | 0.95 |                           |      |      |      | 1.00  |      | 1.00 |
| Frt                               |                                                                                    | 1.00  | 0.85  | 1.00  | 1.00 |                           |      |      |      | 1.00  |      | 0.85 |
| Flt Protected                     |                                                                                    | 1.00  | 1.00  | 0.95  | 1.00 |                           |      |      |      | 0.95  |      | 1.00 |
| Satd. Flow (prot)                 |                                                                                    | 5187  | 1583  | 3467  | 3574 |                           |      |      |      | 1805  |      | 1583 |
| Flt Permitted                     |                                                                                    | 1.00  | 1.00  | 0.95  | 1.00 |                           |      |      |      | 0.95  |      | 1.00 |
| Satd. Flow (perm)                 |                                                                                    | 5187  | 1583  | 3467  | 3574 |                           |      |      |      | 1805  |      | 1583 |
| Peak-hour factor, PHF             | 0.92                                                                               | 0.95  | 0.81  | 0.82  | 0.91 | 0.92                      | 0.92 | 0.92 | 0.92 | 0.76  | 0.92 | 0.84 |
| Adj. Flow (vph)                   | 0                                                                                  | 1466  | 479   | 188   | 780  | 0                         | 0    | 0    | 0    | 400   | 0    | 400  |
| RTOR Reduction (vph)              | 0                                                                                  | 0     | 237   | 0     | 0    | 0                         | 0    | 0    | 0    | 0     | 0    | 123  |
| Lane Group Flow (vph)             | 0                                                                                  | 1466  | 242   | 188   | 780  | 0                         | 0    | 0    | 0    | 400   | 0    | 277  |
| Heavy Vehicles (%)                | 0%                                                                                 | 0%    | 2%    | 1%    | 1%   | 0%                        | 0%   | 0%   | 0%   | 0%    | 0%   | 2%   |
| Turn Type                         |                                                                                    | NA    | Perm  | Prot  | NA   |                           |      |      |      | Perm  |      | Perm |
| Protected Phases                  |                                                                                    | 2     |       | 1     | 6    |                           |      |      |      |       |      |      |
| Permitted Phases                  |                                                                                    |       | 2     |       |      |                           |      |      |      | 4     |      | 4    |
| Actuated Green, G (s)             |                                                                                    | 58.6  | 58.6  | 10.4  | 75.0 |                           |      |      |      | 33.0  |      | 33.0 |
| Effective Green, g (s)            |                                                                                    | 60.6  | 60.6  | 12.4  | 77.0 |                           |      |      |      | 35.0  |      | 35.0 |
| Actuated g/C Ratio                |                                                                                    | 0.51  | 0.51  | 0.10  | 0.64 |                           |      |      |      | 0.29  |      | 0.29 |
| Clearance Time (s)                |                                                                                    | 6.0   | 6.0   | 6.0   | 6.0  |                           |      |      |      | 6.0   |      | 6.0  |
| Vehicle Extension (s)             |                                                                                    | 5.0   | 5.0   | 3.0   | 5.0  |                           |      |      |      | 3.0   |      | 3.0  |
| Lane Grp Cap (vph)                |                                                                                    | 2619  | 799   | 358   | 2293 |                           |      |      |      | 526   |      | 461  |
| v/s Ratio Prot                    |                                                                                    | c0.28 |       | c0.05 | 0.22 |                           |      |      |      |       |      |      |
| v/s Ratio Perm                    |                                                                                    |       | 0.15  |       |      |                           |      |      |      | c0.22 |      | 0.17 |
| v/c Ratio                         |                                                                                    | 0.56  | 0.30  | 0.53  | 0.34 |                           |      |      |      | 0.76  |      | 0.60 |
| Uniform Delay, d1                 |                                                                                    | 20.5  | 17.4  | 51.0  | 9.9  |                           |      |      |      | 38.7  |      | 36.5 |
| Progression Factor                |                                                                                    | 0.59  | 0.11  | 0.61  | 1.48 |                           |      |      |      | 1.00  |      | 1.00 |
| Incremental Delay, d2             |                                                                                    | 0.7   | 0.8   | 1.3   | 0.4  |                           |      |      |      | 6.4   |      | 2.2  |
| Delay (s)                         |                                                                                    | 12.9  | 2.6   | 32.5  | 15.0 |                           |      |      |      | 45.1  |      | 38.7 |
| Level of Service                  |                                                                                    | B     | A     | C     | B    |                           |      |      |      | D     |      | D    |
| Approach Delay (s)                |                                                                                    | 10.3  |       |       | 18.4 |                           |      | 0.0  |      |       | 41.9 |      |
| Approach LOS                      |                                                                                    | B     |       |       | B    |                           |      | A    |      |       | D    |      |
| <b>Intersection Summary</b>       |                                                                                    |       |       |       |      |                           |      |      |      |       |      |      |
| HCM 2000 Control Delay            |                                                                                    |       | 19.2  |       |      | HCM 2000 Level of Service |      |      |      | B     |      |      |
| HCM 2000 Volume to Capacity ratio |                                                                                    |       | 0.63  |       |      |                           |      |      |      |       |      |      |
| Actuated Cycle Length (s)         |                                                                                    |       | 120.0 |       |      | Sum of lost time (s)      |      |      |      | 14.0  |      |      |
| Intersection Capacity Utilization |                                                                                    |       | 73.9% |       |      | ICU Level of Service      |      |      |      | D     |      |      |
| Analysis Period (min)             |                                                                                    |       | 15    |       |      |                           |      |      |      |       |      |      |
| c Critical Lane Group             |                                                                                    |       |       |       |      |                           |      |      |      |       |      |      |

## Queues

Existing PM

## 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)

11/15/2016

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations     |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 184                                                                               | 829                                                                               | 71                                                                                | 286                                                                               | 582                                                                               | 225                                                                               | 108                                                                                | 339                                                                                 | 339                                                                                 | 165                                                                                 | 152                                                                                 | 98                                                                                  |
| Future Volume (vph)     | 184                                                                               | 829                                                                               | 71                                                                                | 286                                                                               | 582                                                                               | 225                                                                               | 108                                                                                | 339                                                                                 | 339                                                                                 | 165                                                                                 | 152                                                                                 | 98                                                                                  |
| Lane Group Flow (vph)   | 211                                                                               | 1023                                                                              | 85                                                                                | 321                                                                               | 669                                                                               | 265                                                                               | 116                                                                                | 424                                                                                 | 404                                                                                 | 176                                                                                 | 183                                                                                 | 104                                                                                 |
| Turn Type               | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                              | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases        | 5                                                                                 | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   | 3                                                                                  | 8                                                                                   |                                                                                     | 7                                                                                   | 4                                                                                   |                                                                                     |
| Permitted Phases        | 2                                                                                 |                                                                                   | 2                                                                                 | 6                                                                                 |                                                                                   | 6                                                                                 | 8                                                                                  |                                                                                     | 8                                                                                   | 4                                                                                   |                                                                                     | 4                                                                                   |
| Detector Phase          | 5                                                                                 | 2                                                                                 | 2                                                                                 | 1                                                                                 | 6                                                                                 | 6                                                                                 | 3                                                                                  | 8                                                                                   | 8                                                                                   | 7                                                                                   | 4                                                                                   | 4                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 4.0                                                                               | 15.0                                                                              | 15.0                                                                              | 4.0                                                                               | 15.0                                                                              | 15.0                                                                              | 4.0                                                                                | 6.0                                                                                 | 6.0                                                                                 | 4.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Minimum Split (s)       | 11.0                                                                              | 37.0                                                                              | 37.0                                                                              | 11.0                                                                              | 37.0                                                                              | 37.0                                                                              | 11.0                                                                               | 42.0                                                                                | 42.0                                                                                | 11.0                                                                                | 42.0                                                                                | 42.0                                                                                |
| Total Split (s)         | 18.0                                                                              | 43.0                                                                              | 43.0                                                                              | 24.0                                                                              | 49.0                                                                              | 49.0                                                                              | 11.0                                                                               | 42.0                                                                                | 42.0                                                                                | 11.0                                                                                | 42.0                                                                                | 42.0                                                                                |
| Total Split (%)         | 15.0%                                                                             | 35.8%                                                                             | 35.8%                                                                             | 20.0%                                                                             | 40.8%                                                                             | 40.8%                                                                             | 9.2%                                                                               | 35.0%                                                                               | 35.0%                                                                               | 9.2%                                                                                | 35.0%                                                                               | 35.0%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    | -2.0                                                                              | -2.0                                                                              | -2.0                                                                              | -2.0                                                                              | -2.0                                                                              | -2.0                                                                              | -2.0                                                                               | -2.0                                                                                | -2.0                                                                                | -2.0                                                                                | -2.0                                                                                | -2.0                                                                                |
| Total Lost Time (s)     | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| Lead/Lag                | Lead                                                                              | Lag                                                                               | Lag                                                                               | Lead                                                                              | Lag                                                                               | Lag                                                                               | Lead                                                                               | Lag                                                                                 | Lag                                                                                 | Lead                                                                                | Lag                                                                                 | Lag                                                                                 |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | C-Min                                                                             | C-Min                                                                             | None                                                                              | C-Min                                                                             | C-Min                                                                             | None                                                                               | None                                                                                | None                                                                                | None                                                                                | None                                                                                | None                                                                                |
| v/c Ratio               | 0.49                                                                              | 0.78                                                                              | 0.13                                                                              | 0.89                                                                              | 0.44                                                                              | 0.33                                                                              | 0.30                                                                               | 0.81                                                                                | 0.63                                                                                | 0.94                                                                                | 0.36                                                                                | 0.19                                                                                |
| Control Delay           | 18.8                                                                              | 40.1                                                                              | 1.3                                                                               | 57.8                                                                              | 18.3                                                                              | 2.9                                                                               | 23.4                                                                               | 44.7                                                                                | 11.2                                                                                | 80.9                                                                                | 35.8                                                                                | 3.0                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 18.8                                                                              | 40.1                                                                              | 1.3                                                                               | 57.8                                                                              | 18.3                                                                              | 2.9                                                                               | 23.4                                                                               | 44.7                                                                                | 11.2                                                                                | 80.9                                                                                | 35.8                                                                                | 3.0                                                                                 |
| Queue Length 50th (ft)  | 80                                                                                | 376                                                                               | 0                                                                                 | 127                                                                               | 258                                                                               | 28                                                                                | 45                                                                                 | 184                                                                                 | 41                                                                                  | 92                                                                                  | 112                                                                                 | 0                                                                                   |
| Queue Length 95th (ft)  | 126                                                                               | 412                                                                               | 3                                                                                 | #341                                                                              | 203                                                                               | 13                                                                                | 73                                                                                 | 208                                                                                 | 68                                                                                  | #185                                                                                | 155                                                                                 | 22                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 1576                                                                              |                                                                                   |                                                                                   | 3513                                                                              |                                                                                   |                                                                                    | 1183                                                                                |                                                                                     |                                                                                     | 1183                                                                                |                                                                                     |
| Turn Bay Length (ft)    | 250                                                                               |                                                                                   | 370                                                                               | 300                                                                               |                                                                                   | 310                                                                               | 240                                                                                |                                                                                     | 250                                                                                 | 300                                                                                 |                                                                                     | 215                                                                                 |
| Base Capacity (vph)     | 446                                                                               | 1309                                                                              | 649                                                                               | 363                                                                               | 1515                                                                              | 812                                                                               | 384                                                                                | 589                                                                                 | 688                                                                                 | 188                                                                                 | 573                                                                                 | 599                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.47                                                                              | 0.78                                                                              | 0.13                                                                              | 0.88                                                                              | 0.44                                                                              | 0.33                                                                              | 0.30                                                                               | 0.72                                                                                | 0.59                                                                                | 0.94                                                                                | 0.32                                                                                | 0.17                                                                                |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 35 (29%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

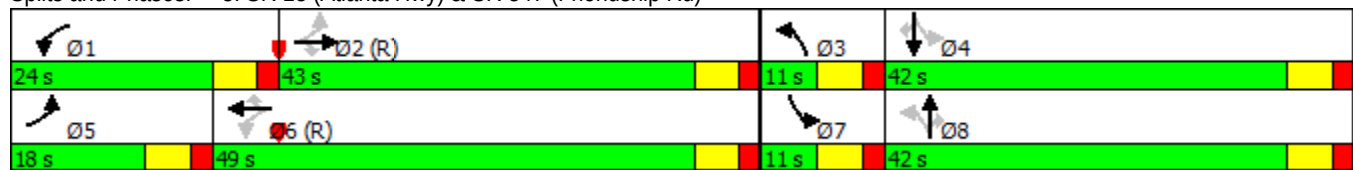
Natural Cycle: 105

Control Type: Actuated-Coordinated

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

## Splits and Phases: 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)



Baseline

Synchro 9 Report  
Page 5

# HCM Signalized Intersection Capacity Analysis

## 3: SR 13 (Atlanta Hwy) & SR 347 (Friendship Rd)

Existing PM  
11/15/2016

|                        |  |  |  |  |  |  |   |  |  |  |  |  |
|------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement               | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations    |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)   | 184                                                                               | 829                                                                               | 71                                                                                | 286                                                                               | 582                                                                               | 225                                                                               | 108                                                                                 | 339                                                                                 | 339                                                                                 | 165                                                                                 | 152                                                                                 | 98                                                                                  |
| Future Volume (vph)    | 184                                                                               | 829                                                                               | 71                                                                                | 286                                                                               | 582                                                                               | 225                                                                               | 108                                                                                 | 339                                                                                 | 339                                                                                 | 165                                                                                 | 152                                                                                 | 98                                                                                  |
| Ideal Flow (vphpl)     | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)    | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| Lane Util. Factor      | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Frt                    | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected          | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)      | 1805                                                                              | 3610                                                                              | 1553                                                                              | 1787                                                                              | 3610                                                                              | 1568                                                                              | 1787                                                                                | 1863                                                                                | 1599                                                                                | 1752                                                                                | 1810                                                                                | 1599                                                                                |
| Flt Permitted          | 0.34                                                                              | 1.00                                                                              | 1.00                                                                              | 0.09                                                                              | 1.00                                                                              | 1.00                                                                              | 0.53                                                                                | 1.00                                                                                | 1.00                                                                                | 0.17                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)      | 650                                                                               | 3610                                                                              | 1553                                                                              | 165                                                                               | 3610                                                                              | 1568                                                                              | 1000                                                                                | 1863                                                                                | 1599                                                                                | 310                                                                                 | 1810                                                                                | 1599                                                                                |
| Peak-hour factor, PHF  | 0.87                                                                              | 0.81                                                                              | 0.84                                                                              | 0.89                                                                              | 0.87                                                                              | 0.85                                                                              | 0.93                                                                                | 0.80                                                                                | 0.84                                                                                | 0.94                                                                                | 0.83                                                                                | 0.94                                                                                |
| Adj. Flow (vph)        | 211                                                                               | 1023                                                                              | 85                                                                                | 321                                                                               | 669                                                                               | 265                                                                               | 116                                                                                 | 424                                                                                 | 404                                                                                 | 176                                                                                 | 183                                                                                 | 104                                                                                 |
| RTOR Reduction (vph)   | 0                                                                                 | 0                                                                                 | 54                                                                                | 0                                                                                 | 0                                                                                 | 154                                                                               | 0                                                                                   | 0                                                                                   | 192                                                                                 | 0                                                                                   | 0                                                                                   | 75                                                                                  |
| Lane Group Flow (vph)  | 211                                                                               | 1023                                                                              | 31                                                                                | 321                                                                               | 669                                                                               | 111                                                                               | 116                                                                                 | 424                                                                                 | 212                                                                                 | 176                                                                                 | 183                                                                                 | 29                                                                                  |
| Heavy Vehicles (%)     | 0%                                                                                | 0%                                                                                | 4%                                                                                | 1%                                                                                | 0%                                                                                | 3%                                                                                | 1%                                                                                  | 2%                                                                                  | 1%                                                                                  | 3%                                                                                  | 5%                                                                                  | 1%                                                                                  |
| Turn Type              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                               | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases       | 5                                                                                 | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   | 3                                                                                   | 8                                                                                   |                                                                                     | 7                                                                                   | 4                                                                                   |                                                                                     |
| Permitted Phases       | 2                                                                                 |                                                                                   | 2                                                                                 | 6                                                                                 |                                                                                   | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   | 4                                                                                   |                                                                                     | 4                                                                                   |
| Actuated Green, G (s)  | 52.5                                                                              | 41.5                                                                              | 41.5                                                                              | 65.4                                                                              | 48.4                                                                              | 48.4                                                                              | 36.6                                                                                | 31.6                                                                                | 31.6                                                                                | 36.6                                                                                | 31.6                                                                                | 31.6                                                                                |
| Effective Green, g (s) | 56.5                                                                              | 43.5                                                                              | 43.5                                                                              | 67.4                                                                              | 50.4                                                                              | 50.4                                                                              | 40.6                                                                                | 33.6                                                                                | 33.6                                                                                | 40.6                                                                                | 33.6                                                                                | 33.6                                                                                |
| Actuated g/C Ratio     | 0.47                                                                              | 0.36                                                                              | 0.36                                                                              | 0.56                                                                              | 0.42                                                                              | 0.42                                                                              | 0.34                                                                                | 0.28                                                                                | 0.28                                                                                | 0.34                                                                                | 0.28                                                                                | 0.28                                                                                |
| Clearance Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)  | 3.0                                                                               | 5.0                                                                               | 5.0                                                                               | 3.0                                                                               | 5.0                                                                               | 5.0                                                                               | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 |
| Lane Grp Cap (vph)     | 431                                                                               | 1308                                                                              | 562                                                                               | 361                                                                               | 1516                                                                              | 658                                                                               | 384                                                                                 | 521                                                                                 | 447                                                                                 | 189                                                                                 | 506                                                                                 | 447                                                                                 |
| v/s Ratio Prot         | 0.05                                                                              | 0.28                                                                              |                                                                                   | c0.15                                                                             | 0.19                                                                              |                                                                                   | 0.02                                                                                | 0.23                                                                                |                                                                                     | c0.05                                                                               | 0.10                                                                                |                                                                                     |
| v/s Ratio Perm         | 0.18                                                                              |                                                                                   | 0.02                                                                              | c0.35                                                                             |                                                                                   | 0.07                                                                              | 0.08                                                                                |                                                                                     | 0.13                                                                                | c0.26                                                                               |                                                                                     | 0.02                                                                                |
| v/c Ratio              | 0.49                                                                              | 0.78                                                                              | 0.05                                                                              | 0.89                                                                              | 0.44                                                                              | 0.17                                                                              | 0.30                                                                                | 0.81                                                                                | 0.48                                                                                | 0.93                                                                                | 0.36                                                                                | 0.07                                                                                |
| Uniform Delay, d1      | 19.2                                                                              | 34.0                                                                              | 24.9                                                                              | 34.8                                                                              | 24.8                                                                              | 21.7                                                                              | 28.2                                                                                | 40.3                                                                                | 35.9                                                                                | 35.8                                                                                | 34.6                                                                                | 31.7                                                                                |
| Progression Factor     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.03                                                                              | 0.67                                                                              | 0.61                                                                              | 0.87                                                                                | 0.80                                                                                | 0.57                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Incremental Delay, d2  | 0.9                                                                               | 4.7                                                                               | 0.2                                                                               | 21.2                                                                              | 0.9                                                                               | 0.5                                                                               | 0.4                                                                                 | 9.2                                                                                 | 0.8                                                                                 | 46.0                                                                                | 0.4                                                                                 | 0.1                                                                                 |
| Delay (s)              | 20.1                                                                              | 38.7                                                                              | 25.1                                                                              | 57.0                                                                              | 17.4                                                                              | 13.7                                                                              | 25.0                                                                                | 41.5                                                                                | 21.1                                                                                | 81.9                                                                                | 35.1                                                                                | 31.7                                                                                |
| Level of Service       | C                                                                                 | D                                                                                 | C                                                                                 | E                                                                                 | B                                                                                 | B                                                                                 | C                                                                                   | D                                                                                   | C                                                                                   | F                                                                                   | D                                                                                   | C                                                                                   |
| Approach Delay (s)     |                                                                                   | 34.9                                                                              |                                                                                   |                                                                                   | 26.7                                                                              |                                                                                   |                                                                                     | 30.7                                                                                |                                                                                     |                                                                                     | 52.1                                                                                |                                                                                     |
| Approach LOS           |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                     | C                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |

### Intersection Summary

|                                   |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 33.3  | HCM 2000 Level of Service | C    |
| HCM 2000 Volume to Capacity ratio | 0.93  |                           |      |
| Actuated Cycle Length (s)         | 120.0 | Sum of lost time (s)      | 16.0 |
| Intersection Capacity Utilization | 79.1% | ICU Level of Service      | D    |
| Analysis Period (min)             | 15    |                           |      |
| c Critical Lane Group             |       |                           |      |

# HCM Unsignalized Intersection Capacity Analysis

## 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) & Roy Carlson Blvd

Existing PM  
11/15/2016



| Movement                          | WBL  | WBR  | NBT   | NBR  | SBL                  | SBT  |
|-----------------------------------|------|------|-------|------|----------------------|------|
| Lane Configurations               |      |      |       |      |                      |      |
| Traffic Volume (veh/h)            | 75   | 77   | 750   | 18   | 4                    | 459  |
| Future Volume (Veh/h)             | 75   | 77   | 750   | 18   | 4                    | 459  |
| Sign Control                      | Stop |      | Free  |      |                      | Free |
| Grade                             | 0%   |      | 0%    |      |                      | 0%   |
| Peak Hour Factor                  | 0.81 | 0.57 | 0.88  | 0.75 | 0.50                 | 0.80 |
| Hourly flow rate (vph)            | 93   | 135  | 852   | 24   | 8                    | 574  |
| Pedestrians                       |      |      |       |      |                      |      |
| Lane Width (ft)                   |      |      |       |      |                      |      |
| Walking Speed (ft/s)              |      |      |       |      |                      |      |
| Percent Blockage                  |      |      |       |      |                      |      |
| Right turn flare (veh)            |      |      |       |      |                      |      |
| Median type                       |      |      | None  |      |                      | None |
| Median storage veh                |      |      |       |      |                      |      |
| Upstream signal (ft)              |      |      |       |      |                      |      |
| pX, platoon unblocked             |      |      |       |      |                      |      |
| vC, conflicting volume            | 1442 | 852  |       |      | 876                  |      |
| vC1, stage 1 conf vol             |      |      |       |      |                      |      |
| vC2, stage 2 conf vol             |      |      |       |      |                      |      |
| vCu, unblocked vol                | 1442 | 852  |       |      | 876                  |      |
| tC, single (s)                    | 6.5  | 6.2  |       |      | 4.1                  |      |
| tC, 2 stage (s)                   |      |      |       |      |                      |      |
| tF (s)                            | 3.6  | 3.3  |       |      | 2.2                  |      |
| p0 queue free %                   | 34   | 63   |       |      | 99                   |      |
| cM capacity (veh/h)               | 141  | 362  |       |      | 779                  |      |
| Direction, Lane #                 | WB 1 | WB 2 | NB 1  | NB 2 | SB 1                 |      |
| Volume Total                      | 93   | 135  | 852   | 24   | 582                  |      |
| Volume Left                       | 93   | 0    | 0     | 0    | 8                    |      |
| Volume Right                      | 0    | 135  | 0     | 24   | 0                    |      |
| cSH                               | 141  | 362  | 1700  | 1700 | 779                  |      |
| Volume to Capacity                | 0.66 | 0.37 | 0.50  | 0.01 | 0.01                 |      |
| Queue Length 95th (ft)            | 91   | 42   | 0     | 0    | 1                    |      |
| Control Delay (s)                 | 70.2 | 20.7 | 0.0   | 0.0  | 0.3                  |      |
| Lane LOS                          | F    | C    |       |      | A                    |      |
| Approach Delay (s)                | 40.9 |      | 0.0   |      | 0.3                  |      |
| Approach LOS                      | E    |      |       |      |                      |      |
| Intersection Summary              |      |      |       |      |                      |      |
| Average Delay                     |      |      | 5.6   |      |                      |      |
| Intersection Capacity Utilization |      |      | 50.9% |      | ICU Level of Service | A    |
| Analysis Period (min)             |      |      | 15    |      |                      |      |



## Queues

Existing PM

## 5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd

11/15/2016

|                         |  |  |  |  |  |  |   |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 |
| Lane Configurations     |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 22                                                                                | 16                                                                                | 20                                                                                | 273                                                                               | 7                                                                                 | 112                                                                               | 6                                                                                   | 661                                                                                 | 365                                                                                 | 160                                                                                 | 466                                                                                 |
| Future Volume (vph)     | 22                                                                                | 16                                                                                | 20                                                                                | 273                                                                               | 7                                                                                 | 112                                                                               | 6                                                                                   | 661                                                                                 | 365                                                                                 | 160                                                                                 | 466                                                                                 |
| Lane Group Flow (vph)   | 0                                                                                 | 72                                                                                | 40                                                                                | 0                                                                                 | 316                                                                               | 140                                                                               | 12                                                                                  | 796                                                                                 | 384                                                                                 | 184                                                                                 | 575                                                                                 |
| Turn Type               | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                | Perm                                                                                | NA                                                                                  |
| Protected Phases        |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |
| Permitted Phases        | 4                                                                                 |                                                                                   | 4                                                                                 | 8                                                                                 |                                                                                   | 8                                                                                 | 2                                                                                   |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     |
| Detector Phase          | 4                                                                                 | 4                                                                                 | 4                                                                                 | 8                                                                                 | 8                                                                                 | 8                                                                                 | 2                                                                                   | 2                                                                                   | 2                                                                                   | 6                                                                                   | 6                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 15.0                                                                                | 15.0                                                                                | 15.0                                                                                | 15.0                                                                                | 15.0                                                                                |
| Minimum Split (s)       | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                                | 24.0                                                                                | 24.0                                                                                | 24.0                                                                                | 24.0                                                                                |
| Total Split (s)         | 47.0                                                                              | 47.0                                                                              | 47.0                                                                              | 47.0                                                                              | 47.0                                                                              | 47.0                                                                              | 73.0                                                                                | 73.0                                                                                | 73.0                                                                                | 73.0                                                                                | 73.0                                                                                |
| Total Split (%)         | 39.2%                                                                             | 39.2%                                                                             | 39.2%                                                                             | 39.2%                                                                             | 39.2%                                                                             | 39.2%                                                                             | 60.8%                                                                               | 60.8%                                                                               | 60.8%                                                                               | 60.8%                                                                               | 60.8%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    |                                                                                   | -2.0                                                                              | -2.0                                                                              |                                                                                   | -2.0                                                                              | -2.0                                                                              | -2.0                                                                                | -2.0                                                                                | -2.0                                                                                | -2.0                                                                                | -2.0                                                                                |
| Total Lost Time (s)     |                                                                                   | 4.0                                                                               | 4.0                                                                               |                                                                                   | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| Lead/Lag                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | C-Min                                                                               | C-Min                                                                               | C-Min                                                                               | C-Min                                                                               | C-Min                                                                               |
| v/c Ratio               |                                                                                   | 0.18                                                                              | 0.08                                                                              |                                                                                   | 0.82                                                                              | 0.24                                                                              | 0.02                                                                                | 0.35                                                                                | 0.33                                                                                | 0.49                                                                                | 0.26                                                                                |
| Control Delay           |                                                                                   | 30.4                                                                              | 8.2                                                                               |                                                                                   | 56.1                                                                              | 5.4                                                                               | 10.5                                                                                | 11.5                                                                                | 1.9                                                                                 | 20.1                                                                                | 11.4                                                                                |
| Queue Delay             |                                                                                   | 0.0                                                                               | 0.0                                                                               |                                                                                   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             |                                                                                   | 30.4                                                                              | 8.2                                                                               |                                                                                   | 56.1                                                                              | 5.4                                                                               | 10.5                                                                                | 11.5                                                                                | 1.9                                                                                 | 20.1                                                                                | 11.4                                                                                |
| Queue Length 50th (ft)  |                                                                                   | 41                                                                                | 0                                                                                 |                                                                                   | 224                                                                               | 0                                                                                 | 3                                                                                   | 144                                                                                 | 0                                                                                   | 89                                                                                  | 132                                                                                 |
| Queue Length 95th (ft)  |                                                                                   | 30                                                                                | 5                                                                                 |                                                                                   | 123                                                                               | 30                                                                                | 7                                                                                   | 190                                                                                 | 41                                                                                  | m138                                                                                | 164                                                                                 |
| Internal Link Dist (ft) |                                                                                   | 275                                                                               |                                                                                   |                                                                                   | 4179                                                                              |                                                                                   |                                                                                     | 3868                                                                                |                                                                                     |                                                                                     | 2104                                                                                |
| Turn Bay Length (ft)    |                                                                                   |                                                                                   | 105                                                                               |                                                                                   |                                                                                   | 250                                                                               | 230                                                                                 |                                                                                     | 230                                                                                 | 200                                                                                 |                                                                                     |
| Base Capacity (vph)     |                                                                                   | 479                                                                               | 576                                                                               |                                                                                   | 466                                                                               | 668                                                                               | 493                                                                                 | 2277                                                                                | 1168                                                                                | 373                                                                                 | 2233                                                                                |
| Starvation Cap Reductn  |                                                                                   | 0                                                                                 | 0                                                                                 |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   |                                                                                   | 0                                                                                 | 0                                                                                 |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     |                                                                                   | 0                                                                                 | 0                                                                                 |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       |                                                                                   | 0.15                                                                              | 0.07                                                                              |                                                                                   | 0.68                                                                              | 0.21                                                                              | 0.02                                                                                | 0.35                                                                                | 0.33                                                                                | 0.49                                                                                | 0.26                                                                                |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

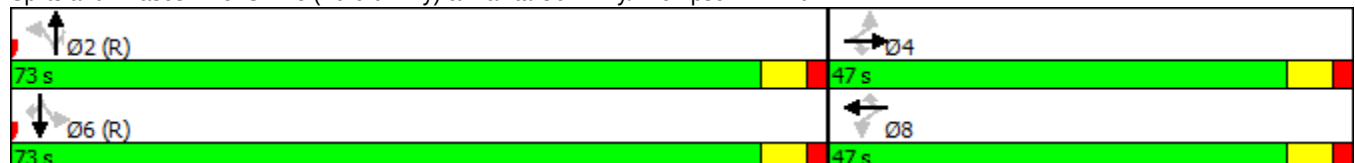
Offset: 69 (58%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd



# HCM Signalized Intersection Capacity Analysis

## 5: SR 13 (Buford Hwy) & Makita Co. Drwy/Thompson Mill Rd

Existing PM

11/15/2016

|                                   |  |  |  |  |  |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)              | 22                                                                                | 16                                                                                | 20                                                                                | 273                                                                               | 7                                                                                 | 112                                                                               | 6                                                                                   | 661                                                                                 | 365                                                                                 | 160                                                                                 | 466                                                                                 | 0                                                                                   |
| Future Volume (vph)               | 22                                                                                | 16                                                                                | 20                                                                                | 273                                                                               | 7                                                                                 | 112                                                                               | 6                                                                                   | 661                                                                                 | 365                                                                                 | 160                                                                                 | 466                                                                                 | 0                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 4.0                                                                               | 4.0                                                                               |                                                                                   | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |                                                                                     |
| Lane Util. Factor                 |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                |                                                                                     |
| Frt                               |                                                                                   | 1.00                                                                              | 0.85                                                                              |                                                                                   | 1.00                                                                              | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Flt Protected                     |                                                                                   | 0.98                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                              | 1.00                                                                              | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (prot)                 |                                                                                   | 1859                                                                              | 1538                                                                              |                                                                                   | 1814                                                                              | 1615                                                                              | 1805                                                                                | 3574                                                                                | 1615                                                                                | 1805                                                                                | 3505                                                                                |                                                                                     |
| Flt Permitted                     |                                                                                   | 0.70                                                                              | 1.00                                                                              |                                                                                   | 0.68                                                                              | 1.00                                                                              | 0.41                                                                                | 1.00                                                                                | 1.00                                                                                | 0.31                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (perm)                 |                                                                                   | 1337                                                                              | 1538                                                                              |                                                                                   | 1301                                                                              | 1615                                                                              | 776                                                                                 | 3574                                                                                | 1615                                                                                | 586                                                                                 | 3505                                                                                |                                                                                     |
| Peak-hour factor, PHF             | 0.69                                                                              | 0.40                                                                              | 0.50                                                                              | 0.91                                                                              | 0.44                                                                              | 0.80                                                                              | 0.50                                                                                | 0.83                                                                                | 0.95                                                                                | 0.87                                                                                | 0.81                                                                                | 0.73                                                                                |
| Adj. Flow (vph)                   | 32                                                                                | 40                                                                                | 40                                                                                | 300                                                                               | 16                                                                                | 140                                                                               | 12                                                                                  | 796                                                                                 | 384                                                                                 | 184                                                                                 | 575                                                                                 | 0                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 28                                                                                | 0                                                                                 | 0                                                                                 | 99                                                                                | 0                                                                                   | 0                                                                                   | 139                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 0                                                                                 | 72                                                                                | 12                                                                                | 0                                                                                 | 316                                                                               | 41                                                                                | 12                                                                                  | 796                                                                                 | 245                                                                                 | 184                                                                                 | 575                                                                                 | 0                                                                                   |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 5%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                  | 1%                                                                                  | 0%                                                                                  | 0%                                                                                  | 3%                                                                                  | 0%                                                                                  |
| Turn Type                         | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                | Perm                                                                                | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   | 4                                                                                 | 8                                                                                 |                                                                                   | 8                                                                                 | 2                                                                                   |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 33.5                                                                              | 33.5                                                                              |                                                                                   | 33.5                                                                              | 33.5                                                                              | 74.5                                                                                | 74.5                                                                                | 74.5                                                                                | 74.5                                                                                | 74.5                                                                                |                                                                                     |
| Effective Green, g (s)            |                                                                                   | 35.5                                                                              | 35.5                                                                              |                                                                                   | 35.5                                                                              | 35.5                                                                              | 76.5                                                                                | 76.5                                                                                | 76.5                                                                                | 76.5                                                                                | 76.5                                                                                |                                                                                     |
| Actuated g/C Ratio                |                                                                                   | 0.30                                                                              | 0.30                                                                              |                                                                                   | 0.30                                                                              | 0.30                                                                              | 0.64                                                                                | 0.64                                                                                | 0.64                                                                                | 0.64                                                                                | 0.64                                                                                |                                                                                     |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Vehicle Extension (s)             |                                                                                   | 3.0                                                                               | 3.0                                                                               |                                                                                   | 3.0                                                                               | 3.0                                                                               | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |                                                                                     |
| Lane Grp Cap (vph)                |                                                                                   | 395                                                                               | 454                                                                               |                                                                                   | 384                                                                               | 477                                                                               | 494                                                                                 | 2278                                                                                | 1029                                                                                | 373                                                                                 | 2234                                                                                |                                                                                     |
| v/s Ratio Prot                    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     | 0.22                                                                                |                                                                                     |                                                                                     | 0.16                                                                                |                                                                                     |
| v/s Ratio Perm                    |                                                                                   | 0.05                                                                              | 0.01                                                                              |                                                                                   | 0.24                                                                              | 0.03                                                                              | 0.02                                                                                |                                                                                     | 0.15                                                                                | 0.31                                                                                |                                                                                     |                                                                                     |
| v/c Ratio                         |                                                                                   | 0.18                                                                              | 0.03                                                                              |                                                                                   | 0.82                                                                              | 0.09                                                                              | 0.02                                                                                | 0.35                                                                                | 0.24                                                                                | 0.49                                                                                | 0.26                                                                                |                                                                                     |
| Uniform Delay, d1                 |                                                                                   | 31.4                                                                              | 30.0                                                                              |                                                                                   | 39.3                                                                              | 30.5                                                                              | 8.0                                                                                 | 10.1                                                                                | 9.3                                                                                 | 11.5                                                                                | 9.4                                                                                 |                                                                                     |
| Progression Factor                |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.10                                                                                | 1.07                                                                                |                                                                                     |
| Incremental Delay, d2             |                                                                                   | 0.2                                                                               | 0.0                                                                               |                                                                                   | 13.3                                                                              | 0.1                                                                               | 0.1                                                                                 | 0.4                                                                                 | 0.5                                                                                 | 4.2                                                                                 | 0.3                                                                                 |                                                                                     |
| Delay (s)                         |                                                                                   | 31.7                                                                              | 30.0                                                                              |                                                                                   | 52.6                                                                              | 30.6                                                                              | 8.1                                                                                 | 10.6                                                                                | 9.8                                                                                 | 16.8                                                                                | 10.3                                                                                |                                                                                     |
| Level of Service                  |                                                                                   | C                                                                                 | C                                                                                 |                                                                                   | D                                                                                 | C                                                                                 | A                                                                                   | B                                                                                   | A                                                                                   | B                                                                                   | B                                                                                   |                                                                                     |
| Approach Delay (s)                |                                                                                   | 31.1                                                                              |                                                                                   |                                                                                   | 45.9                                                                              |                                                                                   |                                                                                     | 10.3                                                                                |                                                                                     |                                                                                     | 11.9                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                     | B                                                                                   |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   | 18.2                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   | 0.60                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   | 62.9%                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

Existing PM

## 6: SR 13 (Buford Hwy) &amp; S. Hill St/Hamilton Mill Rd

11/15/2016

|                         |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | NBL                                                                               | NBT                                                                                | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations     |  |  |  |  |  |  |   |  |  |  |  |
| Traffic Volume (vph)    | 74                                                                                | 265                                                                               | 52                                                                                | 385                                                                               | 211                                                                               | 79                                                                                | 841                                                                                | 733                                                                                 | 255                                                                                 | 543                                                                                 | 42                                                                                  |
| Future Volume (vph)     | 74                                                                                | 265                                                                               | 52                                                                                | 385                                                                               | 211                                                                               | 79                                                                                | 841                                                                                | 733                                                                                 | 255                                                                                 | 543                                                                                 | 42                                                                                  |
| Lane Group Flow (vph)   | 84                                                                                | 276                                                                               | 64                                                                                | 438                                                                               | 476                                                                               | 116                                                                               | 924                                                                                | 797                                                                                 | 300                                                                                 | 646                                                                                 | 48                                                                                  |
| Turn Type               | Perm                                                                              | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                | pm+pt                                                                             | NA                                                                                 | Free                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases        |                                                                                   | 4                                                                                 |                                                                                   | 3                                                                                 | 8                                                                                 | 5                                                                                 | 2                                                                                  |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases        | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 2                                                                                 |                                                                                    | Free                                                                                | 6                                                                                   |                                                                                     | 6                                                                                   |
| Detector Phase          | 4                                                                                 | 4                                                                                 | 4                                                                                 | 3                                                                                 | 8                                                                                 | 5                                                                                 | 2                                                                                  |                                                                                     | 1                                                                                   | 6                                                                                   | 6                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 4.0                                                                               | 6.0                                                                               | 4.0                                                                               | 15.0                                                                               |                                                                                     | 4.0                                                                                 | 15.0                                                                                | 15.0                                                                                |
| Minimum Split (s)       | 41.0                                                                              | 41.0                                                                              | 41.0                                                                              | 11.0                                                                              | 46.0                                                                              | 11.0                                                                              | 37.0                                                                               |                                                                                     | 11.0                                                                                | 40.0                                                                                | 40.0                                                                                |
| Total Split (s)         | 41.0                                                                              | 41.0                                                                              | 41.0                                                                              | 19.0                                                                              | 60.0                                                                              | 11.0                                                                              | 37.0                                                                               |                                                                                     | 18.0                                                                                | 44.0                                                                                | 44.0                                                                                |
| Total Split (%)         | 35.7%                                                                             | 35.7%                                                                             | 35.7%                                                                             | 16.5%                                                                             | 52.2%                                                                             | 9.6%                                                                              | 32.2%                                                                              |                                                                                     | 15.7%                                                                               | 38.3%                                                                               | 38.3%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                |                                                                                     | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                |                                                                                     | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    | -2.0                                                                              | -2.0                                                                              | -2.0                                                                              | -2.0                                                                              | -2.0                                                                              | -2.0                                                                              | -2.0                                                                               |                                                                                     | -2.0                                                                                | -2.0                                                                                | -2.0                                                                                |
| Total Lost Time (s)     | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                |                                                                                     | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| Lead/Lag                | Lag                                                                               | Lag                                                                               | Lag                                                                               | Lead                                                                              |                                                                                   | Lead                                                                              | Lag                                                                                |                                                                                     | Lead                                                                                | Lag                                                                                 | Lag                                                                                 |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | C-Min                                                                              |                                                                                     | None                                                                                | C-Min                                                                               | C-Min                                                                               |
| v/c Ratio               | 0.48                                                                              | 0.69                                                                              | 0.13                                                                              | 1.01                                                                              | 0.70                                                                              | 0.30                                                                              | 0.65                                                                               | 0.51                                                                                | 0.89                                                                                | 0.40                                                                                | 0.06                                                                                |
| Control Delay           | 48.0                                                                              | 50.4                                                                              | 0.5                                                                               | 95.0                                                                              | 31.7                                                                              | 16.3                                                                              | 31.9                                                                               | 1.2                                                                                 | 49.2                                                                                | 22.5                                                                                | 0.1                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 48.0                                                                              | 50.4                                                                              | 0.5                                                                               | 95.0                                                                              | 31.7                                                                              | 16.3                                                                              | 31.9                                                                               | 1.2                                                                                 | 49.2                                                                                | 22.5                                                                                | 0.1                                                                                 |
| Queue Length 50th (ft)  | 55                                                                                | 190                                                                               | 0                                                                                 | ~171                                                                              | 261                                                                               | 39                                                                                | 287                                                                                | 0                                                                                   | 122                                                                                 | 162                                                                                 | 0                                                                                   |
| Queue Length 95th (ft)  | 96                                                                                | 259                                                                               | 0                                                                                 | #268                                                                              | 316                                                                               | 58                                                                                | 404                                                                                | 0                                                                                   | #277                                                                                | 218                                                                                 | 0                                                                                   |
| Internal Link Dist (ft) |                                                                                   | 657                                                                               |                                                                                   |                                                                                   | 1618                                                                              |                                                                                   | 1320                                                                               |                                                                                     |                                                                                     | 3868                                                                                |                                                                                     |
| Turn Bay Length (ft)    | 180                                                                               |                                                                                   | 300                                                                               | 250                                                                               |                                                                                   | 240                                                                               |                                                                                    | 1000                                                                                | 400                                                                                 |                                                                                     | 280                                                                                 |
| Base Capacity (vph)     | 265                                                                               | 611                                                                               | 654                                                                               | 435                                                                               | 866                                                                               | 393                                                                               | 1420                                                                               | 1568                                                                                | 336                                                                                 | 1621                                                                                | 817                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.32                                                                              | 0.45                                                                              | 0.10                                                                              | 1.01                                                                              | 0.55                                                                              | 0.30                                                                              | 0.65                                                                               | 0.51                                                                                | 0.89                                                                                | 0.40                                                                                | 0.06                                                                                |

## Intersection Summary

Cycle Length: 115

Actuated Cycle Length: 115

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

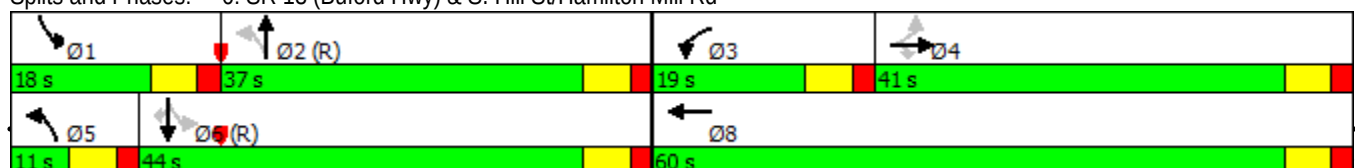
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 6: SR 13 (Buford Hwy) &amp; S. Hill St/Hamilton Mill Rd



# HCM Signalized Intersection Capacity Analysis

## 6: SR 13 (Buford Hwy) & S. Hill St/Hamilton Mill Rd

Existing PM

11/15/2016

|                                   |  |  |  |  |  |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |  |  |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (vph)              | 74                                                                                | 265                                                                               | 52                                                                                | 385                                                                               | 211                                                                               | 180                                                                               | 79                                                                                  | 841                                                                                 | 733                                                                                 | 255                                                                                 | 543                                                                                 | 42                                                                                  |
| Future Volume (vph)               | 74                                                                                | 265                                                                               | 52                                                                                | 385                                                                               | 211                                                                               | 180                                                                               | 79                                                                                  | 841                                                                                 | 733                                                                                 | 255                                                                                 | 543                                                                                 | 42                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               |                                                                                   | 4.0                                                                                 | 4.0                                                                                 | 2.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| Lane Util. Factor                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.97                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |
| Frt                               | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 0.93                                                                              |                                                                                   | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)                 | 1805                                                                              | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1719                                                                              |                                                                                   | 1805                                                                                | 3574                                                                                | 1568                                                                                | 1770                                                                                | 3539                                                                                | 1615                                                                                |
| Flt Permitted                     | 0.43                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.38                                                                                | 1.00                                                                                | 1.00                                                                                | 0.15                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)                 | 826                                                                               | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1719                                                                              |                                                                                   | 713                                                                                 | 3574                                                                                | 1568                                                                                | 279                                                                                 | 3539                                                                                | 1615                                                                                |
| Peak-hour factor, PHF             | 0.88                                                                              | 0.96                                                                              | 0.81                                                                              | 0.88                                                                              | 0.86                                                                              | 0.78                                                                              | 0.68                                                                                | 0.91                                                                                | 0.92                                                                                | 0.85                                                                                | 0.84                                                                                | 0.88                                                                                |
| Adj. Flow (vph)                   | 84                                                                                | 276                                                                               | 64                                                                                | 438                                                                               | 245                                                                               | 231                                                                               | 116                                                                                 | 924                                                                                 | 797                                                                                 | 300                                                                                 | 646                                                                                 | 48                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 50                                                                                | 0                                                                                 | 36                                                                                | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 26                                                                                  |
| Lane Group Flow (vph)             | 84                                                                                | 276                                                                               | 14                                                                                | 438                                                                               | 440                                                                               | 0                                                                                 | 116                                                                                 | 924                                                                                 | 797                                                                                 | 300                                                                                 | 646                                                                                 | 22                                                                                  |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 5%                                                                                | 1%                                                                                | 4%                                                                                | 0%                                                                                  | 1%                                                                                  | 3%                                                                                  | 2%                                                                                  | 2%                                                                                  | 0%                                                                                  |
| Turn Type                         | Perm                                                                              | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                |                                                                                   | pm+pt                                                                               | NA                                                                                  | Free                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   | 3                                                                                 | 8                                                                                 |                                                                                   | 5                                                                                   | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   |                                                                                   | 2                                                                                   |                                                                                     | Free                                                                                | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             | 22.3                                                                              | 22.3                                                                              | 22.3                                                                              | 13.0                                                                              | 41.3                                                                              |                                                                                   | 48.7                                                                                | 43.7                                                                                | 115.0                                                                               | 61.7                                                                                | 50.7                                                                                | 50.7                                                                                |
| Effective Green, g (s)            | 24.3                                                                              | 24.3                                                                              | 24.3                                                                              | 15.0                                                                              | 43.3                                                                              |                                                                                   | 52.7                                                                                | 45.7                                                                                | 115.0                                                                               | 63.7                                                                                | 52.7                                                                                | 52.7                                                                                |
| Actuated g/C Ratio                | 0.21                                                                              | 0.21                                                                              | 0.21                                                                              | 0.13                                                                              | 0.38                                                                              |                                                                                   | 0.46                                                                                | 0.40                                                                                | 1.00                                                                                | 0.55                                                                                | 0.46                                                                                | 0.46                                                                                |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)             | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               |                                                                                   | 3.0                                                                                 | 5.0                                                                                 |                                                                                     | 3.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |
| Lane Grp Cap (vph)                | 174                                                                               | 401                                                                               | 341                                                                               | 435                                                                               | 647                                                                               |                                                                                   | 393                                                                                 | 1420                                                                                | 1568                                                                                | 336                                                                                 | 1621                                                                                | 740                                                                                 |
| v/s Ratio Prot                    |                                                                                   | 0.15                                                                              |                                                                                   | c0.13                                                                             | c0.26                                                                             |                                                                                   | 0.02                                                                                | 0.26                                                                                |                                                                                     | c0.11                                                                               | 0.18                                                                                |                                                                                     |
| v/s Ratio Perm                    | 0.10                                                                              |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.12                                                                                |                                                                                     | 0.51                                                                                | c0.39                                                                               |                                                                                     | 0.01                                                                                |
| v/c Ratio                         | 0.48                                                                              | 0.69                                                                              | 0.04                                                                              | 1.01                                                                              | 0.68                                                                              |                                                                                   | 0.30                                                                                | 0.65                                                                                | 0.51                                                                                | 0.89                                                                                | 0.40                                                                                | 0.03                                                                                |
| Uniform Delay, d1                 | 39.8                                                                              | 41.9                                                                              | 36.1                                                                              | 50.0                                                                              | 30.0                                                                              |                                                                                   | 18.1                                                                                | 28.2                                                                                | 0.0                                                                                 | 21.6                                                                                | 20.6                                                                                | 17.1                                                                                |
| Progression Factor                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Incremental Delay, d2             | 2.1                                                                               | 4.9                                                                               | 0.0                                                                               | 44.9                                                                              | 2.8                                                                               |                                                                                   | 0.4                                                                                 | 2.3                                                                                 | 1.2                                                                                 | 24.4                                                                                | 0.7                                                                                 | 0.1                                                                                 |
| Delay (s)                         | 41.9                                                                              | 46.7                                                                              | 36.1                                                                              | 94.9                                                                              | 32.9                                                                              |                                                                                   | 18.5                                                                                | 30.5                                                                                | 1.2                                                                                 | 46.0                                                                                | 21.4                                                                                | 17.2                                                                                |
| Level of Service                  | D                                                                                 | D                                                                                 | D                                                                                 | F                                                                                 | C                                                                                 |                                                                                   | B                                                                                   | C                                                                                   | A                                                                                   | D                                                                                   | C                                                                                   | B                                                                                   |
| Approach Delay (s)                |                                                                                   | 44.2                                                                              |                                                                                   |                                                                                   | 62.6                                                                              |                                                                                   |                                                                                     | 17.0                                                                                |                                                                                     |                                                                                     | 28.6                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                     | B                                                                                   |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 32.5                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.90                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 115.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                     |                                                                                     | 16.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 77.8%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM Unsignalized Intersection Capacity Analysis

## 7: Pvt. Drwy/Bryant Rd & Thompson Mill Rd

Existing PM

11/15/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                    |  |                                                                                     |                                                                                     |  |                                                                                     |
| Traffic Volume (veh/h)            | 5                                                                                 | 487                                                                               | 0                                                                                 | 0                                                                                 | 278                                                                               | 7                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 27                                                                                  | 0                                                                                   | 8                                                                                   |
| Future Volume (Veh/h)             | 5                                                                                 | 487                                                                               | 0                                                                                 | 0                                                                                 | 278                                                                               | 7                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 27                                                                                  | 0                                                                                   | 8                                                                                   |
| Sign Control                      |                                                                                   | Free                                                                              |                                                                                   |                                                                                   | Free                                                                              |                                                                                   |                                                                                    | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Grade                             |                                                                                   | 0%                                                                                |                                                                                   |                                                                                   | 0%                                                                                |                                                                                   |                                                                                    | 0%                                                                                  |                                                                                     |                                                                                     | 0%                                                                                  |                                                                                     |
| Peak Hour Factor                  | 0.31                                                                              | 0.80                                                                              | 0.25                                                                              | 0.92                                                                              | 0.96                                                                              | 0.58                                                                              | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.61                                                                                | 0.92                                                                                | 0.67                                                                                |
| Hourly flow rate (vph)            | 16                                                                                | 609                                                                               | 0                                                                                 | 0                                                                                 | 290                                                                               | 12                                                                                | 0                                                                                  | 0                                                                                   | 0                                                                                   | 44                                                                                  | 0                                                                                   | 12                                                                                  |
| Pedestrians                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane Width (ft)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Walking Speed (ft/s)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Percent Blockage                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Right turn flare (veh)            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median type                       |                                                                                   | None                                                                              |                                                                                   |                                                                                   | None                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median storage veh                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Upstream signal (ft)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| pX, platoon unblocked             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC, conflicting volume            | 302                                                                               |                                                                                   |                                                                                   | 609                                                                               |                                                                                   |                                                                                   | 949                                                                                | 943                                                                                 | 609                                                                                 | 937                                                                                 | 937                                                                                 | 296                                                                                 |
| vC1, stage 1 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC2, stage 2 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vCu, unblocked vol                | 302                                                                               |                                                                                   |                                                                                   | 609                                                                               |                                                                                   |                                                                                   | 949                                                                                | 943                                                                                 | 609                                                                                 | 937                                                                                 | 937                                                                                 | 296                                                                                 |
| tC, single (s)                    | 4.1                                                                               |                                                                                   |                                                                                   | 4.1                                                                               |                                                                                   |                                                                                   | 7.1                                                                                | 6.5                                                                                 | 6.2                                                                                 | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 |
| tC, 2 stage (s)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| tF (s)                            | 2.2                                                                               |                                                                                   |                                                                                   | 2.2                                                                               |                                                                                   |                                                                                   | 3.5                                                                                | 4.0                                                                                 | 3.3                                                                                 | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 |
| p0 queue free %                   | 99                                                                                |                                                                                   |                                                                                   | 100                                                                               |                                                                                   |                                                                                   | 100                                                                                | 100                                                                                 | 100                                                                                 | 82                                                                                  | 100                                                                                 | 98                                                                                  |
| cM capacity (veh/h)               | 1270                                                                              |                                                                                   |                                                                                   | 979                                                                               |                                                                                   |                                                                                   | 236                                                                                | 261                                                                                 | 499                                                                                 | 245                                                                                 | 263                                                                                 | 748                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total                      | 625                                                                               | 302                                                                               | 0                                                                                 | 56                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left                       | 16                                                                                | 0                                                                                 | 0                                                                                 | 44                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right                      | 0                                                                                 | 12                                                                                | 0                                                                                 | 12                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| cSH                               | 1270                                                                              | 979                                                                               | 1700                                                                              | 286                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume to Capacity                | 0.01                                                                              | 0.00                                                                              | 0.00                                                                              | 0.20                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Queue Length 95th (ft)            | 1                                                                                 | 0                                                                                 | 0                                                                                 | 18                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 0.4                                                                               | 0.0                                                                               | 0.0                                                                               | 20.6                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane LOS                          | A                                                                                 |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 0.4                                                                               | 0.0                                                                               | 0.0                                                                               | 20.6                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Average Delay                     |                                                                                   |                                                                                   | 1.4                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 39.6%                                                                             |                                                                                   | ICU Level of Service                                                              |                                                                                   |                                                                                    |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM Unsignalized Intersection Capacity Analysis 8: N. Bogan Rd & Thompson Mill Rd

Existing PM  
11/15/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                    |  |                                                                                     |                                                                                     |  |                                                                                     |
| Sign Control                      |                                                                                   | Stop                                                                              |                                                                                   |                                                                                   | Stop                                                                              |                                                                                   |                                                                                    | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Traffic Volume (vph)              | 70                                                                                | 326                                                                               | 107                                                                               | 55                                                                                | 159                                                                               | 14                                                                                | 70                                                                                 | 143                                                                                 | 83                                                                                  | 14                                                                                  | 150                                                                                 | 48                                                                                  |
| Future Volume (vph)               | 70                                                                                | 326                                                                               | 107                                                                               | 55                                                                                | 159                                                                               | 14                                                                                | 70                                                                                 | 143                                                                                 | 83                                                                                  | 14                                                                                  | 150                                                                                 | 48                                                                                  |
| Peak Hour Factor                  | 0.83                                                                              | 0.90                                                                              | 0.79                                                                              | 0.92                                                                              | 0.86                                                                              | 0.88                                                                              | 0.92                                                                               | 0.81                                                                                | 0.77                                                                                | 0.70                                                                                | 0.75                                                                                | 0.80                                                                                |
| Hourly flow rate (vph)            | 84                                                                                | 362                                                                               | 135                                                                               | 60                                                                                | 185                                                                               | 16                                                                                | 76                                                                                 | 177                                                                                 | 108                                                                                 | 20                                                                                  | 200                                                                                 | 60                                                                                  |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total (vph)                | 581                                                                               | 261                                                                               | 361                                                                               | 280                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left (vph)                 | 84                                                                                | 60                                                                                | 76                                                                                | 20                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right (vph)                | 135                                                                               | 16                                                                                | 108                                                                               | 60                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Hadj (s)                          | -0.11                                                                             | 0.01                                                                              | -0.13                                                                             | -0.11                                                                             |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Departure Headway (s)             | 7.2                                                                               | 8.0                                                                               | 7.6                                                                               | 7.9                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Degree Utilization, x             | 1.16                                                                              | 0.58                                                                              | 0.76                                                                              | 0.61                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Capacity (veh/h)                  | 493                                                                               | 419                                                                               | 461                                                                               | 429                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 118.1                                                                             | 21.4                                                                              | 30.5                                                                              | 22.5                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 118.1                                                                             | 21.4                                                                              | 30.5                                                                              | 22.5                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      | F                                                                                 | C                                                                                 | D                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Delay                             |                                                                                   |                                                                                   |                                                                                   | 61.7                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  |                                                                                   |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   |                                                                                   | 70.1%                                                                             | ICU Level of Service                                                              | C                                                                                 |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

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Intersection: 8: N. Bogan Rd & Thompson Mill Rd

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| Movement              | EB   | WB   | NB  | SB  |
|-----------------------|------|------|-----|-----|
| Directions Served     | LTR  | LTR  | LTR | LTR |
| Maximum Queue (ft)    | 192  | 90   | 76  | 73  |
| Average Queue (ft)    | 153  | 56   | 47  | 47  |
| 95th Queue (ft)       | 191  | 102  | 76  | 75  |
| Link Distance (ft)    | 2455 | 1031 | 846 | 592 |
| Upstream Blk Time (%) |      |      |     |     |
| Queuing Penalty (veh) |      |      |     |     |
| Storage Bay Dist (ft) |      |      |     |     |
| Storage Blk Time (%)  |      |      |     |     |
| Queuing Penalty (veh) |      |      |     |     |

## **Future “No-Build” Intersection Analysis**



## Queues

Future No-Build AM

## 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)

11/16/2016



| Lane Group              | EBL   | EBT   | WBT   | WBR   | NBL   | NBT   | NBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     |       |       |       |       |       |       |       |
| Traffic Volume (vph)    | 373   | 407   | 1265  | 328   | 318   | 4     | 87    |
| Future Volume (vph)     | 373   | 407   | 1265  | 328   | 318   | 4     | 87    |
| Lane Group Flow (vph)   | 439   | 433   | 1471  | 426   | 189   | 189   | 121   |
| Turn Type               | Prot  | NA    | NA    | Perm  | Perm  | NA    | Perm  |
| Protected Phases        | 5     | 2     | 6     |       |       | 8     |       |
| Permitted Phases        |       |       |       | 6     | 8     |       | 8     |
| Detector Phase          | 5     | 2     | 6     | 6     | 8     | 8     | 8     |
| Switch Phase            |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 4.0   | 15.0  | 15.0  | 15.0  | 6.0   | 6.0   | 6.0   |
| Minimum Split (s)       | 11.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 46.0  | 94.0  | 48.0  | 48.0  | 26.0  | 26.0  | 26.0  |
| Total Split (%)         | 38.3% | 78.3% | 40.0% | 40.0% | 21.7% | 21.7% | 21.7% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lead  |       | Lag   | Lag   |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |
| Recall Mode             | None  | C-Min | C-Min | C-Min | None  | None  | None  |
| v/c Ratio               | 0.87  | 0.16  | 0.67  | 0.46  | 0.77  | 0.77  | 0.36  |
| Control Delay           | 38.7  | 8.8   | 31.2  | 4.3   | 70.3  | 69.9  | 10.8  |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.5   | 0.5   | 0.0   |
| Total Delay             | 38.7  | 8.8   | 31.2  | 4.3   | 70.8  | 70.4  | 10.8  |
| Queue Length 50th (ft)  | 325   | 149   | 341   | 0     | 148   | 148   | 0     |
| Queue Length 95th (ft)  | 421   | 166   | 409   | 23    | 220   | 118   | 25    |
| Internal Link Dist (ft) |       | 591   | 1139  |       |       | 825   |       |
| Turn Bay Length (ft)    |       |       |       | 840   |       |       | 510   |
| Base Capacity (vph)     | 595   | 2729  | 2198  | 923   | 283   | 284   | 370   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 9     | 9     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.74  | 0.16  | 0.67  | 0.46  | 0.69  | 0.69  | 0.33  |

## Intersection Summary

Cycle Length: 120

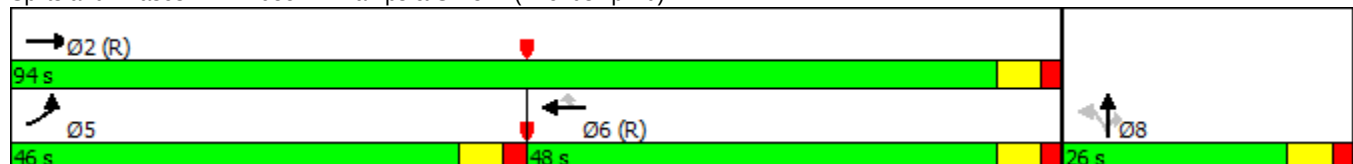
Actuated Cycle Length: 120

Offset: 86 (72%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Splits and Phases: 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)



# HCM Signalized Intersection Capacity Analysis

## 1: I-985 NB Ramps & SR 347 (Friendship Rd)

Future No-Build AM

11/16/2016

|                                   |  |                                                                                    |  |  |                                                                                                                                                                      |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                                                                                                                 | EBR                                                                               | WBL                                                                               | WBT                                                                                                                                                                                                                                                   | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |   |                                                                                   |                                                                                   |    |  |  |  |  |                                                                                     |                                                                                     |                                                                                     |
| Traffic Volume (vph)              | 373                                                                               | 407                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1265                                                                                                                                                                                                                                                  | 328                                                                               | 318                                                                                 | 4                                                                                   | 87                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Future Volume (vph)               | 373                                                                               | 407                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1265                                                                                                                                                                                                                                                  | 328                                                                               | 318                                                                                 | 4                                                                                   | 87                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                                                                                                                | 1900                                                                              | 1900                                                                              | 1900                                                                                                                                                                                                                                                  | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                                                                                                                 |                                                                                   |                                                                                   | 6.0                                                                                                                                                                                                                                                   | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Util. Factor                 | 1.00                                                                              | 0.95                                                                                                                                                                |                                                                                   |                                                                                   | 0.91                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Frt                               | 1.00                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (prot)                 | 1787                                                                              | 3610                                                                                                                                                                |                                                                                   |                                                                                   | 5187                                                                                                                                                                                                                                                  | 1599                                                                              | 1698                                                                                | 1706                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Permitted                     | 0.95                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (perm)                 | 1787                                                                              | 3610                                                                                                                                                                |                                                                                   |                                                                                   | 5187                                                                                                                                                                                                                                                  | 1599                                                                              | 1698                                                                                | 1706                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Peak-hour factor, PHF             | 0.85                                                                              | 0.94                                                                                                                                                                | 0.92                                                                              | 0.92                                                                              | 0.86                                                                                                                                                                                                                                                  | 0.77                                                                              | 0.86                                                                                | 0.50                                                                                | 0.72                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Adj. Flow (vph)                   | 439                                                                               | 433                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1471                                                                                                                                                                                                                                                  | 426                                                                               | 370                                                                                 | 8                                                                                   | 121                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                                                                                                                                                                                     | 246                                                                               | 0                                                                                   | 0                                                                                   | 104                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 439                                                                               | 433                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1471                                                                                                                                                                                                                                                  | 180                                                                               | 189                                                                                 | 189                                                                                 | 17                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Heavy Vehicles (%)                | 1%                                                                                | 0%                                                                                                                                                                  | 0%                                                                                | 0%                                                                                | 0%                                                                                                                                                                                                                                                    | 1%                                                                                | 1%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  |
| Turn Type                         | Prot                                                                              | NA                                                                                                                                                                  |                                                                                   |                                                                                   | NA                                                                                                                                                                                                                                                    | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Protected Phases                  | 5                                                                                 | 2                                                                                                                                                                   |                                                                                   |                                                                                   | 6                                                                                                                                                                                                                                                     |                                                                                   |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Permitted Phases                  |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Actuated Green, G (s)             | 33.9                                                                              | 90.7                                                                                                                                                                |                                                                                   |                                                                                   | 50.8                                                                                                                                                                                                                                                  | 50.8                                                                              | 17.3                                                                                | 17.3                                                                                | 17.3                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Effective Green, g (s)            | 33.9                                                                              | 90.7                                                                                                                                                                |                                                                                   |                                                                                   | 50.8                                                                                                                                                                                                                                                  | 50.8                                                                              | 17.3                                                                                | 17.3                                                                                | 17.3                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Actuated g/C Ratio                | 0.28                                                                              | 0.76                                                                                                                                                                |                                                                                   |                                                                                   | 0.42                                                                                                                                                                                                                                                  | 0.42                                                                              | 0.14                                                                                | 0.14                                                                                | 0.14                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                                                                                                                 |                                                                                   |                                                                                   | 6.0                                                                                                                                                                                                                                                   | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Vehicle Extension (s)             | 3.0                                                                               | 5.0                                                                                                                                                                 |                                                                                   |                                                                                   | 5.0                                                                                                                                                                                                                                                   | 5.0                                                                               | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Grp Cap (vph)                | 504                                                                               | 2728                                                                                                                                                                |                                                                                   |                                                                                   | 2195                                                                                                                                                                                                                                                  | 676                                                                               | 244                                                                                 | 245                                                                                 | 232                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Prot                    | c0.25                                                                             | 0.12                                                                                                                                                                |                                                                                   |                                                                                   | c0.28                                                                                                                                                                                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       | 0.11                                                                              | c0.11                                                                               | 0.11                                                                                | 0.01                                                                                |                                                                                     |                                                                                     |                                                                                     |
| v/c Ratio                         | 0.87                                                                              | 0.16                                                                                                                                                                |                                                                                   |                                                                                   | 0.67                                                                                                                                                                                                                                                  | 0.27                                                                              | 0.77                                                                                | 0.77                                                                                | 0.08                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Uniform Delay, d1                 | 41.0                                                                              | 4.1                                                                                                                                                                 |                                                                                   |                                                                                   | 27.9                                                                                                                                                                                                                                                  | 22.5                                                                              | 49.5                                                                                | 49.4                                                                                | 44.4                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Progression Factor                | 0.53                                                                              | 2.02                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Incremental Delay, d2             | 14.1                                                                              | 0.1                                                                                                                                                                 |                                                                                   |                                                                                   | 1.6                                                                                                                                                                                                                                                   | 1.0                                                                               | 14.2                                                                                | 13.9                                                                                | 0.1                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Delay (s)                         | 35.9                                                                              | 8.3                                                                                                                                                                 |                                                                                   |                                                                                   | 29.5                                                                                                                                                                                                                                                  | 23.5                                                                              | 63.7                                                                                | 63.4                                                                                | 44.6                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  | D                                                                                 | A                                                                                                                                                                   |                                                                                   |                                                                                   | C                                                                                                                                                                                                                                                     | C                                                                                 | E                                                                                   | E                                                                                   | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                |                                                                                   | 22.2                                                                                                                                                                |                                                                                   |                                                                                   | 28.1                                                                                                                                                                                                                                                  |                                                                                   |                                                                                     | 58.9                                                                                |                                                                                     |                                                                                     | 0.0                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                                                                                                   |                                                                                   |                                                                                   | C                                                                                                                                                                                                                                                     |                                                                                   |                                                                                     | E                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                                                                                                     | 31.3                                                                              |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   | HCM 2000 Level of Service                                                           |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                                                                                                     | 0.75                                                                              |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                                                                                                     | 120.0                                                                             |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   | Sum of lost time (s)                                                                |                                                                                     |                                                                                     | 18.0                                                                                |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                                                                                                     | 69.1%                                                                             |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   | ICU Level of Service                                                                |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                                                                                                     | 15                                                                                |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

## 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)

Future No-Build AM

11/16/2016



| Lane Group              | EBT   | EBR   | WBL   | WBT   | SBL   | SBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↑↑↑   | ↑     | ↵     | ↑↑    | ↵     | ↑     |
| Traffic Volume (vph)    | 659   | 402   | 496   | 1115  | 118   | 457   |
| Future Volume (vph)     | 659   | 402   | 496   | 1115  | 118   | 457   |
| Lane Group Flow (vph)   | 766   | 447   | 570   | 1360  | 139   | 544   |
| Turn Type               | NA    | Perm  | Prot  | NA    | Perm  | Perm  |
| Protected Phases        | 2     |       | 1     | 6     |       |       |
| Permitted Phases        |       | 2     |       |       | 4     | 4     |
| Detector Phase          | 2     | 2     | 1     | 6     | 4     | 4     |
| Switch Phase            |       |       |       |       |       |       |
| Minimum Initial (s)     | 15.0  | 15.0  | 4.0   | 15.0  | 6.0   | 6.0   |
| Minimum Split (s)       | 24.0  | 24.0  | 11.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 34.0  | 34.0  | 32.0  | 66.0  | 54.0  | 54.0  |
| Total Split (%)         | 28.3% | 28.3% | 26.7% | 55.0% | 45.0% | 45.0% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lag   | Lag   | Lead  |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |
| Recall Mode             | C-Min | C-Min | None  | C-Min | None  | None  |
| v/c Ratio               | 0.48  | 0.56  | 0.83  | 0.69  | 0.22  | 0.90  |
| Control Delay           | 27.9  | 4.3   | 40.0  | 11.2  | 27.3  | 50.1  |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.5   | 0.0   | 0.0   |
| Total Delay             | 27.9  | 4.3   | 40.0  | 11.7  | 27.3  | 50.1  |
| Queue Length 50th (ft)  | 116   | 25    | 191   | 438   | 74    | 338   |
| Queue Length 95th (ft)  | 136   | m34   | 206   | 478   | 108   | 412   |
| Internal Link Dist (ft) | 904   |       |       | 591   |       |       |
| Turn Bay Length (ft)    |       | 375   | 380   |       |       |       |
| Base Capacity (vph)     | 1583  | 797   | 751   | 1985  | 722   | 688   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 233   | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.48  | 0.56  | 0.76  | 0.78  | 0.19  | 0.79  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

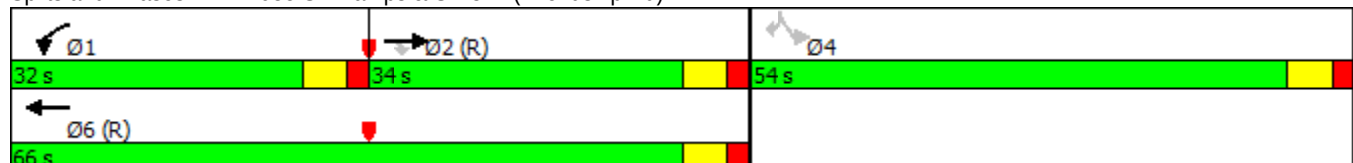
Offset: 18 (15%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)

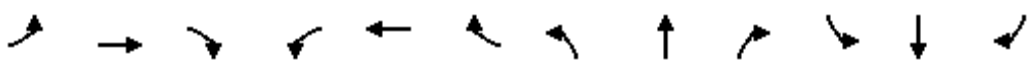


# HCM Signalized Intersection Capacity Analysis

## 2: I-985 SB Ramps & SR 347 (Friendship Rd)

Future No-Build AM

11/16/2016

|                                   |  |      |       |       |       |                           |      |      |      |      |      |       |
|-----------------------------------|------------------------------------------------------------------------------------|------|-------|-------|-------|---------------------------|------|------|------|------|------|-------|
| Movement                          | EBL                                                                                | EBT  | EBR   | WBL   | WBT   | WBR                       | NBL  | NBT  | NBR  | SBL  | SBT  | SBR   |
| Lane Configurations               |                                                                                    | ↑↑↑  | ↑     | ↑↑    | ↑↑    |                           |      |      |      | ↑    |      | ↑     |
| Traffic Volume (vph)              | 0                                                                                  | 659  | 402   | 496   | 1115  | 0                         | 0    | 0    | 0    | 118  | 0    | 457   |
| Future Volume (vph)               | 0                                                                                  | 659  | 402   | 496   | 1115  | 0                         | 0    | 0    | 0    | 118  | 0    | 457   |
| Ideal Flow (vphpl)                | 1900                                                                               | 1900 | 1900  | 1900  | 1900  | 1900                      | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  |
| Total Lost time (s)               |                                                                                    | 6.0  | 6.0   | 6.0   | 6.0   |                           |      |      |      | 6.0  |      | 6.0   |
| Lane Util. Factor                 |                                                                                    | 0.91 | 1.00  | 0.97  | 0.95  |                           |      |      |      | 1.00 |      | 1.00  |
| Frt                               |                                                                                    | 1.00 | 0.85  | 1.00  | 1.00  |                           |      |      |      | 1.00 |      | 0.85  |
| Flt Protected                     |                                                                                    | 1.00 | 1.00  | 0.95  | 1.00  |                           |      |      |      | 0.95 |      | 1.00  |
| Satd. Flow (prot)                 |                                                                                    | 5136 | 1583  | 3467  | 3574  |                           |      |      |      | 1805 |      | 1599  |
| Flt Permitted                     |                                                                                    | 1.00 | 1.00  | 0.95  | 1.00  |                           |      |      |      | 0.95 |      | 1.00  |
| Satd. Flow (perm)                 |                                                                                    | 5136 | 1583  | 3467  | 3574  |                           |      |      |      | 1805 |      | 1599  |
| Peak-hour factor, PHF             | 0.92                                                                               | 0.86 | 0.90  | 0.87  | 0.82  | 0.92                      | 0.92 | 0.92 | 0.92 | 0.85 | 0.92 | 0.84  |
| Adj. Flow (vph)                   | 0                                                                                  | 766  | 447   | 570   | 1360  | 0                         | 0    | 0    | 0    | 139  | 0    | 544   |
| RTOR Reduction (vph)              | 0                                                                                  | 0    | 309   | 0     | 0     | 0                         | 0    | 0    | 0    | 0    | 0    | 54    |
| Lane Group Flow (vph)             | 0                                                                                  | 766  | 138   | 570   | 1360  | 0                         | 0    | 0    | 0    | 139  | 0    | 490   |
| Heavy Vehicles (%)                | 0%                                                                                 | 1%   | 2%    | 1%    | 1%    | 0%                        | 0%   | 0%   | 0%   | 0%   | 0%   | 1%    |
| Turn Type                         |                                                                                    | NA   | Perm  | Prot  | NA    |                           |      |      |      | Perm |      | Perm  |
| Protected Phases                  |                                                                                    | 2    |       | 1     | 6     |                           |      |      |      |      |      |       |
| Permitted Phases                  |                                                                                    |      | 2     |       |       |                           |      |      |      | 4    |      | 4     |
| Actuated Green, G (s)             |                                                                                    | 37.0 | 37.0  | 23.7  | 66.7  |                           |      |      |      | 41.3 |      | 41.3  |
| Effective Green, g (s)            |                                                                                    | 37.0 | 37.0  | 23.7  | 66.7  |                           |      |      |      | 41.3 |      | 41.3  |
| Actuated g/C Ratio                |                                                                                    | 0.31 | 0.31  | 0.20  | 0.56  |                           |      |      |      | 0.34 |      | 0.34  |
| Clearance Time (s)                |                                                                                    | 6.0  | 6.0   | 6.0   | 6.0   |                           |      |      |      | 6.0  |      | 6.0   |
| Vehicle Extension (s)             |                                                                                    | 5.0  | 5.0   | 3.0   | 5.0   |                           |      |      |      | 3.0  |      | 3.0   |
| Lane Grp Cap (vph)                |                                                                                    | 1583 | 488   | 684   | 1986  |                           |      |      |      | 621  |      | 550   |
| v/s Ratio Prot                    |                                                                                    | 0.15 |       | c0.16 | c0.38 |                           |      |      |      |      |      |       |
| v/s Ratio Perm                    |                                                                                    |      | 0.09  |       |       |                           |      |      |      | 0.08 |      | c0.31 |
| v/c Ratio                         |                                                                                    | 0.48 | 0.28  | 0.83  | 0.68  |                           |      |      |      | 0.22 |      | 0.89  |
| Uniform Delay, d1                 |                                                                                    | 33.7 | 31.4  | 46.3  | 19.1  |                           |      |      |      | 28.0 |      | 37.2  |
| Progression Factor                |                                                                                    | 0.75 | 0.52  | 0.67  | 0.47  |                           |      |      |      | 1.00 |      | 1.00  |
| Incremental Delay, d2             |                                                                                    | 0.9  | 1.2   | 6.7   | 1.5   |                           |      |      |      | 0.2  |      | 16.5  |
| Delay (s)                         |                                                                                    | 26.3 | 17.5  | 37.8  | 10.5  |                           |      |      |      | 28.1 |      | 53.8  |
| Level of Service                  |                                                                                    | C    | B     | D     | B     |                           |      |      |      | C    |      | D     |
| Approach Delay (s)                |                                                                                    | 23.1 |       |       | 18.6  |                           |      | 0.0  |      |      | 48.5 |       |
| Approach LOS                      |                                                                                    | C    |       |       | B     |                           |      | A    |      |      | D    |       |
| <b>Intersection Summary</b>       |                                                                                    |      |       |       |       |                           |      |      |      |      |      |       |
| HCM 2000 Control Delay            |                                                                                    |      | 25.3  |       |       | HCM 2000 Level of Service |      |      |      | C    |      |       |
| HCM 2000 Volume to Capacity ratio |                                                                                    |      | 0.82  |       |       |                           |      |      |      |      |      |       |
| Actuated Cycle Length (s)         |                                                                                    |      | 120.0 |       |       | Sum of lost time (s)      |      |      |      | 18.0 |      |       |
| Intersection Capacity Utilization |                                                                                    |      | 69.1% |       |       | ICU Level of Service      |      |      |      | C    |      |       |
| Analysis Period (min)             |                                                                                    |      | 15    |       |       |                           |      |      |      |      |      |       |
| c Critical Lane Group             |                                                                                    |      |       |       |       |                           |      |      |      |      |      |       |

## Queues

Future No-Build AM

## 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)

11/16/2016

|                         |  |  |  |  |  |  |   |  |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations     |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 142                                                                               | 599                                                                               | 99                                                                                | 409                                                                               | 607                                                                               | 78                                                                                | 91                                                                                  | 138                                                                                 | 169                                                                                 | 244                                                                                 | 282                                                                                 | 129                                                                                 |
| Future Volume (vph)     | 142                                                                               | 599                                                                               | 99                                                                                | 409                                                                               | 607                                                                               | 78                                                                                | 91                                                                                  | 138                                                                                 | 169                                                                                 | 244                                                                                 | 282                                                                                 | 129                                                                                 |
| Lane Group Flow (vph)   | 165                                                                               | 689                                                                               | 130                                                                               | 445                                                                               | 723                                                                               | 110                                                                               | 117                                                                                 | 155                                                                                 | 197                                                                                 | 252                                                                                 | 328                                                                                 | 159                                                                                 |
| Turn Type               | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                               | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases        | 5                                                                                 | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   | 3                                                                                   | 8                                                                                   |                                                                                     | 7                                                                                   | 4                                                                                   |                                                                                     |
| Permitted Phases        | 2                                                                                 |                                                                                   | 2                                                                                 | 6                                                                                 |                                                                                   | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   | 4                                                                                   |                                                                                     | 4                                                                                   |
| Detector Phase          | 5                                                                                 | 2                                                                                 | 2                                                                                 | 1                                                                                 | 6                                                                                 | 6                                                                                 | 3                                                                                   | 8                                                                                   | 8                                                                                   | 7                                                                                   | 4                                                                                   | 4                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 4.0                                                                               | 15.0                                                                              | 15.0                                                                              | 4.0                                                                               | 15.0                                                                              | 15.0                                                                              | 4.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 4.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Minimum Split (s)       | 11.0                                                                              | 37.0                                                                              | 37.0                                                                              | 11.0                                                                              | 37.0                                                                              | 37.0                                                                              | 11.0                                                                                | 42.0                                                                                | 42.0                                                                                | 11.0                                                                                | 42.0                                                                                | 42.0                                                                                |
| Total Split (s)         | 18.0                                                                              | 37.0                                                                              | 37.0                                                                              | 30.0                                                                              | 49.0                                                                              | 49.0                                                                              | 11.0                                                                                | 42.0                                                                                | 42.0                                                                                | 11.0                                                                                | 42.0                                                                                | 42.0                                                                                |
| Total Split (%)         | 15.0%                                                                             | 30.8%                                                                             | 30.8%                                                                             | 25.0%                                                                             | 40.8%                                                                             | 40.8%                                                                             | 9.2%                                                                                | 35.0%                                                                               | 35.0%                                                                               | 9.2%                                                                                | 35.0%                                                                               | 35.0%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Lost Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lead/Lag                | Lead                                                                              | Lag                                                                               | Lag                                                                               | Lead                                                                              | Lag                                                                               | Lag                                                                               | Lead                                                                                | Lag                                                                                 | Lag                                                                                 | Lead                                                                                | Lag                                                                                 | Lag                                                                                 |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | C-Min                                                                             | C-Min                                                                             | None                                                                              | C-Min                                                                             | C-Min                                                                             | None                                                                                | None                                                                                | None                                                                                | None                                                                                | None                                                                                | None                                                                                |
| v/c Ratio               | 0.42                                                                              | 0.56                                                                              | 0.20                                                                              | 0.86                                                                              | 0.44                                                                              | 0.14                                                                              | 0.66                                                                                | 0.38                                                                                | 0.40                                                                                | 0.81                                                                                | 0.79                                                                                | 0.32                                                                                |
| Control Delay           | 18.0                                                                              | 35.8                                                                              | 1.6                                                                               | 39.5                                                                              | 13.7                                                                              | 0.3                                                                               | 42.1                                                                                | 33.0                                                                                | 8.9                                                                                 | 58.1                                                                                | 58.1                                                                                | 4.1                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 18.0                                                                              | 35.8                                                                              | 1.6                                                                               | 39.5                                                                              | 13.7                                                                              | 0.3                                                                               | 42.1                                                                                | 33.0                                                                                | 8.9                                                                                 | 58.1                                                                                | 58.1                                                                                | 4.1                                                                                 |
| Queue Length 50th (ft)  | 55                                                                                | 228                                                                               | 0                                                                                 | 193                                                                               | 97                                                                                | 0                                                                                 | 74                                                                                  | 107                                                                                 | 61                                                                                  | 157                                                                                 | 242                                                                                 | 0                                                                                   |
| Queue Length 95th (ft)  | 101                                                                               | 310                                                                               | 0                                                                                 | m#405                                                                             | 181                                                                               | m1                                                                                | 54                                                                                  | 168                                                                                 | 103                                                                                 | 212                                                                                 | 300                                                                                 | 17                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 1576                                                                              |                                                                                   |                                                                                   | 3513                                                                              |                                                                                   |                                                                                     | 1183                                                                                |                                                                                     |                                                                                     | 1183                                                                                |                                                                                     |
| Turn Bay Length (ft)    | 250                                                                               |                                                                                   | 370                                                                               | 300                                                                               |                                                                                   | 310                                                                               |                                                                                     |                                                                                     | 500                                                                                 | 300                                                                                 |                                                                                     | 215                                                                                 |
| Base Capacity (vph)     | 418                                                                               | 1222                                                                              | 662                                                                               | 519                                                                               | 1638                                                                              | 772                                                                               | 176                                                                                 | 564                                                                                 | 608                                                                                 | 311                                                                                 | 564                                                                                 | 608                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.39                                                                              | 0.56                                                                              | 0.20                                                                              | 0.86                                                                              | 0.44                                                                              | 0.14                                                                              | 0.66                                                                                | 0.27                                                                                | 0.32                                                                                | 0.81                                                                                | 0.58                                                                                | 0.26                                                                                |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 73 (61%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 115

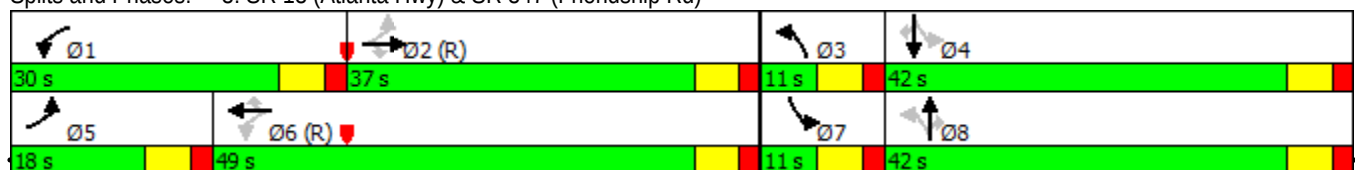
Control Type: Actuated-Coordinated

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)



Baseline

Synchro 9 Report

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# HCM Signalized Intersection Capacity Analysis

## 3: SR 13 (Atlanta Hwy) & SR 347 (Friendship Rd)

Future No-Build AM

11/16/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)              | 142                                                                               | 599                                                                               | 99                                                                                | 409                                                                               | 607                                                                               | 78                                                                                | 91                                                                                  | 138                                                                                 | 169                                                                                 | 244                                                                                 | 282                                                                                 | 129                                                                                 |
| Future Volume (vph)               | 142                                                                               | 599                                                                               | 99                                                                                | 409                                                                               | 607                                                                               | 78                                                                                | 91                                                                                  | 138                                                                                 | 169                                                                                 | 244                                                                                 | 282                                                                                 | 129                                                                                 |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor                 | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Frt                               | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)                 | 1787                                                                              | 3610                                                                              | 1583                                                                              | 1787                                                                              | 3610                                                                              | 1538                                                                              | 1787                                                                                | 1881                                                                                | 1568                                                                                | 1752                                                                                | 1881                                                                                | 1583                                                                                |
| Flt Permitted                     | 0.38                                                                              | 1.00                                                                              | 1.00                                                                              | 0.22                                                                              | 1.00                                                                              | 1.00                                                                              | 0.25                                                                                | 1.00                                                                                | 1.00                                                                                | 0.59                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)                 | 709                                                                               | 3610                                                                              | 1583                                                                              | 418                                                                               | 3610                                                                              | 1538                                                                              | 463                                                                                 | 1881                                                                                | 1568                                                                                | 1085                                                                                | 1881                                                                                | 1583                                                                                |
| Peak-hour factor, PHF             | 0.86                                                                              | 0.87                                                                              | 0.76                                                                              | 0.92                                                                              | 0.84                                                                              | 0.71                                                                              | 0.78                                                                                | 0.89                                                                                | 0.86                                                                                | 0.97                                                                                | 0.86                                                                                | 0.81                                                                                |
| Adj. Flow (vph)                   | 165                                                                               | 689                                                                               | 130                                                                               | 445                                                                               | 723                                                                               | 110                                                                               | 117                                                                                 | 155                                                                                 | 197                                                                                 | 252                                                                                 | 328                                                                                 | 159                                                                                 |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 86                                                                                | 0                                                                                 | 0                                                                                 | 60                                                                                | 0                                                                                   | 0                                                                                   | 154                                                                                 | 0                                                                                   | 0                                                                                   | 124                                                                                 |
| Lane Group Flow (vph)             | 165                                                                               | 689                                                                               | 44                                                                                | 445                                                                               | 723                                                                               | 50                                                                                | 117                                                                                 | 155                                                                                 | 43                                                                                  | 252                                                                                 | 328                                                                                 | 35                                                                                  |
| Heavy Vehicles (%)                | 1%                                                                                | 0%                                                                                | 2%                                                                                | 1%                                                                                | 0%                                                                                | 5%                                                                                | 1%                                                                                  | 1%                                                                                  | 3%                                                                                  | 3%                                                                                  | 1%                                                                                  | 2%                                                                                  |
| Turn Type                         | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                               | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases                  | 5                                                                                 | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   | 3                                                                                   | 8                                                                                   |                                                                                     | 7                                                                                   | 4                                                                                   |                                                                                     |
| Permitted Phases                  | 2                                                                                 |                                                                                   | 2                                                                                 | 6                                                                                 |                                                                                   | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   | 4                                                                                   |                                                                                     | 4                                                                                   |
| Actuated Green, G (s)             | 50.8                                                                              | 40.6                                                                              | 40.6                                                                              | 70.6                                                                              | 54.4                                                                              | 54.4                                                                              | 31.4                                                                                | 26.4                                                                                | 26.4                                                                                | 31.4                                                                                | 26.4                                                                                | 26.4                                                                                |
| Effective Green, g (s)            | 50.8                                                                              | 40.6                                                                              | 40.6                                                                              | 70.6                                                                              | 54.4                                                                              | 54.4                                                                              | 31.4                                                                                | 26.4                                                                                | 26.4                                                                                | 31.4                                                                                | 26.4                                                                                | 26.4                                                                                |
| Actuated g/C Ratio                | 0.42                                                                              | 0.34                                                                              | 0.34                                                                              | 0.59                                                                              | 0.45                                                                              | 0.45                                                                              | 0.26                                                                                | 0.22                                                                                | 0.22                                                                                | 0.26                                                                                | 0.22                                                                                | 0.22                                                                                |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)             | 3.0                                                                               | 5.0                                                                               | 5.0                                                                               | 3.0                                                                               | 5.0                                                                               | 5.0                                                                               | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 |
| Lane Grp Cap (vph)                | 391                                                                               | 1221                                                                              | 535                                                                               | 519                                                                               | 1636                                                                              | 697                                                                               | 176                                                                                 | 413                                                                                 | 344                                                                                 | 311                                                                                 | 413                                                                                 | 348                                                                                 |
| v/s Ratio Prot                    | 0.04                                                                              | 0.19                                                                              |                                                                                   | c0.17                                                                             | 0.20                                                                              |                                                                                   | 0.03                                                                                | 0.08                                                                                |                                                                                     | c0.03                                                                               | 0.17                                                                                |                                                                                     |
| v/s Ratio Perm                    | 0.14                                                                              |                                                                                   | 0.03                                                                              | c0.33                                                                             |                                                                                   | 0.03                                                                              | 0.15                                                                                |                                                                                     | 0.03                                                                                | c0.18                                                                               |                                                                                     | 0.02                                                                                |
| v/c Ratio                         | 0.42                                                                              | 0.56                                                                              | 0.08                                                                              | 0.86                                                                              | 0.44                                                                              | 0.07                                                                              | 0.66                                                                                | 0.38                                                                                | 0.13                                                                                | 0.81                                                                                | 0.79                                                                                | 0.10                                                                                |
| Uniform Delay, d1                 | 22.0                                                                              | 32.5                                                                              | 27.0                                                                              | 19.3                                                                              | 22.4                                                                              | 18.5                                                                              | 38.5                                                                                | 39.8                                                                                | 37.5                                                                                | 41.3                                                                                | 44.2                                                                                | 37.3                                                                                |
| Progression Factor                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.50                                                                              | 0.55                                                                              | 0.03                                                                              | 0.75                                                                                | 0.79                                                                                | 1.40                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Incremental Delay, d2             | 0.7                                                                               | 1.9                                                                               | 0.3                                                                               | 9.5                                                                               | 0.6                                                                               | 0.1                                                                               | 9.1                                                                                 | 0.6                                                                                 | 0.2                                                                                 | 14.7                                                                                | 10.1                                                                                | 0.1                                                                                 |
| Delay (s)                         | 22.7                                                                              | 34.4                                                                              | 27.3                                                                              | 38.5                                                                              | 12.9                                                                              | 0.8                                                                               | 37.9                                                                                | 32.0                                                                                | 52.8                                                                                | 56.0                                                                                | 54.3                                                                                | 37.5                                                                                |
| Level of Service                  | C                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | B                                                                                 | A                                                                                 | D                                                                                   | C                                                                                   | D                                                                                   | E                                                                                   | D                                                                                   | D                                                                                   |
| Approach Delay (s)                |                                                                                   | 31.5                                                                              |                                                                                   |                                                                                   | 20.8                                                                              |                                                                                   |                                                                                     | 42.2                                                                                |                                                                                     |                                                                                     | 51.3                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                     | D                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 33.2                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.87                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 80.0%                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

Future No-Build AM

## 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) &amp; Relocated Thunder Rd/Roy Carlson Blvd 11/16/2016



| Lane Group              | EBT   | WBL   | WBT   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↕     | ↰     | ↱     | ↰     | ↕     | ↱     | ↰     | ↕     | ↱     |
| Traffic Volume (vph)    | 13    | 7     | 8     | 41    | 377   | 54    | 47    | 727   | 2     |
| Future Volume (vph)     | 13    | 7     | 8     | 41    | 377   | 54    | 47    | 727   | 2     |
| Lane Group Flow (vph)   | 60    | 16    | 71    | 45    | 424   | 75    | 90    | 845   | 2     |
| Turn Type               | NA    | Perm  | NA    | Perm  | NA    | Perm  | Perm  | NA    | Perm  |
| Protected Phases        | 4     |       | 8     |       | 2     |       |       | 6     |       |
| Permitted Phases        |       | 8     |       | 2     |       | 2     | 6     |       | 6     |
| Detector Phase          | 4     | 8     | 8     | 2     | 2     | 2     | 6     | 6     | 6     |
| Switch Phase            |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 6.0   | 6.0   | 6.0   | 15.0  | 15.0  | 15.0  | 15.0  | 15.0  | 15.0  |
| Minimum Split (s)       | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 35.0  | 35.0  | 35.0  | 85.0  | 85.0  | 85.0  | 85.0  | 85.0  | 85.0  |
| Total Split (%)         | 29.2% | 29.2% | 29.2% | 70.8% | 70.8% | 70.8% | 70.8% | 70.8% | 70.8% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                |       |       |       |       |       |       |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |       |       |
| Recall Mode             | None  | None  | None  | C-Min | C-Min | C-Min | C-Min | C-Min | C-Min |
| v/c Ratio               | 0.40  | 0.19  | 0.44  | 0.08  | 0.14  | 0.05  | 0.11  | 0.27  | 0.00  |
| Control Delay           | 28.6  | 57.4  | 24.8  | 1.1   | 1.1   | 0.2   | 2.6   | 2.6   | 0.0   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 28.6  | 57.4  | 24.8  | 1.1   | 1.1   | 0.2   | 2.6   | 2.6   | 0.0   |
| Queue Length 50th (ft)  | 11    | 12    | 7     | 1     | 6     | 0     | 8     | 42    | 0     |
| Queue Length 95th (ft)  | 53    | 17    | 52    | 4     | 12    | 0     | 14    | 81    | m0    |
| Internal Link Dist (ft) | 491   |       | 1741  |       | 2367  |       |       | 498   |       |
| Turn Bay Length (ft)    |       |       |       | 375   |       | 375   | 200   |       | 200   |
| Base Capacity (vph)     | 446   | 329   | 446   | 550   | 3099  | 1382  | 808   | 3099  | 1404  |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.13  | 0.05  | 0.16  | 0.08  | 0.14  | 0.05  | 0.11  | 0.27  | 0.00  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

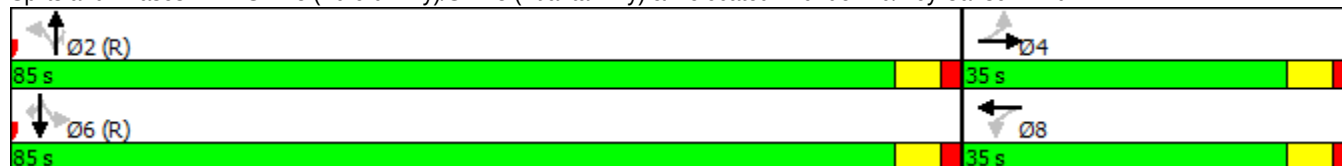
Offset: 29 (24%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) &amp; Relocated Thunder Rd/Roy Carlson Blvd



# HCM Signalized Intersection Capacity Analysis

Future No-Build AM

## 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) & Relocated Thunder Rd/Roy Carlson Blvd 11/16/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (vph)              | 0                                                                                 | 13                                                                                | 42                                                                                | 7                                                                                 | 8                                                                                 | 26                                                                                | 41                                                                                 | 377                                                                                 | 54                                                                                  | 47                                                                                  | 727                                                                                 | 2                                                                                   |
| Future Volume (vph)               | 0                                                                                 | 13                                                                                | 42                                                                                | 7                                                                                 | 8                                                                                 | 26                                                                                | 41                                                                                 | 377                                                                                 | 54                                                                                  | 47                                                                                  | 727                                                                                 | 2                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor                 |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                               | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |
| Frt                               |                                                                                   | 0.90                                                                              |                                                                                   | 1.00                                                                              | 0.87                                                                              |                                                                                   | 1.00                                                                               | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected                     |                                                                                   | 1.00                                                                              |                                                                                   | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                               | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)                 |                                                                                   | 1703                                                                              |                                                                                   | 1805                                                                              | 1651                                                                              |                                                                                   | 1805                                                                               | 3574                                                                                | 1583                                                                                | 1752                                                                                | 3574                                                                                | 1615                                                                                |
| Flt Permitted                     |                                                                                   | 1.00                                                                              |                                                                                   | 0.72                                                                              | 1.00                                                                              |                                                                                   | 0.33                                                                               | 1.00                                                                                | 1.00                                                                                | 0.50                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)                 |                                                                                   | 1703                                                                              |                                                                                   | 1364                                                                              | 1651                                                                              |                                                                                   | 635                                                                                | 3574                                                                                | 1583                                                                                | 931                                                                                 | 3574                                                                                | 1615                                                                                |
| Peak-hour factor, PHF             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.44                                                                              | 0.92                                                                              | 0.42                                                                              | 0.92                                                                               | 0.89                                                                                | 0.72                                                                                | 0.52                                                                                | 0.86                                                                                | 0.92                                                                                |
| Adj. Flow (vph)                   | 0                                                                                 | 14                                                                                | 46                                                                                | 16                                                                                | 9                                                                                 | 62                                                                                | 45                                                                                 | 424                                                                                 | 75                                                                                  | 90                                                                                  | 845                                                                                 | 2                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 44                                                                                | 0                                                                                 | 0                                                                                 | 59                                                                                | 0                                                                                 | 0                                                                                  | 0                                                                                   | 11                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 0                                                                                 | 16                                                                                | 0                                                                                 | 16                                                                                | 12                                                                                | 0                                                                                 | 45                                                                                 | 424                                                                                 | 64                                                                                  | 90                                                                                  | 845                                                                                 | 2                                                                                   |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                 | 1%                                                                                  | 2%                                                                                  | 3%                                                                                  | 1%                                                                                  | 0%                                                                                  |
| Turn Type                         |                                                                                   | NA                                                                                |                                                                                   | Perm                                                                              | NA                                                                                |                                                                                   | Perm                                                                               | NA                                                                                  | Perm                                                                                | Perm                                                                                | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                    | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                   | 2                                                                                  |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 6.3                                                                               |                                                                                   | 6.3                                                                               | 6.3                                                                               |                                                                                   | 101.7                                                                              | 101.7                                                                               | 101.7                                                                               | 101.7                                                                               | 101.7                                                                               | 101.7                                                                               |
| Effective Green, g (s)            |                                                                                   | 6.3                                                                               |                                                                                   | 6.3                                                                               | 6.3                                                                               |                                                                                   | 101.7                                                                              | 101.7                                                                               | 101.7                                                                               | 101.7                                                                               | 101.7                                                                               | 101.7                                                                               |
| Actuated g/C Ratio                |                                                                                   | 0.05                                                                              |                                                                                   | 0.05                                                                              | 0.05                                                                              |                                                                                   | 0.85                                                                               | 0.85                                                                                | 0.85                                                                                | 0.85                                                                                | 0.85                                                                                | 0.85                                                                                |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)             |                                                                                   | 3.0                                                                               |                                                                                   | 3.0                                                                               | 3.0                                                                               |                                                                                   | 5.0                                                                                | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |
| Lane Grp Cap (vph)                |                                                                                   | 89                                                                                |                                                                                   | 71                                                                                | 86                                                                                |                                                                                   | 538                                                                                | 3028                                                                                | 1341                                                                                | 789                                                                                 | 3028                                                                                | 1368                                                                                |
| v/s Ratio Prot                    |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                    | 0.12                                                                                |                                                                                     |                                                                                     | c0.24                                                                               |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                   |                                                                                   | c0.01                                                                             |                                                                                   |                                                                                   | 0.07                                                                               |                                                                                     | 0.04                                                                                | 0.10                                                                                |                                                                                     | 0.00                                                                                |
| v/c Ratio                         |                                                                                   | 0.18                                                                              |                                                                                   | 0.23                                                                              | 0.14                                                                              |                                                                                   | 0.08                                                                               | 0.14                                                                                | 0.05                                                                                | 0.11                                                                                | 0.28                                                                                | 0.00                                                                                |
| Uniform Delay, d1                 |                                                                                   | 54.4                                                                              |                                                                                   | 54.5                                                                              | 54.3                                                                              |                                                                                   | 1.5                                                                                | 1.6                                                                                 | 1.5                                                                                 | 1.5                                                                                 | 1.8                                                                                 | 1.4                                                                                 |
| Progression Factor                |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.43                                                                               | 0.60                                                                                | 0.36                                                                                | 1.23                                                                                | 1.23                                                                                | 1.00                                                                                |
| Incremental Delay, d2             |                                                                                   | 1.0                                                                               |                                                                                   | 1.6                                                                               | 0.8                                                                               |                                                                                   | 0.3                                                                                | 0.1                                                                                 | 0.1                                                                                 | 0.2                                                                                 | 0.2                                                                                 | 0.0                                                                                 |
| Delay (s)                         |                                                                                   | 55.4                                                                              |                                                                                   | 56.1                                                                              | 55.0                                                                              |                                                                                   | 0.9                                                                                | 1.0                                                                                 | 0.6                                                                                 | 2.1                                                                                 | 2.4                                                                                 | 1.4                                                                                 |
| Level of Service                  |                                                                                   | E                                                                                 |                                                                                   | E                                                                                 | E                                                                                 |                                                                                   | A                                                                                  | A                                                                                   | A                                                                                   | A                                                                                   | A                                                                                   | A                                                                                   |
| Approach Delay (s)                |                                                                                   | 55.4                                                                              |                                                                                   |                                                                                   | 55.2                                                                              |                                                                                   |                                                                                    | 1.0                                                                                 |                                                                                     |                                                                                     | 2.4                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | E                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                    | A                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 6.7                                                                               |                                                                                   |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                          |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.28                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   |                                                                                   | Sum of lost time (s)                                                               |                                                                                     |                                                                                     | 12.0                                                                                |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 53.4%                                                                             |                                                                                   |                                                                                   |                                                                                   | ICU Level of Service                                                               |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



## Queues

## 5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd

Future No-Build AM

11/16/2016

|                         | →     | ↘     | ↙     | ←     | ↖     | ↗     | ↑     | ↘     | ↙     | ↓     | ↖     |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Group              | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations     | ↖     | ↗     |       | ↖     | ↗     | ↗     | ↑↑    | ↗     | ↗     | ↑↑    | ↗     |
| Traffic Volume (vph)    | 1     | 6     | 416   | 26    | 234   | 22    | 465   | 185   | 119   | 624   | 40    |
| Future Volume (vph)     | 1     | 6     | 416   | 26    | 234   | 22    | 465   | 185   | 119   | 624   | 40    |
| Lane Group Flow (vph)   | 4     | 12    | 0     | 485   | 263   | 38    | 495   | 201   | 161   | 693   | 55    |
| Turn Type               | NA    | Perm  | Perm  | NA    | Perm  | Perm  | NA    | Perm  | Perm  | NA    | Perm  |
| Protected Phases        | 4     |       |       | 8     |       |       | 2     |       |       | 6     |       |
| Permitted Phases        |       | 4     | 8     |       | 8     | 2     |       | 2     | 6     |       | 6     |
| Detector Phase          | 4     | 4     | 8     | 8     | 8     | 2     | 2     | 2     | 6     | 6     | 6     |
| Switch Phase            |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 15.0  | 15.0  | 15.0  | 15.0  | 15.0  | 15.0  |
| Minimum Split (s)       | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 67.0  | 67.0  | 67.0  | 67.0  | 67.0  | 53.0  | 53.0  | 53.0  | 53.0  | 53.0  | 53.0  |
| Total Split (%)         | 55.8% | 55.8% | 55.8% | 55.8% | 55.8% | 44.2% | 44.2% | 44.2% | 44.2% | 44.2% | 44.2% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   |       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   |       | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                |       |       |       |       |       |       |       |       |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |       |       |       |       |
| Recall Mode             | None  | None  | None  | None  | None  | C-Min | C-Min | C-Min | C-Min | C-Min | C-Min |
| v/c Ratio               | 0.01  | 0.02  |       | 0.84  | 0.33  | 0.13  | 0.29  | 0.23  | 0.40  | 0.40  | 0.07  |
| Control Delay           | 16.0  | 1.8   |       | 44.6  | 5.7   | 20.3  | 18.4  | 7.1   | 18.6  | 14.8  | 2.9   |
| Queue Delay             | 0.0   | 0.0   |       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 16.0  | 1.8   |       | 44.6  | 5.7   | 20.3  | 18.4  | 7.1   | 18.6  | 14.8  | 2.9   |
| Queue Length 50th (ft)  | 2     | 0     |       | 327   | 25    | 20    | 140   | 52    | 58    | 131   | 4     |
| Queue Length 95th (ft)  | 2     | 0     |       | 262   | 63    | 34    | 218   | 109   | 119   | 224   | 6     |
| Internal Link Dist (ft) | 275   |       |       | 4179  |       |       | 3868  |       |       | 2104  |       |
| Turn Bay Length (ft)    |       | 105   |       |       | 250   | 230   |       | 230   | 200   |       | 185   |
| Base Capacity (vph)     | 965   | 714   |       | 714   | 923   | 302   | 1730  | 884   | 400   | 1730  | 817   |
| Starvation Cap Reductn  | 0     | 0     |       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     |       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     |       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.00  | 0.02  |       | 0.68  | 0.28  | 0.13  | 0.29  | 0.23  | 0.40  | 0.40  | 0.07  |

## Intersection Summary

Cycle Length: 120

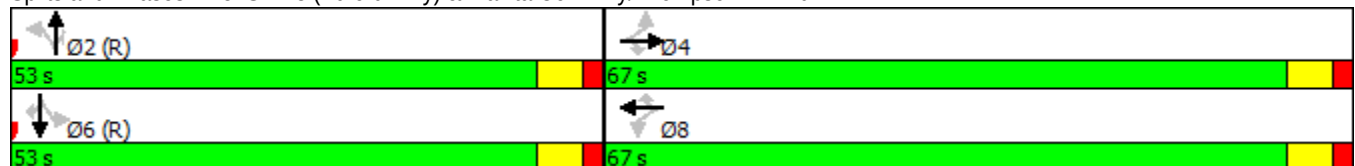
Actuated Cycle Length: 120

Offset: 72 (60%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Splits and Phases: 5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd

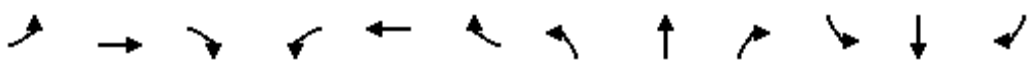


# HCM Signalized Intersection Capacity Analysis

## 5: SR 13 (Buford Hwy) & Makita Co. Drwy/Thompson Mill Rd

Future No-Build AM

11/16/2016

|                                   |  |      |       |      |       |      |      |      |      |       |      |      |
|-----------------------------------|------------------------------------------------------------------------------------|------|-------|------|-------|------|------|------|------|-------|------|------|
| Movement                          | EBL                                                                                | EBT  | EBR   | WBL  | WBT   | WBR  | NBL  | NBT  | NBR  | SBL   | SBT  | SBR  |
| Lane Configurations               |                                                                                    | ↰    | ↱     |      | ↰     | ↱    | ↰    | ↱    | ↱    | ↰     | ↱    | ↱    |
| Traffic Volume (vph)              | 0                                                                                  | 1    | 6     | 416  | 26    | 234  | 22   | 465  | 185  | 119   | 624  | 40   |
| Future Volume (vph)               | 0                                                                                  | 1    | 6     | 416  | 26    | 234  | 22   | 465  | 185  | 119   | 624  | 40   |
| Ideal Flow (vphpl)                | 1900                                                                               | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)               |                                                                                    | 6.0  | 6.0   |      | 6.0   | 6.0  | 6.0  | 6.0  | 6.0  | 6.0   | 6.0  | 6.0  |
| Lane Util. Factor                 |                                                                                    | 1.00 | 1.00  |      | 1.00  | 1.00 | 1.00 | 0.95 | 1.00 | 1.00  | 0.95 | 1.00 |
| Frt                               |                                                                                    | 1.00 | 0.85  |      | 1.00  | 0.85 | 1.00 | 1.00 | 0.85 | 1.00  | 1.00 | 0.85 |
| Flt Protected                     |                                                                                    | 1.00 | 1.00  |      | 0.96  | 1.00 | 0.95 | 1.00 | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (prot)                 |                                                                                    | 1900 | 1380  |      | 1816  | 1615 | 1805 | 3539 | 1599 | 1787  | 3539 | 1615 |
| Flt Permitted                     |                                                                                    | 1.00 | 1.00  |      | 0.74  | 1.00 | 0.32 | 1.00 | 1.00 | 0.44  | 1.00 | 1.00 |
| Satd. Flow (perm)                 |                                                                                    | 1900 | 1380  |      | 1406  | 1615 | 617  | 3539 | 1599 | 820   | 3539 | 1615 |
| Peak-hour factor, PHF             | 0.88                                                                               | 0.25 | 0.50  | 0.93 | 0.69  | 0.89 | 0.58 | 0.94 | 0.92 | 0.74  | 0.90 | 0.73 |
| Adj. Flow (vph)                   | 0                                                                                  | 4    | 12    | 447  | 38    | 263  | 38   | 495  | 201  | 161   | 693  | 55   |
| RTOR Reduction (vph)              | 0                                                                                  | 0    | 7     | 0    | 0     | 123  | 0    | 0    | 103  | 0     | 0    | 28   |
| Lane Group Flow (vph)             | 0                                                                                  | 4    | 5     | 0    | 485   | 140  | 38   | 495  | 98   | 161   | 693  | 27   |
| Heavy Vehicles (%)                | 0%                                                                                 | 0%   | 17%   | 0%   | 0%    | 0%   | 0%   | 2%   | 1%   | 1%    | 2%   | 0%   |
| Turn Type                         |                                                                                    | NA   | Perm  | Perm | NA    | Perm | Perm | NA   | Perm | Perm  | NA   | Perm |
| Protected Phases                  |                                                                                    | 4    |       |      | 8     |      |      | 2    |      |       | 6    |      |
| Permitted Phases                  | 4                                                                                  |      | 4     | 8    |       | 8    | 2    |      | 2    | 6     |      | 6    |
| Actuated Green, G (s)             |                                                                                    | 49.3 | 49.3  |      | 49.3  | 49.3 | 58.7 | 58.7 | 58.7 | 58.7  | 58.7 | 58.7 |
| Effective Green, g (s)            |                                                                                    | 49.3 | 49.3  |      | 49.3  | 49.3 | 58.7 | 58.7 | 58.7 | 58.7  | 58.7 | 58.7 |
| Actuated g/C Ratio                |                                                                                    | 0.41 | 0.41  |      | 0.41  | 0.41 | 0.49 | 0.49 | 0.49 | 0.49  | 0.49 | 0.49 |
| Clearance Time (s)                |                                                                                    | 6.0  | 6.0   |      | 6.0   | 6.0  | 6.0  | 6.0  | 6.0  | 6.0   | 6.0  | 6.0  |
| Vehicle Extension (s)             |                                                                                    | 3.0  | 3.0   |      | 3.0   | 3.0  | 5.0  | 5.0  | 5.0  | 5.0   | 5.0  | 5.0  |
| Lane Grp Cap (vph)                |                                                                                    | 780  | 566   |      | 577   | 663  | 301  | 1731 | 782  | 401   | 1731 | 790  |
| v/s Ratio Prot                    |                                                                                    | 0.00 |       |      |       |      |      | 0.14 |      |       | 0.20 |      |
| v/s Ratio Perm                    |                                                                                    |      | 0.00  |      | c0.34 | 0.09 | 0.06 |      | 0.06 | c0.20 |      | 0.02 |
| v/c Ratio                         |                                                                                    | 0.01 | 0.01  |      | 0.84  | 0.21 | 0.13 | 0.29 | 0.13 | 0.40  | 0.40 | 0.03 |
| Uniform Delay, d1                 |                                                                                    | 20.9 | 20.9  |      | 31.8  | 22.8 | 16.7 | 18.2 | 16.7 | 19.5  | 19.5 | 15.9 |
| Progression Factor                |                                                                                    | 1.00 | 1.00  |      | 1.00  | 1.00 | 0.92 | 0.90 | 2.08 | 0.67  | 0.66 | 0.48 |
| Incremental Delay, d2             |                                                                                    | 0.0  | 0.0   |      | 10.7  | 0.2  | 0.8  | 0.4  | 0.3  | 2.9   | 0.7  | 0.1  |
| Delay (s)                         |                                                                                    | 20.9 | 20.9  |      | 42.5  | 23.0 | 16.1 | 16.8 | 35.0 | 16.0  | 13.6 | 7.6  |
| Level of Service                  |                                                                                    | C    | C     |      | D     | C    | B    | B    | D    | B     | B    | A    |
| Approach Delay (s)                |                                                                                    | 20.9 |       |      | 35.6  |      |      | 21.8 |      |       | 13.6 |      |
| Approach LOS                      |                                                                                    | C    |       |      | D     |      |      | C    |      |       | B    |      |
| <b>Intersection Summary</b>       |                                                                                    |      |       |      |       |      |      |      |      |       |      |      |
| HCM 2000 Control Delay            |                                                                                    |      | 23.0  |      |       |      |      |      |      |       |      |      |
| HCM 2000 Volume to Capacity ratio |                                                                                    |      | 0.60  |      |       |      |      |      |      |       |      |      |
| Actuated Cycle Length (s)         |                                                                                    |      | 120.0 |      |       |      |      |      |      |       |      |      |
| Intersection Capacity Utilization |                                                                                    |      | 75.8% |      |       |      |      |      |      |       |      |      |
| Analysis Period (min)             |                                                                                    |      | 15    |      |       |      |      |      |      |       |      |      |
| <b>c Critical Lane Group</b>      |                                                                                    |      |       |      |       |      |      |      |      |       |      |      |

Queues  
6: SR 13 (Buford Hwy) & S. Hill St/Hamilton Mill Rd

Future No-Build AM

11/16/2016

|                         |  |  |  |  |  |  |   |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | NBL                                                                               | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations     |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 29                                                                                | 166                                                                               | 68                                                                                | 509                                                                               | 250                                                                               | 44                                                                                | 454                                                                                 | 320                                                                                 | 233                                                                                 | 779                                                                                 | 54                                                                                  |
| Future Volume (vph)     | 29                                                                                | 166                                                                               | 68                                                                                | 509                                                                               | 250                                                                               | 44                                                                                | 454                                                                                 | 320                                                                                 | 233                                                                                 | 779                                                                                 | 54                                                                                  |
| Lane Group Flow (vph)   | 54                                                                                | 263                                                                               | 96                                                                                | 553                                                                               | 579                                                                               | 59                                                                                | 493                                                                                 | 432                                                                                 | 328                                                                                 | 838                                                                                 | 59                                                                                  |
| Turn Type               | Perm                                                                              | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                | pm+pt                                                                             | NA                                                                                  | Free                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases        |                                                                                   | 4                                                                                 |                                                                                   | 3                                                                                 | 8                                                                                 | 5                                                                                 | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases        | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 2                                                                                 |                                                                                     | Free                                                                                | 6                                                                                   |                                                                                     | 6                                                                                   |
| Detector Phase          | 4                                                                                 | 4                                                                                 | 4                                                                                 | 3                                                                                 | 8                                                                                 | 5                                                                                 | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   | 6                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 4.0                                                                               | 6.0                                                                               | 4.0                                                                               | 15.0                                                                                |                                                                                     | 4.0                                                                                 | 15.0                                                                                | 15.0                                                                                |
| Minimum Split (s)       | 41.0                                                                              | 41.0                                                                              | 41.0                                                                              | 11.0                                                                              | 46.0                                                                              | 11.0                                                                              | 37.0                                                                                |                                                                                     | 11.0                                                                                | 40.0                                                                                | 40.0                                                                                |
| Total Split (s)         | 41.0                                                                              | 41.0                                                                              | 41.0                                                                              | 25.0                                                                              | 66.0                                                                              | 11.0                                                                              | 37.0                                                                                |                                                                                     | 17.0                                                                                | 43.0                                                                                | 43.0                                                                                |
| Total Split (%)         | 34.2%                                                                             | 34.2%                                                                             | 34.2%                                                                             | 20.8%                                                                             | 55.0%                                                                             | 9.2%                                                                              | 30.8%                                                                               |                                                                                     | 14.2%                                                                               | 35.8%                                                                               | 35.8%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                 |                                                                                     | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                 |                                                                                     | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 |                                                                                     | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Lost Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lead/Lag                | Lag                                                                               | Lag                                                                               | Lag                                                                               | Lead                                                                              |                                                                                   | Lead                                                                              | Lag                                                                                 |                                                                                     | Lead                                                                                | Lag                                                                                 | Lag                                                                                 |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | C-Min                                                                               |                                                                                     | None                                                                                | C-Min                                                                               | C-Min                                                                               |
| v/c Ratio               | 0.40                                                                              | 0.74                                                                              | 0.23                                                                              | 1.05                                                                              | 0.81                                                                              | 0.23                                                                              | 0.38                                                                                | 0.28                                                                                | 0.77                                                                                | 0.55                                                                                | 0.08                                                                                |
| Control Delay           | 50.2                                                                              | 58.5                                                                              | 3.4                                                                               | 100.9                                                                             | 38.7                                                                              | 20.2                                                                              | 30.5                                                                                | 0.5                                                                                 | 30.9                                                                                | 17.5                                                                                | 0.2                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 50.2                                                                              | 58.5                                                                              | 3.4                                                                               | 100.9                                                                             | 38.7                                                                              | 20.2                                                                              | 30.5                                                                                | 0.5                                                                                 | 30.9                                                                                | 17.5                                                                                | 0.2                                                                                 |
| Queue Length 50th (ft)  | 37                                                                                | 195                                                                               | 0                                                                                 | ~240                                                                              | 365                                                                               | 23                                                                                | 146                                                                                 | 0                                                                                   | 111                                                                                 | 173                                                                                 | 0                                                                                   |
| Queue Length 95th (ft)  | 41                                                                                | 173                                                                               | 0                                                                                 | #353                                                                              | 380                                                                               | 44                                                                                | 218                                                                                 | 0                                                                                   | 158                                                                                 | 216                                                                                 | m0                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 657                                                                               |                                                                                   |                                                                                   | 1618                                                                              |                                                                                   | 1320                                                                                |                                                                                     |                                                                                     | 3868                                                                                |                                                                                     |
| Turn Bay Length (ft)    | 180                                                                               |                                                                                   | 300                                                                               | 250                                                                               |                                                                                   | 240                                                                               |                                                                                     | 1000                                                                                | 400                                                                                 |                                                                                     | 280                                                                                 |
| Base Capacity (vph)     | 209                                                                               | 554                                                                               | 567                                                                               | 528                                                                               | 889                                                                               | 252                                                                               | 1286                                                                                | 1538                                                                                | 426                                                                                 | 1528                                                                                | 760                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.26                                                                              | 0.47                                                                              | 0.17                                                                              | 1.05                                                                              | 0.65                                                                              | 0.23                                                                              | 0.38                                                                                | 0.28                                                                                | 0.77                                                                                | 0.55                                                                                | 0.08                                                                                |

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.

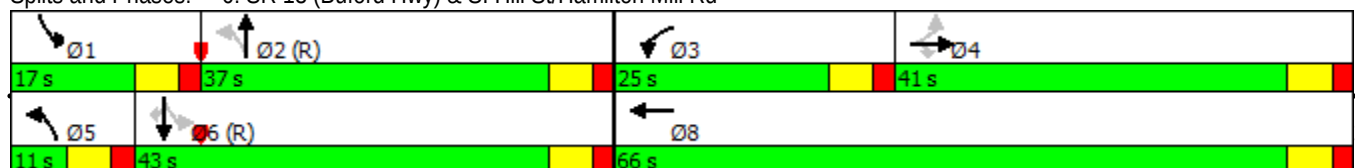
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: SR 13 (Buford Hwy) & S. Hill St/Hamilton Mill Rd



# HCM Signalized Intersection Capacity Analysis

## 6: SR 13 (Buford Hwy) & S. Hill St/Hamilton Mill Rd

Future No-Build AM

11/16/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |  |  |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (vph)              | 29                                                                                | 166                                                                               | 68                                                                                | 509                                                                               | 250                                                                               | 205                                                                               | 44                                                                                  | 454                                                                                 | 320                                                                                 | 233                                                                                 | 779                                                                                 | 54                                                                                  |
| Future Volume (vph)               | 29                                                                                | 166                                                                               | 68                                                                                | 509                                                                               | 250                                                                               | 205                                                                               | 44                                                                                  | 454                                                                                 | 320                                                                                 | 233                                                                                 | 779                                                                                 | 54                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 | 4.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.97                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |
| Frt                               | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 0.93                                                                              |                                                                                   | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)                 | 1805                                                                              | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1726                                                                              |                                                                                   | 1770                                                                                | 3539                                                                                | 1538                                                                                | 1752                                                                                | 3539                                                                                | 1583                                                                                |
| Flt Permitted                     | 0.38                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.26                                                                                | 1.00                                                                                | 1.00                                                                                | 0.35                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)                 | 718                                                                               | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1726                                                                              |                                                                                   | 490                                                                                 | 3539                                                                                | 1538                                                                                | 645                                                                                 | 3539                                                                                | 1583                                                                                |
| Peak-hour factor, PHF             | 0.54                                                                              | 0.63                                                                              | 0.71                                                                              | 0.92                                                                              | 0.81                                                                              | 0.76                                                                              | 0.75                                                                                | 0.92                                                                                | 0.74                                                                                | 0.71                                                                                | 0.93                                                                                | 0.91                                                                                |
| Adj. Flow (vph)                   | 54                                                                                | 263                                                                               | 96                                                                                | 553                                                                               | 309                                                                               | 270                                                                               | 59                                                                                  | 493                                                                                 | 432                                                                                 | 328                                                                                 | 838                                                                                 | 59                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 78                                                                                | 0                                                                                 | 31                                                                                | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 34                                                                                  |
| Lane Group Flow (vph)             | 54                                                                                | 263                                                                               | 18                                                                                | 553                                                                               | 548                                                                               | 0                                                                                 | 59                                                                                  | 493                                                                                 | 432                                                                                 | 328                                                                                 | 838                                                                                 | 25                                                                                  |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 5%                                                                                | 1%                                                                                | 4%                                                                                | 2%                                                                                  | 2%                                                                                  | 5%                                                                                  | 3%                                                                                  | 2%                                                                                  | 2%                                                                                  |
| Turn Type                         | Perm                                                                              | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                |                                                                                   | pm+pt                                                                               | NA                                                                                  | Free                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   | 3                                                                                 | 8                                                                                 |                                                                                   | 5                                                                                   | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   |                                                                                   | 2                                                                                   |                                                                                     | Free                                                                                | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             | 22.4                                                                              | 22.4                                                                              | 22.4                                                                              | 19.0                                                                              | 47.4                                                                              |                                                                                   | 47.6                                                                                | 43.6                                                                                | 120.0                                                                               | 60.6                                                                                | 50.6                                                                                | 50.6                                                                                |
| Effective Green, g (s)            | 22.4                                                                              | 22.4                                                                              | 22.4                                                                              | 19.0                                                                              | 47.4                                                                              |                                                                                   | 47.6                                                                                | 43.6                                                                                | 120.0                                                                               | 60.6                                                                                | 50.6                                                                                | 50.6                                                                                |
| Actuated g/C Ratio                | 0.19                                                                              | 0.19                                                                              | 0.19                                                                              | 0.16                                                                              | 0.39                                                                              |                                                                                   | 0.40                                                                                | 0.36                                                                                | 1.00                                                                                | 0.51                                                                                | 0.42                                                                                | 0.42                                                                                |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)             | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               |                                                                                   | 3.0                                                                                 | 5.0                                                                                 |                                                                                     | 3.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |
| Lane Grp Cap (vph)                | 134                                                                               | 354                                                                               | 301                                                                               | 528                                                                               | 681                                                                               |                                                                                   | 237                                                                                 | 1285                                                                                | 1538                                                                                | 427                                                                                 | 1492                                                                                | 667                                                                                 |
| v/s Ratio Prot                    |                                                                                   | 0.14                                                                              |                                                                                   | c0.17                                                                             | c0.32                                                                             |                                                                                   | 0.01                                                                                | 0.14                                                                                |                                                                                     | c0.07                                                                               | 0.24                                                                                |                                                                                     |
| v/s Ratio Perm                    | 0.08                                                                              |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.09                                                                                |                                                                                     | 0.28                                                                                | c0.32                                                                               |                                                                                     | 0.02                                                                                |
| v/c Ratio                         | 0.40                                                                              | 0.74                                                                              | 0.06                                                                              | 1.05                                                                              | 0.80                                                                              |                                                                                   | 0.25                                                                                | 0.38                                                                                | 0.28                                                                                | 0.77                                                                                | 0.56                                                                                | 0.04                                                                                |
| Uniform Delay, d1                 | 42.9                                                                              | 46.1                                                                              | 40.1                                                                              | 50.5                                                                              | 32.2                                                                              |                                                                                   | 23.0                                                                                | 28.3                                                                                | 0.0                                                                                 | 21.4                                                                                | 26.3                                                                                | 20.4                                                                                |
| Progression Factor                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 0.59                                                                                | 1.00                                                                                |
| Incremental Delay, d2             | 2.0                                                                               | 8.2                                                                               | 0.1                                                                               | 52.1                                                                              | 6.8                                                                               |                                                                                   | 0.6                                                                                 | 0.9                                                                                 | 0.5                                                                                 | 7.3                                                                                 | 1.4                                                                                 | 0.1                                                                                 |
| Delay (s)                         | 44.9                                                                              | 54.3                                                                              | 40.2                                                                              | 102.6                                                                             | 39.0                                                                              |                                                                                   | 23.6                                                                                | 29.1                                                                                | 0.5                                                                                 | 25.6                                                                                | 16.9                                                                                | 20.5                                                                                |
| Level of Service                  | D                                                                                 | D                                                                                 | D                                                                                 | F                                                                                 | D                                                                                 |                                                                                   | C                                                                                   | C                                                                                   | A                                                                                   | C                                                                                   | B                                                                                   | C                                                                                   |
| Approach Delay (s)                |                                                                                   | 49.8                                                                              |                                                                                   |                                                                                   | 70.1                                                                              |                                                                                   |                                                                                     | 16.2                                                                                |                                                                                     |                                                                                     | 19.4                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                     | B                                                                                   |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 37.2                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.88                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                     |                                                                                     | 24.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 76.1%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM Unsignalized Intersection Capacity Analysis 7: Pvt. Drwy/Bryant Rd & Thompson Mill Rd

Future No-Build AM  
11/16/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
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|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                    |  |                                                                                     |                                                                                     |  |                                                                                     |
| Traffic Volume (veh/h)            | 5                                                                                 | 212                                                                               | 1                                                                                 | 0                                                                                 | 619                                                                               | 28                                                                                | 0                                                                                  | 0                                                                                   | 0                                                                                   | 13                                                                                  | 0                                                                                   | 6                                                                                   |
| Future Volume (Veh/h)             | 5                                                                                 | 212                                                                               | 1                                                                                 | 0                                                                                 | 619                                                                               | 28                                                                                | 0                                                                                  | 0                                                                                   | 0                                                                                   | 13                                                                                  | 0                                                                                   | 6                                                                                   |
| Sign Control                      |                                                                                   | Free                                                                              |                                                                                   |                                                                                   | Free                                                                              |                                                                                   |                                                                                    | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Grade                             |                                                                                   | 0%                                                                                |                                                                                   |                                                                                   | 0%                                                                                |                                                                                   |                                                                                    | 0%                                                                                  |                                                                                     |                                                                                     | 0%                                                                                  |                                                                                     |
| Peak Hour Factor                  | 0.42                                                                              | 0.83                                                                              | 0.25                                                                              | 0.92                                                                              | 0.94                                                                              | 0.68                                                                              | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.60                                                                                | 0.92                                                                                | 0.75                                                                                |
| Hourly flow rate (vph)            | 12                                                                                | 255                                                                               | 4                                                                                 | 0                                                                                 | 659                                                                               | 41                                                                                | 0                                                                                  | 0                                                                                   | 0                                                                                   | 22                                                                                  | 0                                                                                   | 8                                                                                   |
| Pedestrians                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane Width (ft)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Walking Speed (ft/s)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Percent Blockage                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Right turn flare (veh)            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median type                       | None                                                                              |                                                                                   |                                                                                   |                                                                                   | None                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median storage (veh)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Upstream signal (ft)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| pX, platoon unblocked             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC, conflicting volume            | 700                                                                               |                                                                                   |                                                                                   | 259                                                                               |                                                                                   |                                                                                   | 968                                                                                | 981                                                                                 | 257                                                                                 | 960                                                                                 | 962                                                                                 | 680                                                                                 |
| vC1, stage 1 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC2, stage 2 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vCu, unblocked vol                | 700                                                                               |                                                                                   |                                                                                   | 259                                                                               |                                                                                   |                                                                                   | 968                                                                                | 981                                                                                 | 257                                                                                 | 960                                                                                 | 962                                                                                 | 680                                                                                 |
| tC, single (s)                    | 4.1                                                                               |                                                                                   |                                                                                   | 4.1                                                                               |                                                                                   |                                                                                   | 7.1                                                                                | 6.5                                                                                 | 6.2                                                                                 | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 |
| tC, 2 stage (s)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| tF (s)                            | 2.2                                                                               |                                                                                   |                                                                                   | 2.2                                                                               |                                                                                   |                                                                                   | 3.5                                                                                | 4.0                                                                                 | 3.3                                                                                 | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 |
| p0 queue free %                   | 99                                                                                |                                                                                   |                                                                                   | 100                                                                               |                                                                                   |                                                                                   | 100                                                                                | 100                                                                                 | 100                                                                                 | 91                                                                                  | 100                                                                                 | 98                                                                                  |
| cM capacity (veh/h)               | 906                                                                               |                                                                                   |                                                                                   | 1317                                                                              |                                                                                   |                                                                                   | 229                                                                                | 248                                                                                 | 787                                                                                 | 236                                                                                 | 254                                                                                 | 455                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total                      | 271                                                                               | 700                                                                               | 0                                                                                 | 30                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left                       | 12                                                                                | 0                                                                                 | 0                                                                                 | 22                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right                      | 4                                                                                 | 41                                                                                | 0                                                                                 | 8                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| cSH                               | 906                                                                               | 1317                                                                              | 1700                                                                              | 270                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume to Capacity                | 0.01                                                                              | 0.00                                                                              | 0.00                                                                              | 0.11                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Queue Length 95th (ft)            | 1                                                                                 | 0                                                                                 | 0                                                                                 | 9                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 0.5                                                                               | 0.0                                                                               | 0.0                                                                               | 20.0                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane LOS                          | A                                                                                 |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 0.5                                                                               | 0.0                                                                               | 0.0                                                                               | 20.0                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Average Delay                     |                                                                                   |                                                                                   | 0.7                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 44.3%                                                                             | ICU Level of Service                                                              |                                                                                   |                                                                                   |                                                                                    | A                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM Unsignalized Intersection Capacity Analysis 8: N. Bogan Rd & Thompson Mill Rd

Future No-Build AM

11/16/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
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|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                    |  |                                                                                     |                                                                                     |  |                                                                                     |
| Sign Control                      |                                                                                   | Stop                                                                              |                                                                                   |                                                                                   | Stop                                                                              |                                                                                   |                                                                                    | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Traffic Volume (vph)              | 56                                                                                | 111                                                                               | 69                                                                                | 54                                                                                | 406                                                                               | 9                                                                                 | 119                                                                                | 69                                                                                  | 17                                                                                  | 8                                                                                   | 98                                                                                  | 127                                                                                 |
| Future Volume (vph)               | 56                                                                                | 111                                                                               | 69                                                                                | 54                                                                                | 406                                                                               | 9                                                                                 | 119                                                                                | 69                                                                                  | 17                                                                                  | 8                                                                                   | 98                                                                                  | 127                                                                                 |
| Peak Hour Factor                  | 0.74                                                                              | 0.80                                                                              | 0.75                                                                              | 0.85                                                                              | 0.95                                                                              | 0.45                                                                              | 0.72                                                                               | 0.87                                                                                | 0.80                                                                                | 0.50                                                                                | 0.93                                                                                | 0.78                                                                                |
| Hourly flow rate (vph)            | 76                                                                                | 139                                                                               | 92                                                                                | 64                                                                                | 427                                                                               | 20                                                                                | 165                                                                                | 79                                                                                  | 21                                                                                  | 16                                                                                  | 105                                                                                 | 163                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total (vph)                | 307                                                                               | 511                                                                               | 265                                                                               | 284                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left (vph)                 | 76                                                                                | 64                                                                                | 165                                                                               | 16                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right (vph)                | 92                                                                                | 20                                                                                | 21                                                                                | 163                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Hadj (s)                          | -0.12                                                                             | 0.00                                                                              | 0.08                                                                              | -0.33                                                                             |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Departure Headway (s)             | 7.5                                                                               | 7.0                                                                               | 8.0                                                                               | 7.6                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Degree Utilization, x             | 0.64                                                                              | 1.00                                                                              | 0.59                                                                              | 0.60                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Capacity (veh/h)                  | 468                                                                               | 511                                                                               | 433                                                                               | 462                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 22.9                                                                              | 65.5                                                                              | 21.8                                                                              | 21.1                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 22.9                                                                              | 65.5                                                                              | 21.8                                                                              | 21.1                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      | C                                                                                 | F                                                                                 | C                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Delay                             |                                                                                   |                                                                                   |                                                                                   | 38.2                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  |                                                                                   |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   |                                                                                   | 62.8%                                                                             | ICU Level of Service                                                              | B                                                                                 |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

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Intersection: 8: N. Bogan Rd & Thompson Mill Rd

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| Movement              | EB   | WB   | NB  | SB  |
|-----------------------|------|------|-----|-----|
| Directions Served     | LTR  | LTR  | LTR | LTR |
| Maximum Queue (ft)    | 50   | 260  | 68  | 76  |
| Average Queue (ft)    | 35   | 155  | 56  | 60  |
| 95th Queue (ft)       | 48   | 281  | 67  | 77  |
| Link Distance (ft)    | 2455 | 1031 | 846 | 592 |
| Upstream Blk Time (%) |      |      |     |     |
| Queuing Penalty (veh) |      |      |     |     |
| Storage Bay Dist (ft) |      |      |     |     |
| Storage Blk Time (%)  |      |      |     |     |
| Queuing Penalty (veh) |      |      |     |     |

## Queues

Future No-Build PM

## 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)

11/16/2016



| Lane Group              | EBL   | EBT   | WBT   | WBR   | NBL   | NBT   | NBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↰     | ↱↱    | ↰↰↰   | ↱     | ↰     | ↱     | ↱     |
| Traffic Volume (vph)    | 472   | 1297  | 550   | 135   | 347   | 1     | 562   |
| Future Volume (vph)     | 472   | 1297  | 550   | 135   | 347   | 1     | 562   |
| Lane Group Flow (vph)   | 576   | 1457  | 567   | 173   | 206   | 211   | 618   |
| Turn Type               | Prot  | NA    | NA    | Perm  | Perm  | NA    | Perm  |
| Protected Phases        | 5     | 2     | 6     |       |       | 8     |       |
| Permitted Phases        |       |       |       | 6     | 8     |       | 8     |
| Detector Phase          | 5     | 2     | 6     | 6     | 8     | 8     | 8     |
| Switch Phase            |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 4.0   | 15.0  | 15.0  | 15.0  | 6.0   | 6.0   | 6.0   |
| Minimum Split (s)       | 11.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 47.0  | 71.0  | 24.0  | 24.0  | 49.0  | 49.0  | 49.0  |
| Total Split (%)         | 39.2% | 59.2% | 20.0% | 20.0% | 40.8% | 40.8% | 40.8% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lead  |       | Lag   | Lag   |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |
| Recall Mode             | None  | C-Min | C-Min | C-Min | None  | None  | None  |
| v/c Ratio               | 0.96  | 0.75  | 0.71  | 0.44  | 0.34  | 0.35  | 0.98  |
| Control Delay           | 53.9  | 17.6  | 53.7  | 10.4  | 30.1  | 30.2  | 64.8  |
| Queue Delay             | 0.0   | 2.7   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 53.9  | 20.3  | 53.7  | 10.4  | 30.1  | 30.2  | 64.8  |
| Queue Length 50th (ft)  | 431   | 493   | 155   | 0     | 122   | 125   | 422   |
| Queue Length 95th (ft)  | #565  | 617   | 199   | 38    | 174   | 47    | #673  |
| Internal Link Dist (ft) |       | 591   | 1139  |       |       | 825   |       |
| Turn Bay Length (ft)    |       |       |       | 840   |       |       | 510   |
| Base Capacity (vph)     | 610   | 1955  | 803   | 395   | 608   | 610   | 631   |
| Starvation Cap Reductn  | 0     | 367   | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.94  | 0.92  | 0.71  | 0.44  | 0.34  | 0.35  | 0.98  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 73 (61%), Referenced to phase 2:EBT and 6:WBT, Start of Green

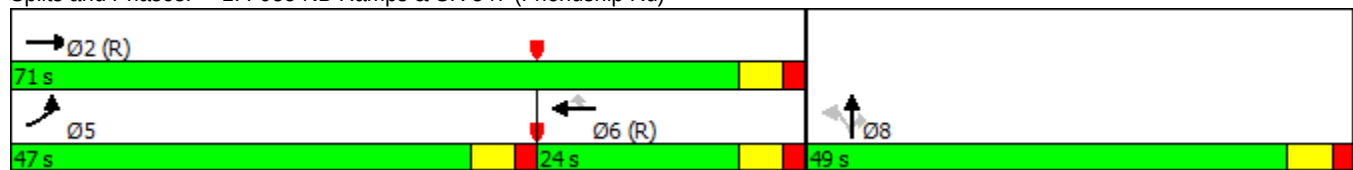
Natural Cycle: 90

Control Type: Actuated-Coordinated

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)



Baseline

Synchro 9 Report  
Page 1



# HCM Signalized Intersection Capacity Analysis

## 1: I-985 NB Ramps & SR 347 (Friendship Rd)

Future No-Build PM

11/16/2016

|                                   |  |                                                                                    |  |  |                                                                                                                                                                      |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                                                                                                                 | EBR                                                                               | WBL                                                                               | WBT                                                                                                                                                                                                                                                   | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |   |                                                                                   |                                                                                   |    |  |  |  |  |                                                                                     |                                                                                     |                                                                                     |
| Traffic Volume (vph)              | 472                                                                               | 1297                                                                                                                                                                | 0                                                                                 | 0                                                                                 | 550                                                                                                                                                                                                                                                   | 135                                                                               | 347                                                                                 | 1                                                                                   | 562                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Future Volume (vph)               | 472                                                                               | 1297                                                                                                                                                                | 0                                                                                 | 0                                                                                 | 550                                                                                                                                                                                                                                                   | 135                                                                               | 347                                                                                 | 1                                                                                   | 562                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                                                                                                                | 1900                                                                              | 1900                                                                              | 1900                                                                                                                                                                                                                                                  | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                                                                                                                 |                                                                                   |                                                                                   | 6.0                                                                                                                                                                                                                                                   | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Util. Factor                 | 1.00                                                                              | 0.95                                                                                                                                                                |                                                                                   |                                                                                   | 0.91                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Frt                               | 1.00                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (prot)                 | 1787                                                                              | 3610                                                                                                                                                                |                                                                                   |                                                                                   | 5136                                                                                                                                                                                                                                                  | 1599                                                                              | 1698                                                                                | 1704                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Permitted                     | 0.95                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (perm)                 | 1787                                                                              | 3610                                                                                                                                                                |                                                                                   |                                                                                   | 5136                                                                                                                                                                                                                                                  | 1599                                                                              | 1698                                                                                | 1704                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Peak-hour factor, PHF             | 0.82                                                                              | 0.89                                                                                                                                                                | 0.92                                                                              | 0.92                                                                              | 0.97                                                                                                                                                                                                                                                  | 0.78                                                                              | 0.84                                                                                | 0.25                                                                                | 0.91                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Adj. Flow (vph)                   | 576                                                                               | 1457                                                                                                                                                                | 0                                                                                 | 0                                                                                 | 567                                                                                                                                                                                                                                                   | 173                                                                               | 413                                                                                 | 4                                                                                   | 618                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                                                                                                                                                                                     | 146                                                                               | 0                                                                                   | 0                                                                                   | 53                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 576                                                                               | 1457                                                                                                                                                                | 0                                                                                 | 0                                                                                 | 567                                                                                                                                                                                                                                                   | 27                                                                                | 206                                                                                 | 211                                                                                 | 565                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Heavy Vehicles (%)                | 1%                                                                                | 0%                                                                                                                                                                  | 0%                                                                                | 0%                                                                                | 1%                                                                                                                                                                                                                                                    | 1%                                                                                | 1%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  |
| Turn Type                         | Prot                                                                              | NA                                                                                                                                                                  |                                                                                   |                                                                                   | NA                                                                                                                                                                                                                                                    | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Protected Phases                  | 5                                                                                 | 2                                                                                                                                                                   |                                                                                   |                                                                                   | 6                                                                                                                                                                                                                                                     |                                                                                   |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Permitted Phases                  |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Actuated Green, G (s)             | 40.2                                                                              | 65.0                                                                                                                                                                |                                                                                   |                                                                                   | 18.8                                                                                                                                                                                                                                                  | 18.8                                                                              | 43.0                                                                                | 43.0                                                                                | 43.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Effective Green, g (s)            | 40.2                                                                              | 65.0                                                                                                                                                                |                                                                                   |                                                                                   | 18.8                                                                                                                                                                                                                                                  | 18.8                                                                              | 43.0                                                                                | 43.0                                                                                | 43.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Actuated g/C Ratio                | 0.34                                                                              | 0.54                                                                                                                                                                |                                                                                   |                                                                                   | 0.16                                                                                                                                                                                                                                                  | 0.16                                                                              | 0.36                                                                                | 0.36                                                                                | 0.36                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                                                                                                                 |                                                                                   |                                                                                   | 6.0                                                                                                                                                                                                                                                   | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Vehicle Extension (s)             | 3.0                                                                               | 5.0                                                                                                                                                                 |                                                                                   |                                                                                   | 5.0                                                                                                                                                                                                                                                   | 5.0                                                                               | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Grp Cap (vph)                | 598                                                                               | 1955                                                                                                                                                                |                                                                                   |                                                                                   | 804                                                                                                                                                                                                                                                   | 250                                                                               | 608                                                                                 | 610                                                                                 | 578                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Prot                    | c0.32                                                                             | c0.40                                                                                                                                                               |                                                                                   |                                                                                   | 0.11                                                                                                                                                                                                                                                  |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       | 0.02                                                                              | 0.12                                                                                | 0.12                                                                                | c0.35                                                                               |                                                                                     |                                                                                     |                                                                                     |
| v/c Ratio                         | 0.96                                                                              | 0.75                                                                                                                                                                |                                                                                   |                                                                                   | 0.71                                                                                                                                                                                                                                                  | 0.11                                                                              | 0.34                                                                                | 0.35                                                                                | 0.98                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Uniform Delay, d1                 | 39.2                                                                              | 21.1                                                                                                                                                                |                                                                                   |                                                                                   | 48.0                                                                                                                                                                                                                                                  | 43.4                                                                              | 28.1                                                                                | 28.2                                                                                | 38.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Progression Factor                | 0.71                                                                              | 0.72                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Incremental Delay, d2             | 23.9                                                                              | 2.1                                                                                                                                                                 |                                                                                   |                                                                                   | 5.2                                                                                                                                                                                                                                                   | 0.9                                                                               | 0.3                                                                                 | 0.3                                                                                 | 31.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Delay (s)                         | 51.7                                                                              | 17.4                                                                                                                                                                |                                                                                   |                                                                                   | 53.1                                                                                                                                                                                                                                                  | 44.3                                                                              | 28.5                                                                                | 28.5                                                                                | 69.6                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  | D                                                                                 | B                                                                                                                                                                   |                                                                                   |                                                                                   | D                                                                                                                                                                                                                                                     | D                                                                                 | C                                                                                   | C                                                                                   | E                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                |                                                                                   | 27.1                                                                                                                                                                |                                                                                   |                                                                                   | 51.1                                                                                                                                                                                                                                                  |                                                                                   |                                                                                     | 53.0                                                                                |                                                                                     |                                                                                     | 0.0                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                                                                                                   |                                                                                   |                                                                                   | D                                                                                                                                                                                                                                                     |                                                                                   |                                                                                     | D                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                                                                                                     | 38.8                                                                              |                                                                                   | HCM 2000 Level of Service                                                                                                                                                                                                                             |                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                                                                                                     | 0.95                                                                              |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                                                                                                     | 120.0                                                                             |                                                                                   | Sum of lost time (s)                                                                                                                                                                                                                                  |                                                                                   |                                                                                     |                                                                                     | 18.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                                                                                                     | 80.7%                                                                             |                                                                                   | ICU Level of Service                                                                                                                                                                                                                                  |                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                                                                                                     | 15                                                                                |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

## 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)

Future No-Build PM

11/16/2016



| Lane Group              | EBT   | EBR   | WBL   | WBT   | SBL   | SBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↑↑↑   | ↑     | ↵     | ↑↑    | ↵     | ↑     |
| Traffic Volume (vph)    | 1464  | 408   | 162   | 746   | 320   | 353   |
| Future Volume (vph)     | 1464  | 408   | 162   | 746   | 320   | 353   |
| Lane Group Flow (vph)   | 1541  | 504   | 198   | 820   | 421   | 420   |
| Turn Type               | NA    | Perm  | Prot  | NA    | Perm  | Perm  |
| Protected Phases        | 2     |       | 1     | 6     |       |       |
| Permitted Phases        |       | 2     |       |       | 4     | 4     |
| Detector Phase          | 2     | 2     | 1     | 6     | 4     | 4     |
| Switch Phase            |       |       |       |       |       |       |
| Minimum Initial (s)     | 15.0  | 15.0  | 4.0   | 15.0  | 6.0   | 6.0   |
| Minimum Split (s)       | 24.0  | 24.0  | 11.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 54.0  | 54.0  | 18.0  | 72.0  | 48.0  | 48.0  |
| Total Split (%)         | 45.0% | 45.0% | 15.0% | 60.0% | 40.0% | 40.0% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lag   | Lag   | Lead  |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |
| Recall Mode             | C-Min | C-Min | None  | C-Min | None  | None  |
| v/c Ratio               | 0.63  | 0.50  | 0.62  | 0.37  | 0.83  | 0.76  |
| Control Delay           | 16.4  | 1.6   | 43.7  | 14.8  | 53.9  | 32.8  |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.1   | 0.0   |
| Total Delay             | 16.4  | 1.6   | 43.7  | 14.8  | 53.9  | 32.8  |
| Queue Length 50th (ft)  | 174   | 5     | 72    | 315   | 304   | 193   |
| Queue Length 95th (ft)  | m201  | m1    | 91    | 394   | 310   | 252   |
| Internal Link Dist (ft) | 904   |       |       | 591   |       |       |
| Turn Bay Length (ft)    |       | 375   | 380   |       |       |       |
| Base Capacity (vph)     | 2463  | 1016  | 346   | 2207  | 631   | 653   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 57    | 0     | 0     | 0     | 5     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.64  | 0.50  | 0.57  | 0.37  | 0.67  | 0.64  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

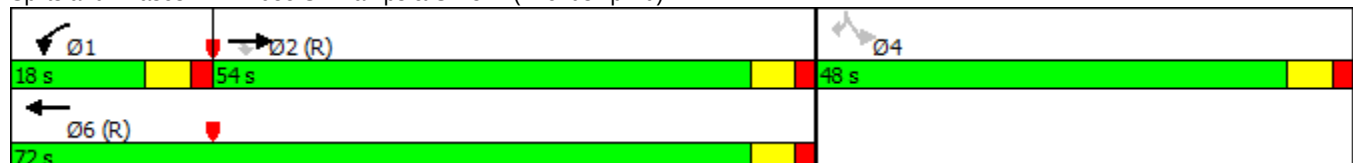
Offset: 6 (5%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)



# HCM Signalized Intersection Capacity Analysis

## 2: I-985 SB Ramps & SR 347 (Friendship Rd)

Future No-Build PM

11/16/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   | ↑↑↑                                                                               | ↑                                                                                 | ↑↑                                                                                | ↑↑                                                                                |                                                                                   |                                                                                     |                                                                                     |                                                                                     | ↑                                                                                   |                                                                                     | ↑                                                                                   |
| Traffic Volume (vph)              | 0                                                                                 | 1464                                                                              | 408                                                                               | 162                                                                               | 746                                                                               | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 320                                                                                 | 0                                                                                   | 353                                                                                 |
| Future Volume (vph)               | 0                                                                                 | 1464                                                                              | 408                                                                               | 162                                                                               | 746                                                                               | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 320                                                                                 | 0                                                                                   | 353                                                                                 |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 6.0                                                                                 |                                                                                     | 6.0                                                                                 |
| Lane Util. Factor                 |                                                                                   | 0.91                                                                              | 1.00                                                                              | 0.97                                                                              | 0.95                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Frt                               |                                                                                   | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     | 0.85                                                                                |
| Flt Protected                     |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 0.95                                                                                |                                                                                     | 1.00                                                                                |
| Satd. Flow (prot)                 |                                                                                   | 5187                                                                              | 1583                                                                              | 3467                                                                              | 3574                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 1805                                                                                |                                                                                     | 1583                                                                                |
| Flt Permitted                     |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 0.95                                                                                |                                                                                     | 1.00                                                                                |
| Satd. Flow (perm)                 |                                                                                   | 5187                                                                              | 1583                                                                              | 3467                                                                              | 3574                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 1805                                                                                |                                                                                     | 1583                                                                                |
| Peak-hour factor, PHF             | 0.92                                                                              | 0.95                                                                              | 0.81                                                                              | 0.82                                                                              | 0.91                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.76                                                                                | 0.92                                                                                | 0.84                                                                                |
| Adj. Flow (vph)                   | 0                                                                                 | 1541                                                                              | 504                                                                               | 198                                                                               | 820                                                                               | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 421                                                                                 | 0                                                                                   | 420                                                                                 |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 265                                                                               | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 110                                                                                 |
| Lane Group Flow (vph)             | 0                                                                                 | 1541                                                                              | 239                                                                               | 198                                                                               | 820                                                                               | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 421                                                                                 | 0                                                                                   | 310                                                                                 |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 2%                                                                                | 1%                                                                                | 1%                                                                                | 0%                                                                                | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 2%                                                                                  |
| Turn Type                         |                                                                                   | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                |                                                                                   |                                                                                     |                                                                                     |                                                                                     | Perm                                                                                |                                                                                     | Perm                                                                                |
| Protected Phases                  |                                                                                   | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Permitted Phases                  |                                                                                   |                                                                                   | 2                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 4                                                                                   |                                                                                     | 4                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 57.0                                                                              | 57.0                                                                              | 11.1                                                                              | 74.1                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 33.9                                                                                |                                                                                     | 33.9                                                                                |
| Effective Green, g (s)            |                                                                                   | 57.0                                                                              | 57.0                                                                              | 11.1                                                                              | 74.1                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 33.9                                                                                |                                                                                     | 33.9                                                                                |
| Actuated g/C Ratio                |                                                                                   | 0.48                                                                              | 0.48                                                                              | 0.09                                                                              | 0.62                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 0.28                                                                                |                                                                                     | 0.28                                                                                |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 6.0                                                                                 |                                                                                     | 6.0                                                                                 |
| Vehicle Extension (s)             |                                                                                   | 5.0                                                                               | 5.0                                                                               | 3.0                                                                               | 5.0                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 3.0                                                                                 |                                                                                     | 3.0                                                                                 |
| Lane Grp Cap (vph)                |                                                                                   | 2463                                                                              | 751                                                                               | 320                                                                               | 2206                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 509                                                                                 |                                                                                     | 447                                                                                 |
| v/s Ratio Prot                    |                                                                                   | c0.30                                                                             |                                                                                   | c0.06                                                                             | 0.23                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                   | 0.15                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     | c0.23                                                                               |                                                                                     | 0.20                                                                                |
| v/c Ratio                         |                                                                                   | 0.63                                                                              | 0.32                                                                              | 0.62                                                                              | 0.37                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 0.83                                                                                |                                                                                     | 0.69                                                                                |
| Uniform Delay, d1                 |                                                                                   | 23.5                                                                              | 19.5                                                                              | 52.4                                                                              | 11.4                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 40.3                                                                                |                                                                                     | 38.4                                                                                |
| Progression Factor                |                                                                                   | 0.62                                                                              | 0.19                                                                              | 0.69                                                                              | 1.16                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Incremental Delay, d2             |                                                                                   | 0.9                                                                               | 0.8                                                                               | 3.0                                                                               | 0.4                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 10.6                                                                                |                                                                                     | 4.6                                                                                 |
| Delay (s)                         |                                                                                   | 15.5                                                                              | 4.4                                                                               | 39.3                                                                              | 13.7                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 50.9                                                                                |                                                                                     | 43.1                                                                                |
| Level of Service                  |                                                                                   | B                                                                                 | A                                                                                 | D                                                                                 | B                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     | D                                                                                   |                                                                                     | D                                                                                   |
| Approach Delay (s)                |                                                                                   | 12.8                                                                              |                                                                                   |                                                                                   | 18.7                                                                              |                                                                                   |                                                                                     | 0.0                                                                                 |                                                                                     |                                                                                     | 47.0                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | B                                                                                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                     | A                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 21.7                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                     |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.69                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                     |                                                                                     |                                                                                     | 18.0                                                                                |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 80.7%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                     |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

Future No-Build PM

## 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)

11/16/2016

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations     |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 193                                                                               | 871                                                                               | 75                                                                                | 301                                                                               | 612                                                                               | 237                                                                               | 114                                                                                | 356                                                                                 | 356                                                                                 | 173                                                                                 | 160                                                                                 | 103                                                                                 |
| Future Volume (vph)     | 193                                                                               | 871                                                                               | 75                                                                                | 301                                                                               | 612                                                                               | 237                                                                               | 114                                                                                | 356                                                                                 | 356                                                                                 | 173                                                                                 | 160                                                                                 | 103                                                                                 |
| Lane Group Flow (vph)   | 222                                                                               | 1075                                                                              | 89                                                                                | 338                                                                               | 703                                                                               | 279                                                                               | 123                                                                                | 445                                                                                 | 424                                                                                 | 184                                                                                 | 193                                                                                 | 110                                                                                 |
| Turn Type               | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                              | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases        | 5                                                                                 | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   | 3                                                                                  | 8                                                                                   |                                                                                     | 7                                                                                   | 4                                                                                   |                                                                                     |
| Permitted Phases        | 2                                                                                 |                                                                                   | 2                                                                                 | 6                                                                                 |                                                                                   | 6                                                                                 | 8                                                                                  |                                                                                     | 8                                                                                   | 4                                                                                   |                                                                                     | 4                                                                                   |
| Detector Phase          | 5                                                                                 | 2                                                                                 | 2                                                                                 | 1                                                                                 | 6                                                                                 | 6                                                                                 | 3                                                                                  | 8                                                                                   | 8                                                                                   | 7                                                                                   | 4                                                                                   | 4                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 4.0                                                                               | 15.0                                                                              | 15.0                                                                              | 4.0                                                                               | 15.0                                                                              | 15.0                                                                              | 4.0                                                                                | 6.0                                                                                 | 6.0                                                                                 | 4.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Minimum Split (s)       | 11.0                                                                              | 37.0                                                                              | 37.0                                                                              | 11.0                                                                              | 37.0                                                                              | 37.0                                                                              | 11.0                                                                               | 42.0                                                                                | 42.0                                                                                | 11.0                                                                                | 42.0                                                                                | 42.0                                                                                |
| Total Split (s)         | 22.0                                                                              | 43.0                                                                              | 43.0                                                                              | 23.0                                                                              | 44.0                                                                              | 44.0                                                                              | 12.0                                                                               | 42.0                                                                                | 42.0                                                                                | 12.0                                                                                | 42.0                                                                                | 42.0                                                                                |
| Total Split (%)         | 18.3%                                                                             | 35.8%                                                                             | 35.8%                                                                             | 19.2%                                                                             | 36.7%                                                                             | 36.7%                                                                             | 10.0%                                                                              | 35.0%                                                                               | 35.0%                                                                               | 10.0%                                                                               | 35.0%                                                                               | 35.0%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Lost Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lead/Lag                | Lead                                                                              | Lag                                                                               | Lag                                                                               | Lead                                                                              | Lag                                                                               | Lag                                                                               | Lead                                                                               | Lag                                                                                 | Lag                                                                                 | Lead                                                                                | Lag                                                                                 | Lag                                                                                 |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | C-Min                                                                             | C-Min                                                                             | None                                                                              | C-Min                                                                             | C-Min                                                                             | None                                                                               | None                                                                                | None                                                                                | None                                                                                | None                                                                                | None                                                                                |
| v/c Ratio               | 0.58                                                                              | 0.89                                                                              | 0.15                                                                              | 1.07                                                                              | 0.53                                                                              | 0.37                                                                              | 0.33                                                                               | 0.88                                                                                | 0.64                                                                                | 1.12                                                                                | 0.39                                                                                | 0.21                                                                                |
| Control Delay           | 23.1                                                                              | 48.4                                                                              | 1.7                                                                               | 105.7                                                                             | 23.1                                                                              | 4.1                                                                               | 18.9                                                                               | 53.3                                                                                | 17.1                                                                                | 135.2                                                                               | 37.4                                                                                | 3.7                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 23.1                                                                              | 48.4                                                                              | 1.7                                                                               | 105.7                                                                             | 23.1                                                                              | 4.1                                                                               | 18.9                                                                               | 53.3                                                                                | 17.1                                                                                | 135.2                                                                               | 37.4                                                                                | 3.7                                                                                 |
| Queue Length 50th (ft)  | 93                                                                                | 424                                                                               | 0                                                                                 | ~227                                                                              | 282                                                                               | 44                                                                                | 58                                                                                 | 339                                                                                 | 188                                                                                 | ~107                                                                                | 119                                                                                 | 0                                                                                   |
| Queue Length 95th (ft)  | 141                                                                               | 451                                                                               | 5                                                                                 | #419                                                                              | 303                                                                               | 23                                                                                | 88                                                                                 | 405                                                                                 | 254                                                                                 | #230                                                                                | 168                                                                                 | 27                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 1576                                                                              |                                                                                   |                                                                                   | 3513                                                                              |                                                                                   |                                                                                    | 1183                                                                                |                                                                                     |                                                                                     | 1183                                                                                |                                                                                     |
| Turn Bay Length (ft)    | 250                                                                               |                                                                                   | 370                                                                               | 300                                                                               |                                                                                   | 310                                                                               |                                                                                    |                                                                                     | 500                                                                                 | 300                                                                                 |                                                                                     | 215                                                                                 |
| Base Capacity (vph)     | 426                                                                               | 1213                                                                              | 612                                                                               | 315                                                                               | 1328                                                                              | 753                                                                               | 370                                                                                | 558                                                                                 | 697                                                                                 | 165                                                                                 | 543                                                                                 | 574                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.52                                                                              | 0.89                                                                              | 0.15                                                                              | 1.07                                                                              | 0.53                                                                              | 0.37                                                                              | 0.33                                                                               | 0.80                                                                                | 0.61                                                                                | 1.12                                                                                | 0.36                                                                                | 0.19                                                                                |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 68 (57%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

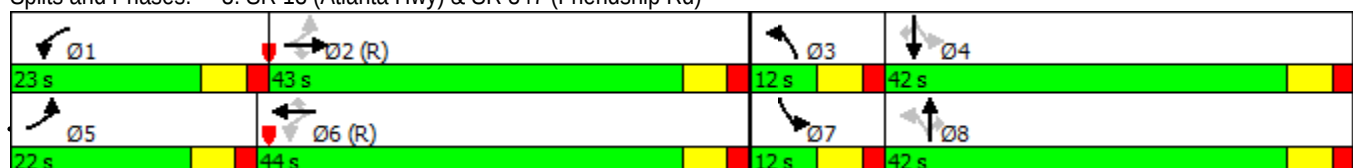
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

## Splits and Phases: 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)



# HCM Signalized Intersection Capacity Analysis

## 3: SR 13 (Atlanta Hwy) & SR 347 (Friendship Rd)

Future No-Build PM

11/16/2016

|                        |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement               | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations    |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)   | 193                                                                               | 871                                                                               | 75                                                                                | 301                                                                               | 612                                                                               | 237                                                                               | 114                                                                                 | 356                                                                                 | 356                                                                                 | 173                                                                                 | 160                                                                                 | 103                                                                                 |
| Future Volume (vph)    | 193                                                                               | 871                                                                               | 75                                                                                | 301                                                                               | 612                                                                               | 237                                                                               | 114                                                                                 | 356                                                                                 | 356                                                                                 | 173                                                                                 | 160                                                                                 | 103                                                                                 |
| Ideal Flow (vphpl)     | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)    | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor      | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Frt                    | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected          | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)      | 1805                                                                              | 3610                                                                              | 1553                                                                              | 1787                                                                              | 3610                                                                              | 1568                                                                              | 1787                                                                                | 1863                                                                                | 1599                                                                                | 1752                                                                                | 1810                                                                                | 1599                                                                                |
| Flt Permitted          | 0.29                                                                              | 1.00                                                                              | 1.00                                                                              | 0.09                                                                              | 1.00                                                                              | 1.00                                                                              | 0.55                                                                                | 1.00                                                                                | 1.00                                                                                | 0.15                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)      | 552                                                                               | 3610                                                                              | 1553                                                                              | 171                                                                               | 3610                                                                              | 1568                                                                              | 1033                                                                                | 1863                                                                                | 1599                                                                                | 286                                                                                 | 1810                                                                                | 1599                                                                                |
| Peak-hour factor, PHF  | 0.87                                                                              | 0.81                                                                              | 0.84                                                                              | 0.89                                                                              | 0.87                                                                              | 0.85                                                                              | 0.93                                                                                | 0.80                                                                                | 0.84                                                                                | 0.94                                                                                | 0.83                                                                                | 0.94                                                                                |
| Adj. Flow (vph)        | 222                                                                               | 1075                                                                              | 89                                                                                | 338                                                                               | 703                                                                               | 279                                                                               | 123                                                                                 | 445                                                                                 | 424                                                                                 | 184                                                                                 | 193                                                                                 | 110                                                                                 |
| RTOR Reduction (vph)   | 0                                                                                 | 0                                                                                 | 59                                                                                | 0                                                                                 | 0                                                                                 | 176                                                                               | 0                                                                                   | 0                                                                                   | 226                                                                                 | 0                                                                                   | 0                                                                                   | 80                                                                                  |
| Lane Group Flow (vph)  | 222                                                                               | 1075                                                                              | 30                                                                                | 338                                                                               | 703                                                                               | 103                                                                               | 123                                                                                 | 445                                                                                 | 198                                                                                 | 184                                                                                 | 193                                                                                 | 30                                                                                  |
| Heavy Vehicles (%)     | 0%                                                                                | 0%                                                                                | 4%                                                                                | 1%                                                                                | 0%                                                                                | 3%                                                                                | 1%                                                                                  | 2%                                                                                  | 1%                                                                                  | 3%                                                                                  | 5%                                                                                  | 1%                                                                                  |
| Turn Type              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                               | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases       | 5                                                                                 | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   | 3                                                                                   | 8                                                                                   |                                                                                     | 7                                                                                   | 4                                                                                   |                                                                                     |
| Permitted Phases       | 2                                                                                 |                                                                                   | 2                                                                                 | 6                                                                                 |                                                                                   | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   | 4                                                                                   |                                                                                     | 4                                                                                   |
| Actuated Green, G (s)  | 53.5                                                                              | 40.3                                                                              | 40.3                                                                              | 61.1                                                                              | 44.1                                                                              | 44.1                                                                              | 38.7                                                                                | 32.7                                                                                | 32.7                                                                                | 38.7                                                                                | 32.7                                                                                | 32.7                                                                                |
| Effective Green, g (s) | 53.5                                                                              | 40.3                                                                              | 40.3                                                                              | 61.1                                                                              | 44.1                                                                              | 44.1                                                                              | 38.7                                                                                | 32.7                                                                                | 32.7                                                                                | 38.7                                                                                | 32.7                                                                                | 32.7                                                                                |
| Actuated g/C Ratio     | 0.45                                                                              | 0.34                                                                              | 0.34                                                                              | 0.51                                                                              | 0.37                                                                              | 0.37                                                                              | 0.32                                                                                | 0.27                                                                                | 0.27                                                                                | 0.32                                                                                | 0.27                                                                                | 0.27                                                                                |
| Clearance Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)  | 3.0                                                                               | 5.0                                                                               | 5.0                                                                               | 3.0                                                                               | 5.0                                                                               | 5.0                                                                               | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 |
| Lane Grp Cap (vph)     | 383                                                                               | 1212                                                                              | 521                                                                               | 316                                                                               | 1326                                                                              | 576                                                                               | 370                                                                                 | 507                                                                                 | 435                                                                                 | 165                                                                                 | 493                                                                                 | 435                                                                                 |
| v/s Ratio Prot         | 0.06                                                                              | 0.30                                                                              |                                                                                   | c0.15                                                                             | c0.19                                                                             |                                                                                   | 0.02                                                                                | 0.24                                                                                |                                                                                     | c0.06                                                                               | 0.11                                                                                |                                                                                     |
| v/s Ratio Perm         | 0.19                                                                              |                                                                                   | 0.02                                                                              | c0.39                                                                             |                                                                                   | 0.07                                                                              | 0.09                                                                                |                                                                                     | 0.12                                                                                | c0.30                                                                               |                                                                                     | 0.02                                                                                |
| v/c Ratio              | 0.58                                                                              | 0.89                                                                              | 0.06                                                                              | 1.07                                                                              | 0.53                                                                              | 0.18                                                                              | 0.33                                                                                | 0.88                                                                                | 0.45                                                                                | 1.12                                                                                | 0.39                                                                                | 0.07                                                                                |
| Uniform Delay, d1      | 21.6                                                                              | 37.7                                                                              | 27.0                                                                              | 37.2                                                                              | 29.8                                                                              | 25.7                                                                              | 29.7                                                                                | 41.7                                                                                | 36.2                                                                                | 38.7                                                                                | 35.5                                                                                | 32.4                                                                                |
| Progression Factor     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.10                                                                              | 0.69                                                                              | 0.78                                                                              | 0.65                                                                                | 0.83                                                                                | 1.27                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Incremental Delay, d2  | 2.1                                                                               | 9.8                                                                               | 0.2                                                                               | 68.2                                                                              | 1.4                                                                               | 0.6                                                                               | 0.5                                                                                 | 15.2                                                                                | 0.7                                                                                 | 104.3                                                                               | 0.5                                                                                 | 0.1                                                                                 |
| Delay (s)              | 23.7                                                                              | 47.5                                                                              | 27.2                                                                              | 109.0                                                                             | 22.1                                                                              | 20.5                                                                              | 19.7                                                                                | 49.9                                                                                | 46.7                                                                                | 143.0                                                                               | 36.1                                                                                | 32.4                                                                                |
| Level of Service       | C                                                                                 | D                                                                                 | C                                                                                 | F                                                                                 | C                                                                                 | C                                                                                 | B                                                                                   | D                                                                                   | D                                                                                   | F                                                                                   | D                                                                                   | C                                                                                   |
| Approach Delay (s)     |                                                                                   | 42.4                                                                              |                                                                                   |                                                                                   | 44.0                                                                              |                                                                                   |                                                                                     | 44.8                                                                                |                                                                                     |                                                                                     | 75.6                                                                                |                                                                                     |
| Approach LOS           |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                     | D                                                                                   |                                                                                     |                                                                                     | E                                                                                   |                                                                                     |

### Intersection Summary

|                                   |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 47.3  | HCM 2000 Level of Service | D    |
| HCM 2000 Volume to Capacity ratio | 1.12  |                           |      |
| Actuated Cycle Length (s)         | 120.0 | Sum of lost time (s)      | 24.0 |
| Intersection Capacity Utilization | 89.1% | ICU Level of Service      | E    |
| Analysis Period (min)             | 15    |                           |      |
| c Critical Lane Group             |       |                           |      |

## Queues

Future No-Build PM

## 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) &amp; Relocated Thunder Rd/Roy Carlson Blvd 11/16/2016



| Lane Group              | EBT   | WBL   | WBT   | NBL   | NBT   | NBR   | SBL   | SBT   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↔     | ↔     | ↔     | ↔     | ↔     | ↔     | ↔     | ↔     |
| Traffic Volume (vph)    | 12    | 80    | 14    | 18    | 778   | 21    | 15    | 471   |
| Future Volume (vph)     | 12    | 80    | 14    | 18    | 778   | 21    | 15    | 471   |
| Lane Group Flow (vph)   | 68    | 99    | 175   | 20    | 884   | 28    | 30    | 589   |
| Turn Type               | NA    | Perm  | NA    | Perm  | NA    | Perm  | Perm  | NA    |
| Protected Phases        | 4     |       | 8     |       | 2     |       |       | 6     |
| Permitted Phases        |       | 8     |       | 2     |       | 2     | 6     |       |
| Detector Phase          | 4     | 8     | 8     | 2     | 2     | 2     | 6     | 6     |
| Switch Phase            |       |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 6.0   | 6.0   | 6.0   | 15.0  | 15.0  | 15.0  | 15.0  | 15.0  |
| Minimum Split (s)       | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 41.0  | 41.0  | 41.0  | 79.0  | 79.0  | 79.0  | 79.0  | 79.0  |
| Total Split (%)         | 34.2% | 34.2% | 34.2% | 65.8% | 65.8% | 65.8% | 65.8% | 65.8% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                |       |       |       |       |       |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |       |
| Recall Mode             | None  | None  | None  | C-Min | C-Min | C-Min | C-Min | C-Min |
| v/c Ratio               | 0.26  | 0.63  | 0.51  | 0.03  | 0.32  | 0.02  | 0.07  | 0.21  |
| Control Delay           | 18.0  | 66.9  | 14.3  | 0.8   | 0.9   | 0.0   | 5.8   | 5.8   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 18.0  | 66.9  | 14.3  | 0.8   | 0.9   | 0.0   | 5.8   | 5.8   |
| Queue Length 50th (ft)  | 9     | 74    | 10    | 1     | 12    | 0     | 7     | 78    |
| Queue Length 95th (ft)  | 49    | 112   | 73    | m2    | 18    | 0     | m8    | m84   |
| Internal Link Dist (ft) | 491   |       | 1743  |       | 2367  |       |       | 498   |
| Turn Bay Length (ft)    |       |       |       | 375   |       | 375   | 200   |       |
| Base Capacity (vph)     | 532   | 369   | 591   | 634   | 2747  | 1189  | 457   | 2747  |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.13  | 0.27  | 0.30  | 0.03  | 0.32  | 0.02  | 0.07  | 0.21  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

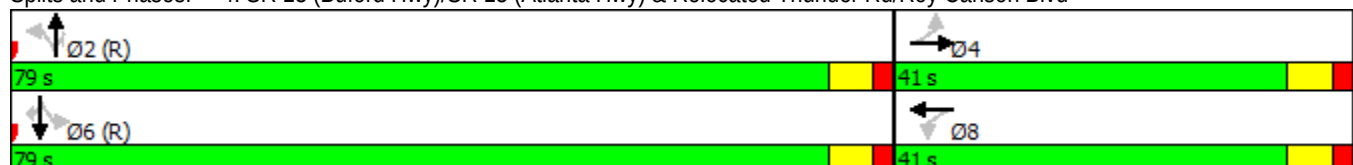
Offset: 15 (13%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) &amp; Relocated Thunder Rd/Roy Carlson Blvd



# HCM Signalized Intersection Capacity Analysis

Future No-Build PM

4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) & Relocated Thunder Rd/Roy Carlson Blvd 11/16/2016

|                                   |  |  |  |  |  |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (vph)              | 0                                                                                 | 12                                                                                | 51                                                                                | 80                                                                                | 14                                                                                | 91                                                                                | 18                                                                                  | 778                                                                                 | 21                                                                                  | 15                                                                                  | 471                                                                                 | 0                                                                                   |
| Future Volume (vph)               | 0                                                                                 | 12                                                                                | 51                                                                                | 80                                                                                | 14                                                                                | 91                                                                                | 18                                                                                  | 778                                                                                 | 21                                                                                  | 15                                                                                  | 471                                                                                 | 0                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Lane Util. Factor                 |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                |                                                                                     |
| Frt                               |                                                                                   | 0.89                                                                              |                                                                                   | 1.00                                                                              | 0.86                                                                              |                                                                                   | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Flt Protected                     |                                                                                   | 1.00                                                                              |                                                                                   | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (prot)                 |                                                                                   | 1693                                                                              |                                                                                   | 1687                                                                              | 1639                                                                              |                                                                                   | 1805                                                                                | 3539                                                                                | 1524                                                                                | 1805                                                                                | 3539                                                                                |                                                                                     |
| Flt Permitted                     |                                                                                   | 1.00                                                                              |                                                                                   | 0.71                                                                              | 1.00                                                                              |                                                                                   | 0.43                                                                                | 1.00                                                                                | 1.00                                                                                | 0.31                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (perm)                 |                                                                                   | 1693                                                                              |                                                                                   | 1266                                                                              | 1639                                                                              |                                                                                   | 816                                                                                 | 3539                                                                                | 1524                                                                                | 589                                                                                 | 3539                                                                                |                                                                                     |
| Peak-hour factor, PHF             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.81                                                                              | 0.92                                                                              | 0.57                                                                              | 0.92                                                                                | 0.88                                                                                | 0.75                                                                                | 0.50                                                                                | 0.80                                                                                | 0.92                                                                                |
| Adj. Flow (vph)                   | 0                                                                                 | 13                                                                                | 55                                                                                | 99                                                                                | 15                                                                                | 160                                                                               | 20                                                                                  | 884                                                                                 | 28                                                                                  | 30                                                                                  | 589                                                                                 | 0                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 48                                                                                | 0                                                                                 | 0                                                                                 | 140                                                                               | 0                                                                                 | 0                                                                                   | 0                                                                                   | 6                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 0                                                                                 | 20                                                                                | 0                                                                                 | 99                                                                                | 35                                                                                | 0                                                                                 | 20                                                                                  | 884                                                                                 | 22                                                                                  | 30                                                                                  | 589                                                                                 | 0                                                                                   |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 7%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                  | 2%                                                                                  | 6%                                                                                  | 0%                                                                                  | 2%                                                                                  | 0%                                                                                  |
| Turn Type                         |                                                                                   | NA                                                                                |                                                                                   | Perm                                                                              | NA                                                                                |                                                                                   | Perm                                                                                | NA                                                                                  | Perm                                                                                | Perm                                                                                | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                   | 2                                                                                   |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 14.8                                                                              |                                                                                   | 14.8                                                                              | 14.8                                                                              |                                                                                   | 93.2                                                                                | 93.2                                                                                | 93.2                                                                                | 93.2                                                                                | 93.2                                                                                |                                                                                     |
| Effective Green, g (s)            |                                                                                   | 14.8                                                                              |                                                                                   | 14.8                                                                              | 14.8                                                                              |                                                                                   | 93.2                                                                                | 93.2                                                                                | 93.2                                                                                | 93.2                                                                                | 93.2                                                                                |                                                                                     |
| Actuated g/C Ratio                |                                                                                   | 0.12                                                                              |                                                                                   | 0.12                                                                              | 0.12                                                                              |                                                                                   | 0.78                                                                                | 0.78                                                                                | 0.78                                                                                | 0.78                                                                                | 0.78                                                                                |                                                                                     |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Vehicle Extension (s)             |                                                                                   | 3.0                                                                               |                                                                                   | 3.0                                                                               | 3.0                                                                               |                                                                                   | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |                                                                                     |
| Lane Grp Cap (vph)                |                                                                                   | 208                                                                               |                                                                                   | 156                                                                               | 202                                                                               |                                                                                   | 633                                                                                 | 2748                                                                                | 1183                                                                                | 457                                                                                 | 2748                                                                                |                                                                                     |
| v/s Ratio Prot                    |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   | 0.02                                                                              |                                                                                   |                                                                                     | 0.25                                                                                |                                                                                     |                                                                                     | 0.17                                                                                |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                   |                                                                                   | 0.08                                                                              |                                                                                   |                                                                                   | 0.02                                                                                |                                                                                     | 0.01                                                                                | 0.05                                                                                |                                                                                     |                                                                                     |
| v/c Ratio                         |                                                                                   | 0.10                                                                              |                                                                                   | 0.63                                                                              | 0.17                                                                              |                                                                                   | 0.03                                                                                | 0.32                                                                                | 0.02                                                                                | 0.07                                                                                | 0.21                                                                                |                                                                                     |
| Uniform Delay, d1                 |                                                                                   | 46.7                                                                              |                                                                                   | 50.0                                                                              | 47.1                                                                              |                                                                                   | 3.1                                                                                 | 4.0                                                                                 | 3.0                                                                                 | 3.2                                                                                 | 3.6                                                                                 |                                                                                     |
| Progression Factor                |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.17                                                                                | 0.14                                                                                | 0.00                                                                                | 1.32                                                                                | 1.40                                                                                |                                                                                     |
| Incremental Delay, d2             |                                                                                   | 0.2                                                                               |                                                                                   | 8.2                                                                               | 0.4                                                                               |                                                                                   | 0.1                                                                                 | 0.3                                                                                 | 0.0                                                                                 | 0.2                                                                                 | 0.1                                                                                 |                                                                                     |
| Delay (s)                         |                                                                                   | 46.9                                                                              |                                                                                   | 58.2                                                                              | 47.5                                                                              |                                                                                   | 0.6                                                                                 | 0.9                                                                                 | 0.0                                                                                 | 4.4                                                                                 | 5.2                                                                                 |                                                                                     |
| Level of Service                  |                                                                                   | D                                                                                 |                                                                                   | E                                                                                 | D                                                                                 |                                                                                   | A                                                                                   | A                                                                                   | A                                                                                   | A                                                                                   | A                                                                                   |                                                                                     |
| Approach Delay (s)                |                                                                                   | 46.9                                                                              |                                                                                   |                                                                                   | 51.4                                                                              |                                                                                   |                                                                                     | 0.8                                                                                 |                                                                                     |                                                                                     | 5.1                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                     | A                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 11.2                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                     |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.36                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                     |                                                                                     | 12.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 45.0%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

## 5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd

Future No-Build PM

11/16/2016

|                         |  |  |  |  |  |  |   |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 |
| Lane Configurations     |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 23                                                                                | 17                                                                                | 21                                                                                | 287                                                                               | 7                                                                                 | 118                                                                               | 6                                                                                   | 695                                                                                 | 384                                                                                 | 168                                                                                 | 490                                                                                 |
| Future Volume (vph)     | 23                                                                                | 17                                                                                | 21                                                                                | 287                                                                               | 7                                                                                 | 118                                                                               | 6                                                                                   | 695                                                                                 | 384                                                                                 | 168                                                                                 | 490                                                                                 |
| Lane Group Flow (vph)   | 0                                                                                 | 76                                                                                | 42                                                                                | 0                                                                                 | 331                                                                               | 148                                                                               | 12                                                                                  | 837                                                                                 | 404                                                                                 | 193                                                                                 | 605                                                                                 |
| Turn Type               | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                | Perm                                                                                | NA                                                                                  |
| Protected Phases        |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |
| Permitted Phases        | 4                                                                                 |                                                                                   | 4                                                                                 | 8                                                                                 |                                                                                   | 8                                                                                 | 2                                                                                   |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     |
| Detector Phase          | 4                                                                                 | 4                                                                                 | 4                                                                                 | 8                                                                                 | 8                                                                                 | 8                                                                                 | 2                                                                                   | 2                                                                                   | 2                                                                                   | 6                                                                                   | 6                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 15.0                                                                                | 15.0                                                                                | 15.0                                                                                | 15.0                                                                                | 15.0                                                                                |
| Minimum Split (s)       | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                                | 24.0                                                                                | 24.0                                                                                | 24.0                                                                                | 24.0                                                                                |
| Total Split (s)         | 48.0                                                                              | 48.0                                                                              | 48.0                                                                              | 48.0                                                                              | 48.0                                                                              | 48.0                                                                              | 72.0                                                                                | 72.0                                                                                | 72.0                                                                                | 72.0                                                                                | 72.0                                                                                |
| Total Split (%)         | 40.0%                                                                             | 40.0%                                                                             | 40.0%                                                                             | 40.0%                                                                             | 40.0%                                                                             | 40.0%                                                                             | 60.0%                                                                               | 60.0%                                                                               | 60.0%                                                                               | 60.0%                                                                               | 60.0%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    |                                                                                   | 0.0                                                                               | 0.0                                                                               |                                                                                   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Lost Time (s)     |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lead/Lag                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | C-Min                                                                               | C-Min                                                                               | C-Min                                                                               | C-Min                                                                               | C-Min                                                                               |
| v/c Ratio               |                                                                                   | 0.20                                                                              | 0.09                                                                              |                                                                                   | 0.88                                                                              | 0.26                                                                              | 0.03                                                                                | 0.39                                                                                | 0.35                                                                                | 0.57                                                                                | 0.28                                                                                |
| Control Delay           |                                                                                   | 31.3                                                                              | 8.3                                                                               |                                                                                   | 63.7                                                                              | 5.6                                                                               | 6.8                                                                                 | 6.2                                                                                 | 0.7                                                                                 | 18.5                                                                                | 6.1                                                                                 |
| Queue Delay             |                                                                                   | 0.0                                                                               | 0.0                                                                               |                                                                                   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             |                                                                                   | 31.3                                                                              | 8.3                                                                               |                                                                                   | 63.7                                                                              | 5.6                                                                               | 6.8                                                                                 | 6.2                                                                                 | 0.7                                                                                 | 18.5                                                                                | 6.1                                                                                 |
| Queue Length 50th (ft)  |                                                                                   | 44                                                                                | 0                                                                                 |                                                                                   | 240                                                                               | 1                                                                                 | 1                                                                                   | 52                                                                                  | 0                                                                                   | 82                                                                                  | 62                                                                                  |
| Queue Length 95th (ft)  |                                                                                   | 33                                                                                | 4                                                                                 |                                                                                   | 131                                                                               | 31                                                                                | m2                                                                                  | 68                                                                                  | m4                                                                                  | 216                                                                                 | 74                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 275                                                                               |                                                                                   |                                                                                   | 4179                                                                              |                                                                                   |                                                                                     | 3868                                                                                |                                                                                     |                                                                                     | 2104                                                                                |
| Turn Bay Length (ft)    |                                                                                   |                                                                                   | 105                                                                               |                                                                                   |                                                                                   | 250                                                                               | 230                                                                                 |                                                                                     | 230                                                                                 | 200                                                                                 |                                                                                     |
| Base Capacity (vph)     |                                                                                   | 447                                                                               | 565                                                                               |                                                                                   | 452                                                                               | 660                                                                               | 460                                                                                 | 2172                                                                                | 1140                                                                                | 339                                                                                 | 2130                                                                                |
| Starvation Cap Reductn  |                                                                                   | 0                                                                                 | 0                                                                                 |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   |                                                                                   | 0                                                                                 | 0                                                                                 |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     |                                                                                   | 0                                                                                 | 0                                                                                 |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       |                                                                                   | 0.17                                                                              | 0.07                                                                              |                                                                                   | 0.73                                                                              | 0.22                                                                              | 0.03                                                                                | 0.39                                                                                | 0.35                                                                                | 0.57                                                                                | 0.28                                                                                |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 60 (50%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd





# HCM Signalized Intersection Capacity Analysis

## 5: SR 13 (Buford Hwy) & Makita Co. Drwy/Thompson Mill Rd

Future No-Build PM

11/16/2016

|                                   |  |  |  |  |  |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)              | 23                                                                                | 17                                                                                | 21                                                                                | 287                                                                               | 7                                                                                 | 118                                                                               | 6                                                                                   | 695                                                                                 | 384                                                                                 | 168                                                                                 | 490                                                                                 | 0                                                                                   |
| Future Volume (vph)               | 23                                                                                | 17                                                                                | 21                                                                                | 287                                                                               | 7                                                                                 | 118                                                                               | 6                                                                                   | 695                                                                                 | 384                                                                                 | 168                                                                                 | 490                                                                                 | 0                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Lane Util. Factor                 |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                |                                                                                     |
| Frt                               |                                                                                   | 1.00                                                                              | 0.85                                                                              |                                                                                   | 1.00                                                                              | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Flt Protected                     |                                                                                   | 0.98                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                              | 1.00                                                                              | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (prot)                 |                                                                                   | 1860                                                                              | 1538                                                                              |                                                                                   | 1814                                                                              | 1615                                                                              | 1805                                                                                | 3574                                                                                | 1615                                                                                | 1805                                                                                | 3505                                                                                |                                                                                     |
| Flt Permitted                     |                                                                                   | 0.67                                                                              | 1.00                                                                              |                                                                                   | 0.68                                                                              | 1.00                                                                              | 0.40                                                                                | 1.00                                                                                | 1.00                                                                                | 0.29                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (perm)                 |                                                                                   | 1278                                                                              | 1538                                                                              |                                                                                   | 1295                                                                              | 1615                                                                              | 759                                                                                 | 3574                                                                                | 1615                                                                                | 559                                                                                 | 3505                                                                                |                                                                                     |
| Peak-hour factor, PHF             | 0.69                                                                              | 0.40                                                                              | 0.50                                                                              | 0.91                                                                              | 0.44                                                                              | 0.80                                                                              | 0.50                                                                                | 0.83                                                                                | 0.95                                                                                | 0.87                                                                                | 0.81                                                                                | 0.73                                                                                |
| Adj. Flow (vph)                   | 33                                                                                | 42                                                                                | 42                                                                                | 315                                                                               | 16                                                                                | 148                                                                               | 12                                                                                  | 837                                                                                 | 404                                                                                 | 193                                                                                 | 605                                                                                 | 0                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 30                                                                                | 0                                                                                 | 0                                                                                 | 104                                                                               | 0                                                                                   | 0                                                                                   | 158                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 0                                                                                 | 76                                                                                | 12                                                                                | 0                                                                                 | 331                                                                               | 44                                                                                | 12                                                                                  | 837                                                                                 | 246                                                                                 | 193                                                                                 | 605                                                                                 | 0                                                                                   |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 5%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                  | 1%                                                                                  | 0%                                                                                  | 0%                                                                                  | 3%                                                                                  | 0%                                                                                  |
| Turn Type                         | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                | Perm                                                                                | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   | 4                                                                                 | 8                                                                                 |                                                                                   | 8                                                                                 | 2                                                                                   |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 35.0                                                                              | 35.0                                                                              |                                                                                   | 35.0                                                                              | 35.0                                                                              | 73.0                                                                                | 73.0                                                                                | 73.0                                                                                | 73.0                                                                                | 73.0                                                                                |                                                                                     |
| Effective Green, g (s)            |                                                                                   | 35.0                                                                              | 35.0                                                                              |                                                                                   | 35.0                                                                              | 35.0                                                                              | 73.0                                                                                | 73.0                                                                                | 73.0                                                                                | 73.0                                                                                | 73.0                                                                                |                                                                                     |
| Actuated g/C Ratio                |                                                                                   | 0.29                                                                              | 0.29                                                                              |                                                                                   | 0.29                                                                              | 0.29                                                                              | 0.61                                                                                | 0.61                                                                                | 0.61                                                                                | 0.61                                                                                | 0.61                                                                                |                                                                                     |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Vehicle Extension (s)             |                                                                                   | 3.0                                                                               | 3.0                                                                               |                                                                                   | 3.0                                                                               | 3.0                                                                               | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |                                                                                     |
| Lane Grp Cap (vph)                |                                                                                   | 372                                                                               | 448                                                                               |                                                                                   | 377                                                                               | 471                                                                               | 461                                                                                 | 2174                                                                                | 982                                                                                 | 340                                                                                 | 2132                                                                                |                                                                                     |
| v/s Ratio Prot                    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     | 0.23                                                                                |                                                                                     |                                                                                     | 0.17                                                                                |                                                                                     |
| v/s Ratio Perm                    |                                                                                   | 0.06                                                                              | 0.01                                                                              |                                                                                   | 0.26                                                                              | 0.03                                                                              | 0.02                                                                                |                                                                                     | 0.15                                                                                | 0.35                                                                                |                                                                                     |                                                                                     |
| v/c Ratio                         |                                                                                   | 0.20                                                                              | 0.03                                                                              |                                                                                   | 0.88                                                                              | 0.09                                                                              | 0.03                                                                                | 0.39                                                                                | 0.25                                                                                | 0.57                                                                                | 0.28                                                                                |                                                                                     |
| Uniform Delay, d1                 |                                                                                   | 32.0                                                                              | 30.3                                                                              |                                                                                   | 40.5                                                                              | 30.9                                                                              | 9.4                                                                                 | 12.0                                                                                | 10.9                                                                                | 14.1                                                                                | 11.1                                                                                |                                                                                     |
| Progression Factor                |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.57                                                                                | 0.44                                                                                | 0.10                                                                                | 0.67                                                                                | 0.48                                                                                |                                                                                     |
| Incremental Delay, d2             |                                                                                   | 0.3                                                                               | 0.0                                                                               |                                                                                   | 20.0                                                                              | 0.1                                                                               | 0.1                                                                                 | 0.4                                                                                 | 0.4                                                                                 | 6.7                                                                                 | 0.3                                                                                 |                                                                                     |
| Delay (s)                         |                                                                                   | 32.3                                                                              | 30.4                                                                              |                                                                                   | 60.4                                                                              | 31.0                                                                              | 5.4                                                                                 | 5.7                                                                                 | 1.5                                                                                 | 16.0                                                                                | 5.7                                                                                 |                                                                                     |
| Level of Service                  |                                                                                   | C                                                                                 | C                                                                                 |                                                                                   | E                                                                                 | C                                                                                 | A                                                                                   | A                                                                                   | A                                                                                   | B                                                                                   | A                                                                                   |                                                                                     |
| Approach Delay (s)                |                                                                                   | 31.6                                                                              |                                                                                   |                                                                                   | 51.3                                                                              |                                                                                   |                                                                                     | 4.4                                                                                 |                                                                                     |                                                                                     | 8.2                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                     | A                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   | 15.2                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   | 0.67                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   | 69.6%                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

Future No-Build PM

6: SR 13 (Buford Hwy) &amp; S. Hill St/Hamilton Mill Rd

11/16/2016

|                         |  |  |  |  |  |  |   |  |  |  |  |
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| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | NBL                                                                               | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations     |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 78                                                                                | 279                                                                               | 55                                                                                | 405                                                                               | 222                                                                               | 83                                                                                | 884                                                                                 | 770                                                                                 | 268                                                                                 | 571                                                                                 | 44                                                                                  |
| Future Volume (vph)     | 78                                                                                | 279                                                                               | 55                                                                                | 405                                                                               | 222                                                                               | 83                                                                                | 884                                                                                 | 770                                                                                 | 268                                                                                 | 571                                                                                 | 44                                                                                  |
| Lane Group Flow (vph)   | 89                                                                                | 291                                                                               | 68                                                                                | 460                                                                               | 500                                                                               | 122                                                                               | 971                                                                                 | 837                                                                                 | 315                                                                                 | 680                                                                                 | 50                                                                                  |
| Turn Type               | Perm                                                                              | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                | pm+pt                                                                             | NA                                                                                  | Free                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases        |                                                                                   | 4                                                                                 |                                                                                   | 3                                                                                 | 8                                                                                 | 5                                                                                 | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases        | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 2                                                                                 |                                                                                     | Free                                                                                | 6                                                                                   |                                                                                     | 6                                                                                   |
| Detector Phase          | 4                                                                                 | 4                                                                                 | 4                                                                                 | 3                                                                                 | 8                                                                                 | 5                                                                                 | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   | 6                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 4.0                                                                               | 6.0                                                                               | 4.0                                                                               | 15.0                                                                                |                                                                                     | 4.0                                                                                 | 15.0                                                                                | 15.0                                                                                |
| Minimum Split (s)       | 41.0                                                                              | 41.0                                                                              | 41.0                                                                              | 11.0                                                                              | 46.0                                                                              | 11.0                                                                              | 37.0                                                                                |                                                                                     | 11.0                                                                                | 40.0                                                                                | 40.0                                                                                |
| Total Split (s)         | 41.0                                                                              | 41.0                                                                              | 41.0                                                                              | 22.0                                                                              | 63.0                                                                              | 15.0                                                                              | 37.0                                                                                |                                                                                     | 20.0                                                                                | 42.0                                                                                | 42.0                                                                                |
| Total Split (%)         | 34.2%                                                                             | 34.2%                                                                             | 34.2%                                                                             | 18.3%                                                                             | 52.5%                                                                             | 12.5%                                                                             | 30.8%                                                                               |                                                                                     | 16.7%                                                                               | 35.0%                                                                               | 35.0%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                 |                                                                                     | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                 |                                                                                     | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 |                                                                                     | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Lost Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lead/Lag                | Lag                                                                               | Lag                                                                               | Lag                                                                               | Lead                                                                              |                                                                                   | Lead                                                                              | Lag                                                                                 |                                                                                     | Lead                                                                                | Lag                                                                                 | Lag                                                                                 |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | C-Min                                                                               |                                                                                     | None                                                                                | C-Min                                                                               | C-Min                                                                               |
| v/c Ratio               | 0.50                                                                              | 0.77                                                                              | 0.16                                                                              | 1.04                                                                              | 0.72                                                                              | 0.35                                                                              | 0.78                                                                                | 0.53                                                                                | 1.11                                                                                | 0.48                                                                                | 0.07                                                                                |
| Control Delay           | 51.2                                                                              | 58.5                                                                              | 0.8                                                                               | 102.9                                                                             | 34.0                                                                              | 20.1                                                                              | 40.9                                                                                | 1.3                                                                                 | 109.4                                                                               | 26.4                                                                                | 0.9                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 51.2                                                                              | 58.5                                                                              | 0.8                                                                               | 102.9                                                                             | 34.0                                                                              | 20.1                                                                              | 40.9                                                                                | 1.3                                                                                 | 109.4                                                                               | 26.4                                                                                | 0.9                                                                                 |
| Queue Length 50th (ft)  | 62                                                                                | 215                                                                               | 0                                                                                 | ~197                                                                              | 295                                                                               | 47                                                                                | 350                                                                                 | 0                                                                                   | ~199                                                                                | 214                                                                                 | 1                                                                                   |
| Queue Length 95th (ft)  | 105                                                                               | 290                                                                               | 0                                                                                 | #292                                                                              | 350                                                                               | 69                                                                                | #525                                                                                | 0                                                                                   | #365                                                                                | 295                                                                                 | m7                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 657                                                                               |                                                                                   |                                                                                   | 1618                                                                              |                                                                                   | 1320                                                                                |                                                                                     |                                                                                     | 3868                                                                                |                                                                                     |
| Turn Bay Length (ft)    | 180                                                                               |                                                                                   | 300                                                                               | 250                                                                               |                                                                                   | 240                                                                               |                                                                                     | 1000                                                                                | 400                                                                                 |                                                                                     | 280                                                                                 |
| Base Capacity (vph)     | 260                                                                               | 554                                                                               | 567                                                                               | 444                                                                               | 844                                                                               | 357                                                                               | 1252                                                                                | 1568                                                                                | 284                                                                                 | 1405                                                                                | 723                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.34                                                                              | 0.53                                                                              | 0.12                                                                              | 1.04                                                                              | 0.59                                                                              | 0.34                                                                              | 0.78                                                                                | 0.53                                                                                | 1.11                                                                                | 0.48                                                                                | 0.07                                                                                |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 125

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.

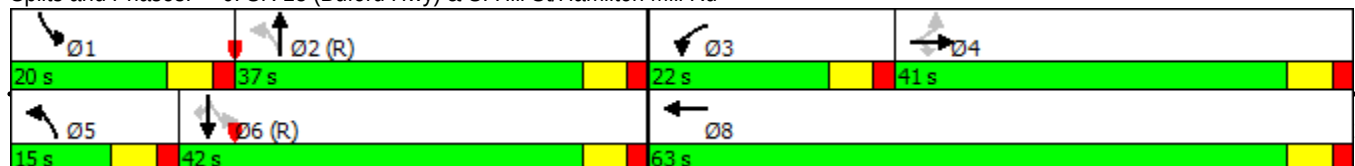
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: SR 13 (Buford Hwy) &amp; S. Hill St/Hamilton Mill Rd



# HCM Signalized Intersection Capacity Analysis

## 6: SR 13 (Buford Hwy) & S. Hill St/Hamilton Mill Rd

Future No-Build PM

11/16/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |  |  |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (vph)              | 78                                                                                | 279                                                                               | 55                                                                                | 405                                                                               | 222                                                                               | 189                                                                               | 83                                                                                 | 884                                                                                 | 770                                                                                 | 268                                                                                 | 571                                                                                 | 44                                                                                  |
| Future Volume (vph)               | 78                                                                                | 279                                                                               | 55                                                                                | 405                                                                               | 222                                                                               | 189                                                                               | 83                                                                                 | 884                                                                                 | 770                                                                                 | 268                                                                                 | 571                                                                                 | 44                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                | 6.0                                                                                 | 4.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.97                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                               | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |
| Frt                               | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 0.93                                                                              |                                                                                   | 1.00                                                                               | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                               | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)                 | 1805                                                                              | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1720                                                                              |                                                                                   | 1805                                                                               | 3574                                                                                | 1568                                                                                | 1770                                                                                | 3539                                                                                | 1615                                                                                |
| Flt Permitted                     | 0.47                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.33                                                                               | 1.00                                                                                | 1.00                                                                                | 0.11                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)                 | 893                                                                               | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1720                                                                              |                                                                                   | 634                                                                                | 3574                                                                                | 1568                                                                                | 198                                                                                 | 3539                                                                                | 1615                                                                                |
| Peak-hour factor, PHF             | 0.88                                                                              | 0.96                                                                              | 0.81                                                                              | 0.88                                                                              | 0.86                                                                              | 0.78                                                                              | 0.68                                                                               | 0.91                                                                                | 0.92                                                                                | 0.85                                                                                | 0.84                                                                                | 0.88                                                                                |
| Adj. Flow (vph)                   | 89                                                                                | 291                                                                               | 68                                                                                | 460                                                                               | 258                                                                               | 242                                                                               | 122                                                                                | 971                                                                                 | 837                                                                                 | 315                                                                                 | 680                                                                                 | 50                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 54                                                                                | 0                                                                                 | 33                                                                                | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 30                                                                                  |
| Lane Group Flow (vph)             | 89                                                                                | 291                                                                               | 14                                                                                | 460                                                                               | 467                                                                               | 0                                                                                 | 122                                                                                | 971                                                                                 | 837                                                                                 | 315                                                                                 | 680                                                                                 | 20                                                                                  |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 5%                                                                                | 1%                                                                                | 4%                                                                                | 0%                                                                                 | 1%                                                                                  | 3%                                                                                  | 2%                                                                                  | 2%                                                                                  | 0%                                                                                  |
| Turn Type                         | Perm                                                                              | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                |                                                                                   | pm+pt                                                                              | NA                                                                                  | Free                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   | 3                                                                                 | 8                                                                                 |                                                                                   | 5                                                                                  | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   |                                                                                   | 2                                                                                  |                                                                                     | Free                                                                                | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             | 23.9                                                                              | 23.9                                                                              | 23.9                                                                              | 16.0                                                                              | 45.9                                                                              |                                                                                   | 50.5                                                                               | 42.1                                                                                | 120.0                                                                               | 61.7                                                                                | 47.7                                                                                | 47.7                                                                                |
| Effective Green, g (s)            | 23.9                                                                              | 23.9                                                                              | 23.9                                                                              | 16.0                                                                              | 45.9                                                                              |                                                                                   | 50.5                                                                               | 42.1                                                                                | 120.0                                                                               | 61.7                                                                                | 47.7                                                                                | 47.7                                                                                |
| Actuated g/C Ratio                | 0.20                                                                              | 0.20                                                                              | 0.20                                                                              | 0.13                                                                              | 0.38                                                                              |                                                                                   | 0.42                                                                               | 0.35                                                                                | 1.00                                                                                | 0.51                                                                                | 0.40                                                                                | 0.40                                                                                |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)             | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               |                                                                                   | 3.0                                                                                | 5.0                                                                                 |                                                                                     | 3.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |
| Lane Grp Cap (vph)                | 177                                                                               | 378                                                                               | 321                                                                               | 444                                                                               | 657                                                                               |                                                                                   | 348                                                                                | 1253                                                                                | 1568                                                                                | 285                                                                                 | 1406                                                                                | 641                                                                                 |
| v/s Ratio Prot                    |                                                                                   | 0.15                                                                              |                                                                                   | c0.14                                                                             | c0.27                                                                             |                                                                                   | 0.02                                                                               | 0.27                                                                                |                                                                                     | c0.13                                                                               | 0.19                                                                                |                                                                                     |
| v/s Ratio Perm                    | 0.10                                                                              |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.12                                                                               |                                                                                     | c0.53                                                                               | c0.44                                                                               |                                                                                     | 0.01                                                                                |
| v/c Ratio                         | 0.50                                                                              | 0.77                                                                              | 0.04                                                                              | 1.04                                                                              | 0.71                                                                              |                                                                                   | 0.35                                                                               | 0.77                                                                                | 0.53                                                                                | 1.11                                                                                | 0.48                                                                                | 0.03                                                                                |
| Uniform Delay, d1                 | 42.8                                                                              | 45.4                                                                              | 38.8                                                                              | 52.0                                                                              | 31.4                                                                              |                                                                                   | 21.8                                                                               | 34.7                                                                                | 0.0                                                                                 | 32.6                                                                                | 27.0                                                                                | 22.1                                                                                |
| Progression Factor                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 0.76                                                                                | 0.89                                                                                | 1.00                                                                                |
| Incremental Delay, d2             | 2.2                                                                               | 9.1                                                                               | 0.1                                                                               | 52.3                                                                              | 3.6                                                                               |                                                                                   | 0.6                                                                                | 4.7                                                                                 | 1.3                                                                                 | 82.9                                                                                | 1.1                                                                                 | 0.1                                                                                 |
| Delay (s)                         | 45.0                                                                              | 54.6                                                                              | 38.9                                                                              | 104.3                                                                             | 35.0                                                                              |                                                                                   | 22.4                                                                               | 39.5                                                                                | 1.3                                                                                 | 107.7                                                                               | 25.0                                                                                | 22.1                                                                                |
| Level of Service                  | D                                                                                 | D                                                                                 | D                                                                                 | F                                                                                 | D                                                                                 |                                                                                   | C                                                                                  | D                                                                                   | A                                                                                   | F                                                                                   | C                                                                                   | C                                                                                   |
| Approach Delay (s)                |                                                                                   | 50.3                                                                              |                                                                                   |                                                                                   | 68.2                                                                              |                                                                                   |                                                                                    | 21.8                                                                                |                                                                                     |                                                                                     | 49.8                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                    | C                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 41.6                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                    |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 1.05                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                    |                                                                                     | 24.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 87.5%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                    |                                                                                     | E                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM Unsignalized Intersection Capacity Analysis

## 7: Pvt. Drwy/Bryant Rd & Thompson Mill Rd

Future No-Build PM

11/16/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                    |  |                                                                                     |                                                                                     |  |                                                                                     |
| Traffic Volume (veh/h)            | 5                                                                                 | 512                                                                               | 0                                                                                 | 0                                                                                 | 292                                                                               | 7                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 28                                                                                  | 0                                                                                   | 8                                                                                   |
| Future Volume (Veh/h)             | 5                                                                                 | 512                                                                               | 0                                                                                 | 0                                                                                 | 292                                                                               | 7                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 28                                                                                  | 0                                                                                   | 8                                                                                   |
| Sign Control                      |                                                                                   | Free                                                                              |                                                                                   |                                                                                   | Free                                                                              |                                                                                   |                                                                                    | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Grade                             |                                                                                   | 0%                                                                                |                                                                                   |                                                                                   | 0%                                                                                |                                                                                   |                                                                                    | 0%                                                                                  |                                                                                     |                                                                                     | 0%                                                                                  |                                                                                     |
| Peak Hour Factor                  | 0.31                                                                              | 0.80                                                                              | 0.25                                                                              | 0.92                                                                              | 0.96                                                                              | 0.58                                                                              | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.61                                                                                | 0.92                                                                                | 0.67                                                                                |
| Hourly flow rate (vph)            | 16                                                                                | 640                                                                               | 0                                                                                 | 0                                                                                 | 304                                                                               | 12                                                                                | 0                                                                                  | 0                                                                                   | 0                                                                                   | 46                                                                                  | 0                                                                                   | 12                                                                                  |
| Pedestrians                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane Width (ft)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Walking Speed (ft/s)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Percent Blockage                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Right turn flare (veh)            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median type                       |                                                                                   | None                                                                              |                                                                                   |                                                                                   | None                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median storage (veh)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Upstream signal (ft)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| pX, platoon unblocked             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC, conflicting volume            | 316                                                                               |                                                                                   |                                                                                   | 640                                                                               |                                                                                   |                                                                                   | 994                                                                                | 988                                                                                 | 640                                                                                 | 982                                                                                 | 982                                                                                 | 310                                                                                 |
| vC1, stage 1 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC2, stage 2 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vCu, unblocked vol                | 316                                                                               |                                                                                   |                                                                                   | 640                                                                               |                                                                                   |                                                                                   | 994                                                                                | 988                                                                                 | 640                                                                                 | 982                                                                                 | 982                                                                                 | 310                                                                                 |
| tC, single (s)                    | 4.1                                                                               |                                                                                   |                                                                                   | 4.1                                                                               |                                                                                   |                                                                                   | 7.1                                                                                | 6.5                                                                                 | 6.2                                                                                 | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 |
| tC, 2 stage (s)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| tF (s)                            | 2.2                                                                               |                                                                                   |                                                                                   | 2.2                                                                               |                                                                                   |                                                                                   | 3.5                                                                                | 4.0                                                                                 | 3.3                                                                                 | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 |
| p0 queue free %                   | 99                                                                                |                                                                                   |                                                                                   | 100                                                                               |                                                                                   |                                                                                   | 100                                                                                | 100                                                                                 | 100                                                                                 | 80                                                                                  | 100                                                                                 | 98                                                                                  |
| cM capacity (veh/h)               | 1256                                                                              |                                                                                   |                                                                                   | 954                                                                               |                                                                                   |                                                                                   | 220                                                                                | 246                                                                                 | 479                                                                                 | 228                                                                                 | 248                                                                                 | 735                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total                      | 656                                                                               | 316                                                                               | 0                                                                                 | 58                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left                       | 16                                                                                | 0                                                                                 | 0                                                                                 | 46                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right                      | 0                                                                                 | 12                                                                                | 0                                                                                 | 12                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| cSH                               | 1256                                                                              | 954                                                                               | 1700                                                                              | 266                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume to Capacity                | 0.01                                                                              | 0.00                                                                              | 0.00                                                                              | 0.22                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Queue Length 95th (ft)            | 1                                                                                 | 0                                                                                 | 0                                                                                 | 20                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 0.4                                                                               | 0.0                                                                               | 0.0                                                                               | 22.3                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane LOS                          | A                                                                                 |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 0.4                                                                               | 0.0                                                                               | 0.0                                                                               | 22.3                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Average Delay                     |                                                                                   |                                                                                   | 1.5                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 40.9%                                                                             |                                                                                   | ICU Level of Service                                                              |                                                                                   |                                                                                    |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM Unsignalized Intersection Capacity Analysis 8: N. Bogan Rd & Thompson Mill Rd

Future No-Build PM

11/16/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                    |  |                                                                                     |                                                                                     |  |                                                                                     |
| Sign Control                      |                                                                                   | Stop                                                                              |                                                                                   |                                                                                   | Stop                                                                              |                                                                                   |                                                                                    | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Traffic Volume (vph)              | 74                                                                                | 343                                                                               | 112                                                                               | 58                                                                                | 167                                                                               | 15                                                                                | 74                                                                                 | 150                                                                                 | 87                                                                                  | 15                                                                                  | 158                                                                                 | 50                                                                                  |
| Future Volume (vph)               | 74                                                                                | 343                                                                               | 112                                                                               | 58                                                                                | 167                                                                               | 15                                                                                | 74                                                                                 | 150                                                                                 | 87                                                                                  | 15                                                                                  | 158                                                                                 | 50                                                                                  |
| Peak Hour Factor                  | 0.83                                                                              | 0.90                                                                              | 0.79                                                                              | 0.92                                                                              | 0.86                                                                              | 0.88                                                                              | 0.92                                                                               | 0.81                                                                                | 0.77                                                                                | 0.70                                                                                | 0.75                                                                                | 0.80                                                                                |
| Hourly flow rate (vph)            | 89                                                                                | 381                                                                               | 142                                                                               | 63                                                                                | 194                                                                               | 17                                                                                | 80                                                                                 | 185                                                                                 | 113                                                                                 | 21                                                                                  | 211                                                                                 | 63                                                                                  |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total (vph)                | 612                                                                               | 274                                                                               | 378                                                                               | 295                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left (vph)                 | 89                                                                                | 63                                                                                | 80                                                                                | 21                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right (vph)                | 142                                                                               | 17                                                                                | 113                                                                               | 63                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Hadj (s)                          | -0.11                                                                             | 0.01                                                                              | -0.13                                                                             | -0.11                                                                             |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Departure Headway (s)             | 7.6                                                                               | 8.3                                                                               | 7.8                                                                               | 8.1                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Degree Utilization, x             | 1.28                                                                              | 0.63                                                                              | 0.82                                                                              | 0.66                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Capacity (veh/h)                  | 464                                                                               | 408                                                                               | 442                                                                               | 420                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 166.2                                                                             | 24.3                                                                              | 37.0                                                                              | 25.7                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 166.2                                                                             | 24.3                                                                              | 37.0                                                                              | 25.7                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      | F                                                                                 | C                                                                                 | E                                                                                 | D                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Delay                             |                                                                                   |                                                                                   |                                                                                   | 83.3                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  |                                                                                   |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   |                                                                                   | 73.2%                                                                             | ICU Level of Service                                                              | D                                                                                 |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

Intersection: 8: N. Bogan Rd & Thompson Mill Rd

| Movement              | EB   | WB   | NB  | SB  |
|-----------------------|------|------|-----|-----|
| Directions Served     | LTR  | LTR  | LTR | LTR |
| Maximum Queue (ft)    | 176  | 73   | 128 | 76  |
| Average Queue (ft)    | 105  | 49   | 80  | 52  |
| 95th Queue (ft)       | 171  | 82   | 125 | 76  |
| Link Distance (ft)    | 2455 | 1031 | 846 | 592 |
| Upstream Blk Time (%) |      |      |     |     |
| Queuing Penalty (veh) |      |      |     |     |
| Storage Bay Dist (ft) |      |      |     |     |
| Storage Blk Time (%)  |      |      |     |     |
| Queuing Penalty (veh) |      |      |     |     |

**Future “No-Build” Improved  
Intersection Analysis**

## Queues

## Future No-Build AM - Improved

## 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)

11/16/2016



| Lane Group              | EBL   | EBT   | WBT   | WBR   | NBL   | NBT   | NBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     |       |       |       |       |       |       |       |
| Traffic Volume (vph)    | 373   | 407   | 1265  | 328   | 318   | 4     | 87    |
| Future Volume (vph)     | 373   | 407   | 1265  | 328   | 318   | 4     | 87    |
| Lane Group Flow (vph)   | 439   | 433   | 1471  | 426   | 189   | 189   | 121   |
| Turn Type               | Prot  | NA    | NA    | Perm  | Perm  | NA    | Perm  |
| Protected Phases        | 5     | 2     | 6     |       |       | 8     |       |
| Permitted Phases        |       |       |       | 6     | 8     |       | 8     |
| Detector Phase          | 5     | 2     | 6     | 6     | 8     | 8     | 8     |
| Switch Phase            |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 4.0   | 15.0  | 15.0  | 15.0  | 6.0   | 6.0   | 6.0   |
| Minimum Split (s)       | 11.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 46.0  | 94.0  | 48.0  | 48.0  | 26.0  | 26.0  | 26.0  |
| Total Split (%)         | 38.3% | 78.3% | 40.0% | 40.0% | 21.7% | 21.7% | 21.7% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lead  |       | Lag   | Lag   |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |
| Recall Mode             | None  | C-Min | C-Min | C-Min | None  | None  | None  |
| v/c Ratio               | 0.87  | 0.16  | 0.67  | 0.46  | 0.77  | 0.77  | 0.36  |
| Control Delay           | 38.7  | 8.8   | 31.2  | 4.3   | 70.3  | 69.9  | 10.8  |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.5   | 0.5   | 0.0   |
| Total Delay             | 38.7  | 8.8   | 31.2  | 4.3   | 70.8  | 70.4  | 10.8  |
| Queue Length 50th (ft)  | 325   | 149   | 341   | 0     | 148   | 148   | 0     |
| Queue Length 95th (ft)  | 421   | 166   | 409   | 23    | 220   | 118   | 25    |
| Internal Link Dist (ft) |       | 591   | 1139  |       |       | 825   |       |
| Turn Bay Length (ft)    |       |       |       | 840   |       |       | 510   |
| Base Capacity (vph)     | 595   | 2729  | 2198  | 923   | 283   | 284   | 370   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 9     | 9     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.74  | 0.16  | 0.67  | 0.46  | 0.69  | 0.69  | 0.33  |

## Intersection Summary

Cycle Length: 120

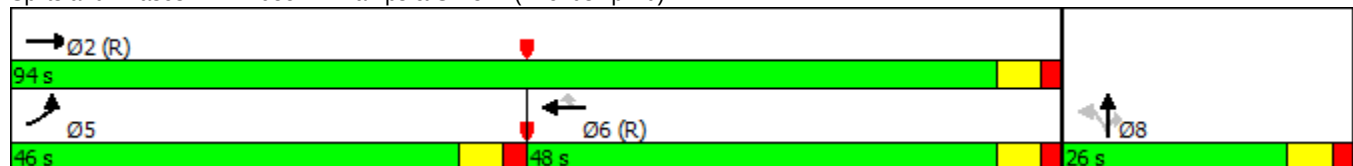
Actuated Cycle Length: 120

Offset: 86 (72%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Splits and Phases: 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)





# HCM Signalized Intersection Capacity Analysis

## 1: I-985 NB Ramps & SR 347 (Friendship Rd)

Future No-Build AM - Improved

11/16/2016

|                                   |  |                                                                                    |  |  |                                                                                                                                                                      |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                                                                                                                 | EBR                                                                               | WBL                                                                               | WBT                                                                                                                                                                                                                                                   | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |   |                                                                                   |                                                                                   |    |  |  |  |  |                                                                                     |                                                                                     |                                                                                     |
| Traffic Volume (vph)              | 373                                                                               | 407                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1265                                                                                                                                                                                                                                                  | 328                                                                               | 318                                                                                 | 4                                                                                   | 87                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Future Volume (vph)               | 373                                                                               | 407                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1265                                                                                                                                                                                                                                                  | 328                                                                               | 318                                                                                 | 4                                                                                   | 87                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                                                                                                                | 1900                                                                              | 1900                                                                              | 1900                                                                                                                                                                                                                                                  | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                                                                                                                 |                                                                                   |                                                                                   | 6.0                                                                                                                                                                                                                                                   | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Util. Factor                 | 1.00                                                                              | 0.95                                                                                                                                                                |                                                                                   |                                                                                   | 0.91                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Frt                               | 1.00                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (prot)                 | 1787                                                                              | 3610                                                                                                                                                                |                                                                                   |                                                                                   | 5187                                                                                                                                                                                                                                                  | 1599                                                                              | 1698                                                                                | 1706                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Permitted                     | 0.95                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (perm)                 | 1787                                                                              | 3610                                                                                                                                                                |                                                                                   |                                                                                   | 5187                                                                                                                                                                                                                                                  | 1599                                                                              | 1698                                                                                | 1706                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Peak-hour factor, PHF             | 0.85                                                                              | 0.94                                                                                                                                                                | 0.92                                                                              | 0.92                                                                              | 0.86                                                                                                                                                                                                                                                  | 0.77                                                                              | 0.86                                                                                | 0.50                                                                                | 0.72                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Adj. Flow (vph)                   | 439                                                                               | 433                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1471                                                                                                                                                                                                                                                  | 426                                                                               | 370                                                                                 | 8                                                                                   | 121                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                                                                                                                                                                                     | 246                                                                               | 0                                                                                   | 0                                                                                   | 104                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 439                                                                               | 433                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1471                                                                                                                                                                                                                                                  | 180                                                                               | 189                                                                                 | 189                                                                                 | 17                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Heavy Vehicles (%)                | 1%                                                                                | 0%                                                                                                                                                                  | 0%                                                                                | 0%                                                                                | 0%                                                                                                                                                                                                                                                    | 1%                                                                                | 1%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  |
| Turn Type                         | Prot                                                                              | NA                                                                                                                                                                  |                                                                                   |                                                                                   | NA                                                                                                                                                                                                                                                    | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Protected Phases                  | 5                                                                                 | 2                                                                                                                                                                   |                                                                                   |                                                                                   | 6                                                                                                                                                                                                                                                     |                                                                                   |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Permitted Phases                  |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Actuated Green, G (s)             | 33.9                                                                              | 90.7                                                                                                                                                                |                                                                                   |                                                                                   | 50.8                                                                                                                                                                                                                                                  | 50.8                                                                              | 17.3                                                                                | 17.3                                                                                | 17.3                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Effective Green, g (s)            | 33.9                                                                              | 90.7                                                                                                                                                                |                                                                                   |                                                                                   | 50.8                                                                                                                                                                                                                                                  | 50.8                                                                              | 17.3                                                                                | 17.3                                                                                | 17.3                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Actuated g/C Ratio                | 0.28                                                                              | 0.76                                                                                                                                                                |                                                                                   |                                                                                   | 0.42                                                                                                                                                                                                                                                  | 0.42                                                                              | 0.14                                                                                | 0.14                                                                                | 0.14                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                                                                                                                 |                                                                                   |                                                                                   | 6.0                                                                                                                                                                                                                                                   | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Vehicle Extension (s)             | 3.0                                                                               | 5.0                                                                                                                                                                 |                                                                                   |                                                                                   | 5.0                                                                                                                                                                                                                                                   | 5.0                                                                               | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Grp Cap (vph)                | 504                                                                               | 2728                                                                                                                                                                |                                                                                   |                                                                                   | 2195                                                                                                                                                                                                                                                  | 676                                                                               | 244                                                                                 | 245                                                                                 | 232                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Prot                    | c0.25                                                                             | 0.12                                                                                                                                                                |                                                                                   |                                                                                   | c0.28                                                                                                                                                                                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       | 0.11                                                                              | c0.11                                                                               | 0.11                                                                                | 0.01                                                                                |                                                                                     |                                                                                     |                                                                                     |
| v/c Ratio                         | 0.87                                                                              | 0.16                                                                                                                                                                |                                                                                   |                                                                                   | 0.67                                                                                                                                                                                                                                                  | 0.27                                                                              | 0.77                                                                                | 0.77                                                                                | 0.08                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Uniform Delay, d1                 | 41.0                                                                              | 4.1                                                                                                                                                                 |                                                                                   |                                                                                   | 27.9                                                                                                                                                                                                                                                  | 22.5                                                                              | 49.5                                                                                | 49.4                                                                                | 44.4                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Progression Factor                | 0.53                                                                              | 2.02                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Incremental Delay, d2             | 14.1                                                                              | 0.1                                                                                                                                                                 |                                                                                   |                                                                                   | 1.6                                                                                                                                                                                                                                                   | 1.0                                                                               | 14.2                                                                                | 13.9                                                                                | 0.1                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Delay (s)                         | 35.9                                                                              | 8.3                                                                                                                                                                 |                                                                                   |                                                                                   | 29.5                                                                                                                                                                                                                                                  | 23.5                                                                              | 63.7                                                                                | 63.4                                                                                | 44.6                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  | D                                                                                 | A                                                                                                                                                                   |                                                                                   |                                                                                   | C                                                                                                                                                                                                                                                     | C                                                                                 | E                                                                                   | E                                                                                   | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                |                                                                                   | 22.2                                                                                                                                                                |                                                                                   |                                                                                   | 28.1                                                                                                                                                                                                                                                  |                                                                                   |                                                                                     | 58.9                                                                                |                                                                                     |                                                                                     | 0.0                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                                                                                                   |                                                                                   |                                                                                   | C                                                                                                                                                                                                                                                     |                                                                                   |                                                                                     | E                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                                                                                                     | 31.3                                                                              |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   | HCM 2000 Level of Service                                                           |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                                                                                                     | 0.75                                                                              |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                                                                                                     | 120.0                                                                             |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   | Sum of lost time (s)                                                                |                                                                                     |                                                                                     | 18.0                                                                                |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                                                                                                     | 69.1%                                                                             |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   | ICU Level of Service                                                                |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                                                                                                     | 15                                                                                |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

## 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)

Future No-Build AM - Improved

11/16/2016

|                         | →     | ↘     | ↙     | ←     | ↘     | ↙     |
|-------------------------|-------|-------|-------|-------|-------|-------|
| Lane Group              | EBT   | EBR   | WBL   | WBT   | SBL   | SBR   |
| Lane Configurations     | ↑↑↑   | ↑     | ↘↙    | ↑↑    | ↘     | ↙     |
| Traffic Volume (vph)    | 659   | 402   | 496   | 1115  | 118   | 457   |
| Future Volume (vph)     | 659   | 402   | 496   | 1115  | 118   | 457   |
| Lane Group Flow (vph)   | 766   | 447   | 570   | 1360  | 139   | 544   |
| Turn Type               | NA    | Perm  | Prot  | NA    | Perm  | Perm  |
| Protected Phases        | 2     |       | 1     | 6     |       |       |
| Permitted Phases        |       | 2     |       |       | 4     | 4     |
| Detector Phase          | 2     | 2     | 1     | 6     | 4     | 4     |
| Switch Phase            |       |       |       |       |       |       |
| Minimum Initial (s)     | 15.0  | 15.0  | 4.0   | 15.0  | 6.0   | 6.0   |
| Minimum Split (s)       | 24.0  | 24.0  | 11.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 34.0  | 34.0  | 32.0  | 66.0  | 54.0  | 54.0  |
| Total Split (%)         | 28.3% | 28.3% | 26.7% | 55.0% | 45.0% | 45.0% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lag   | Lag   | Lead  |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |
| Recall Mode             | C-Min | C-Min | None  | C-Min | None  | None  |
| v/c Ratio               | 0.48  | 0.56  | 0.83  | 0.69  | 0.22  | 0.90  |
| Control Delay           | 27.9  | 4.3   | 40.0  | 11.2  | 27.3  | 50.1  |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.5   | 0.0   | 0.0   |
| Total Delay             | 27.9  | 4.3   | 40.0  | 11.7  | 27.3  | 50.1  |
| Queue Length 50th (ft)  | 116   | 25    | 191   | 438   | 74    | 338   |
| Queue Length 95th (ft)  | 136   | m34   | 206   | 478   | 108   | 412   |
| Internal Link Dist (ft) | 904   |       |       | 591   |       |       |
| Turn Bay Length (ft)    |       | 375   | 380   |       |       |       |
| Base Capacity (vph)     | 1583  | 797   | 751   | 1985  | 722   | 688   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 233   | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.48  | 0.56  | 0.76  | 0.78  | 0.19  | 0.79  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

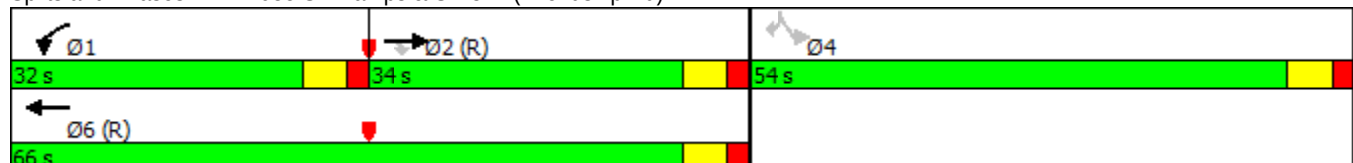
Offset: 18 (15%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)



# HCM Signalized Intersection Capacity Analysis 2: I-985 SB Ramps & SR 347 (Friendship Rd)

Future No-Build AM - Improved

11/16/2016

|                                   |  |                                                                                                                                                                      |  |                                                                                    |                                                                                    |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                                                                                                                                                                                                   | EBR                                                                               | WBL                                                                                                                                                                 | WBT                                                                                                                                                                 | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |    |  |   |   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |  |                                                                                     |  |
| Traffic Volume (vph)              | 0                                                                                 | 659                                                                                                                                                                                                                                                   | 402                                                                               | 496                                                                                                                                                                 | 1115                                                                                                                                                                | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 118                                                                                 | 0                                                                                   | 457                                                                                 |
| Future Volume (vph)               | 0                                                                                 | 659                                                                                                                                                                                                                                                   | 402                                                                               | 496                                                                                                                                                                 | 1115                                                                                                                                                                | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 118                                                                                 | 0                                                                                   | 457                                                                                 |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                                                                                                                                                                                                  | 1900                                                                              | 1900                                                                                                                                                                | 1900                                                                                                                                                                | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 6.0                                                                                                                                                                                                                                                   | 6.0                                                                               | 6.0                                                                                                                                                                 | 6.0                                                                                                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 6.0                                                                                 |                                                                                     | 6.0                                                                                 |
| Lane Util. Factor                 |                                                                                   | 0.91                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.97                                                                                                                                                                | 0.95                                                                                                                                                                |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Frt                               |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 0.85                                                                              | 1.00                                                                                                                                                                | 1.00                                                                                                                                                                |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     | 0.85                                                                                |
| Flt Protected                     |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                                                                                                | 1.00                                                                                                                                                                |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 0.95                                                                                |                                                                                     | 1.00                                                                                |
| Satd. Flow (prot)                 |                                                                                   | 5136                                                                                                                                                                                                                                                  | 1583                                                                              | 3467                                                                                                                                                                | 3574                                                                                                                                                                |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 1805                                                                                |                                                                                     | 1599                                                                                |
| Flt Permitted                     |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                                                                                                | 1.00                                                                                                                                                                |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 0.95                                                                                |                                                                                     | 1.00                                                                                |
| Satd. Flow (perm)                 |                                                                                   | 5136                                                                                                                                                                                                                                                  | 1583                                                                              | 3467                                                                                                                                                                | 3574                                                                                                                                                                |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 1805                                                                                |                                                                                     | 1599                                                                                |
| Peak-hour factor, PHF             | 0.92                                                                              | 0.86                                                                                                                                                                                                                                                  | 0.90                                                                              | 0.87                                                                                                                                                                | 0.82                                                                                                                                                                | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.85                                                                                | 0.92                                                                                | 0.84                                                                                |
| Adj. Flow (vph)                   | 0                                                                                 | 766                                                                                                                                                                                                                                                   | 447                                                                               | 570                                                                                                                                                                 | 1360                                                                                                                                                                | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 139                                                                                 | 0                                                                                   | 544                                                                                 |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                                                                                                                                                                                     | 309                                                                               | 0                                                                                                                                                                   | 0                                                                                                                                                                   | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 54                                                                                  |
| Lane Group Flow (vph)             | 0                                                                                 | 766                                                                                                                                                                                                                                                   | 138                                                                               | 570                                                                                                                                                                 | 1360                                                                                                                                                                | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 139                                                                                 | 0                                                                                   | 490                                                                                 |
| Heavy Vehicles (%)                | 0%                                                                                | 1%                                                                                                                                                                                                                                                    | 2%                                                                                | 1%                                                                                                                                                                  | 1%                                                                                                                                                                  | 0%                                                                                | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 1%                                                                                  |
| Turn Type                         |                                                                                   | NA                                                                                                                                                                                                                                                    | Perm                                                                              | Prot                                                                                                                                                                | NA                                                                                                                                                                  |                                                                                   |                                                                                     |                                                                                     |                                                                                     | Perm                                                                                |                                                                                     | Perm                                                                                |
| Protected Phases                  |                                                                                   | 2                                                                                                                                                                                                                                                     |                                                                                   | 1                                                                                                                                                                   | 6                                                                                                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Permitted Phases                  |                                                                                   |                                                                                                                                                                                                                                                       | 2                                                                                 |                                                                                                                                                                     |                                                                                                                                                                     |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 4                                                                                   |                                                                                     | 4                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 37.0                                                                                                                                                                                                                                                  | 37.0                                                                              | 23.7                                                                                                                                                                | 66.7                                                                                                                                                                |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 41.3                                                                                |                                                                                     | 41.3                                                                                |
| Effective Green, g (s)            |                                                                                   | 37.0                                                                                                                                                                                                                                                  | 37.0                                                                              | 23.7                                                                                                                                                                | 66.7                                                                                                                                                                |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 41.3                                                                                |                                                                                     | 41.3                                                                                |
| Actuated g/C Ratio                |                                                                                   | 0.31                                                                                                                                                                                                                                                  | 0.31                                                                              | 0.20                                                                                                                                                                | 0.56                                                                                                                                                                |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 0.34                                                                                |                                                                                     | 0.34                                                                                |
| Clearance Time (s)                |                                                                                   | 6.0                                                                                                                                                                                                                                                   | 6.0                                                                               | 6.0                                                                                                                                                                 | 6.0                                                                                                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 6.0                                                                                 |                                                                                     | 6.0                                                                                 |
| Vehicle Extension (s)             |                                                                                   | 5.0                                                                                                                                                                                                                                                   | 5.0                                                                               | 3.0                                                                                                                                                                 | 5.0                                                                                                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 3.0                                                                                 |                                                                                     | 3.0                                                                                 |
| Lane Grp Cap (vph)                |                                                                                   | 1583                                                                                                                                                                                                                                                  | 488                                                                               | 684                                                                                                                                                                 | 1986                                                                                                                                                                |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 621                                                                                 |                                                                                     | 550                                                                                 |
| v/s Ratio Prot                    |                                                                                   | 0.15                                                                                                                                                                                                                                                  |                                                                                   | c0.16                                                                                                                                                               | c0.38                                                                                                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                                                                                                                                                                                       | 0.09                                                                              |                                                                                                                                                                     |                                                                                                                                                                     |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 0.08                                                                                |                                                                                     | c0.31                                                                               |
| v/c Ratio                         |                                                                                   | 0.48                                                                                                                                                                                                                                                  | 0.28                                                                              | 0.83                                                                                                                                                                | 0.68                                                                                                                                                                |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 0.22                                                                                |                                                                                     | 0.89                                                                                |
| Uniform Delay, d1                 |                                                                                   | 33.7                                                                                                                                                                                                                                                  | 31.4                                                                              | 46.3                                                                                                                                                                | 19.1                                                                                                                                                                |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 28.0                                                                                |                                                                                     | 37.2                                                                                |
| Progression Factor                |                                                                                   | 0.75                                                                                                                                                                                                                                                  | 0.52                                                                              | 0.67                                                                                                                                                                | 0.47                                                                                                                                                                |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Incremental Delay, d2             |                                                                                   | 0.9                                                                                                                                                                                                                                                   | 1.2                                                                               | 6.7                                                                                                                                                                 | 1.5                                                                                                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 0.2                                                                                 |                                                                                     | 16.5                                                                                |
| Delay (s)                         |                                                                                   | 26.3                                                                                                                                                                                                                                                  | 17.5                                                                              | 37.8                                                                                                                                                                | 10.5                                                                                                                                                                |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 28.1                                                                                |                                                                                     | 53.8                                                                                |
| Level of Service                  |                                                                                   | C                                                                                                                                                                                                                                                     | B                                                                                 | D                                                                                                                                                                   | B                                                                                                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     | C                                                                                   |                                                                                     | D                                                                                   |
| Approach Delay (s)                |                                                                                   | 23.1                                                                                                                                                                                                                                                  |                                                                                   |                                                                                                                                                                     | 18.6                                                                                                                                                                |                                                                                   |                                                                                     | 0.0                                                                                 |                                                                                     |                                                                                     | 48.5                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                                                                                                                                                                                     |                                                                                   |                                                                                                                                                                     | B                                                                                                                                                                   |                                                                                   |                                                                                     | A                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                                                                                                     |                                                                                                                                                                     |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                                                                                                                                                                                       | 25.3                                                                              |                                                                                                                                                                     |                                                                                                                                                                     | HCM 2000 Level of Service                                                         |                                                                                     |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                                                                                                                                                                                       | 0.82                                                                              |                                                                                                                                                                     |                                                                                                                                                                     |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                                                                                                                                                                                       | 120.0                                                                             |                                                                                                                                                                     |                                                                                                                                                                     | Sum of lost time (s)                                                              |                                                                                     |                                                                                     |                                                                                     | 18.0                                                                                |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                                                                                                                                                                                       | 69.1%                                                                             |                                                                                                                                                                     |                                                                                                                                                                     | ICU Level of Service                                                              |                                                                                     |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                                                                                                                                                                                       | 15                                                                                |                                                                                                                                                                     |                                                                                                                                                                     |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                                                                                                     |                                                                                                                                                                     |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

## Future No-Build AM - Improved

## 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)

11/16/2016

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations     |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 142                                                                               | 599                                                                               | 99                                                                                | 409                                                                               | 607                                                                               | 78                                                                                | 91                                                                                 | 138                                                                                 | 169                                                                                 | 244                                                                                 | 282                                                                                 | 129                                                                                 |
| Future Volume (vph)     | 142                                                                               | 599                                                                               | 99                                                                                | 409                                                                               | 607                                                                               | 78                                                                                | 91                                                                                 | 138                                                                                 | 169                                                                                 | 244                                                                                 | 282                                                                                 | 129                                                                                 |
| Lane Group Flow (vph)   | 165                                                                               | 689                                                                               | 130                                                                               | 445                                                                               | 723                                                                               | 110                                                                               | 117                                                                                | 155                                                                                 | 197                                                                                 | 252                                                                                 | 328                                                                                 | 159                                                                                 |
| Turn Type               | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                              | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases        | 5                                                                                 | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   | 3                                                                                  | 8                                                                                   |                                                                                     | 7                                                                                   | 4                                                                                   |                                                                                     |
| Permitted Phases        | 2                                                                                 |                                                                                   | 2                                                                                 | 6                                                                                 |                                                                                   | 6                                                                                 | 8                                                                                  |                                                                                     | 8                                                                                   | 4                                                                                   |                                                                                     | 4                                                                                   |
| Detector Phase          | 5                                                                                 | 2                                                                                 | 2                                                                                 | 1                                                                                 | 6                                                                                 | 6                                                                                 | 3                                                                                  | 8                                                                                   | 8                                                                                   | 7                                                                                   | 4                                                                                   | 4                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 4.0                                                                               | 15.0                                                                              | 15.0                                                                              | 4.0                                                                               | 15.0                                                                              | 15.0                                                                              | 4.0                                                                                | 6.0                                                                                 | 6.0                                                                                 | 4.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Minimum Split (s)       | 11.0                                                                              | 37.0                                                                              | 37.0                                                                              | 11.0                                                                              | 37.0                                                                              | 37.0                                                                              | 11.0                                                                               | 42.0                                                                                | 42.0                                                                                | 11.0                                                                                | 42.0                                                                                | 42.0                                                                                |
| Total Split (s)         | 18.0                                                                              | 37.0                                                                              | 37.0                                                                              | 30.0                                                                              | 49.0                                                                              | 49.0                                                                              | 11.0                                                                               | 42.0                                                                                | 42.0                                                                                | 11.0                                                                                | 42.0                                                                                | 42.0                                                                                |
| Total Split (%)         | 15.0%                                                                             | 30.8%                                                                             | 30.8%                                                                             | 25.0%                                                                             | 40.8%                                                                             | 40.8%                                                                             | 9.2%                                                                               | 35.0%                                                                               | 35.0%                                                                               | 9.2%                                                                                | 35.0%                                                                               | 35.0%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Lost Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lead/Lag                | Lead                                                                              | Lag                                                                               | Lag                                                                               | Lead                                                                              | Lag                                                                               | Lag                                                                               | Lead                                                                               | Lag                                                                                 | Lag                                                                                 | Lead                                                                                | Lag                                                                                 | Lag                                                                                 |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | C-Min                                                                             | C-Min                                                                             | None                                                                              | C-Min                                                                             | C-Min                                                                             | None                                                                               | None                                                                                | None                                                                                | None                                                                                | None                                                                                | None                                                                                |
| v/c Ratio               | 0.42                                                                              | 0.56                                                                              | 0.20                                                                              | 0.86                                                                              | 0.44                                                                              | 0.14                                                                              | 0.66                                                                               | 0.38                                                                                | 0.40                                                                                | 0.81                                                                                | 0.79                                                                                | 0.32                                                                                |
| Control Delay           | 18.0                                                                              | 35.8                                                                              | 1.6                                                                               | 39.5                                                                              | 13.7                                                                              | 0.3                                                                               | 42.1                                                                               | 33.0                                                                                | 8.9                                                                                 | 58.1                                                                                | 58.1                                                                                | 4.1                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 18.0                                                                              | 35.8                                                                              | 1.6                                                                               | 39.5                                                                              | 13.7                                                                              | 0.3                                                                               | 42.1                                                                               | 33.0                                                                                | 8.9                                                                                 | 58.1                                                                                | 58.1                                                                                | 4.1                                                                                 |
| Queue Length 50th (ft)  | 55                                                                                | 228                                                                               | 0                                                                                 | 193                                                                               | 97                                                                                | 0                                                                                 | 74                                                                                 | 107                                                                                 | 61                                                                                  | 157                                                                                 | 242                                                                                 | 0                                                                                   |
| Queue Length 95th (ft)  | 101                                                                               | 310                                                                               | 0                                                                                 | m#405                                                                             | 181                                                                               | m1                                                                                | 54                                                                                 | 168                                                                                 | 103                                                                                 | 212                                                                                 | 300                                                                                 | 17                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 1576                                                                              |                                                                                   |                                                                                   | 3513                                                                              |                                                                                   |                                                                                    | 1183                                                                                |                                                                                     |                                                                                     | 1183                                                                                |                                                                                     |
| Turn Bay Length (ft)    | 250                                                                               |                                                                                   | 370                                                                               | 300                                                                               |                                                                                   | 310                                                                               |                                                                                    |                                                                                     | 500                                                                                 | 300                                                                                 |                                                                                     | 215                                                                                 |
| Base Capacity (vph)     | 418                                                                               | 1222                                                                              | 662                                                                               | 519                                                                               | 1638                                                                              | 772                                                                               | 176                                                                                | 564                                                                                 | 608                                                                                 | 311                                                                                 | 564                                                                                 | 608                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.39                                                                              | 0.56                                                                              | 0.20                                                                              | 0.86                                                                              | 0.44                                                                              | 0.14                                                                              | 0.66                                                                               | 0.27                                                                                | 0.32                                                                                | 0.81                                                                                | 0.58                                                                                | 0.26                                                                                |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 73 (61%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 115

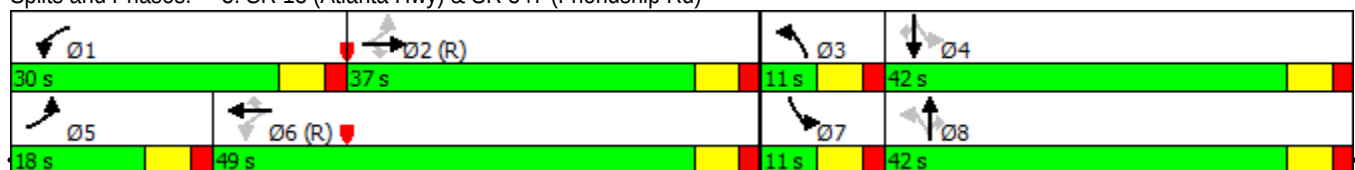
Control Type: Actuated-Coordinated

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)



Baseline

Synchro 9 Report

Page 5

# HCM Signalized Intersection Capacity Analysis

## 3: SR 13 (Atlanta Hwy) & SR 347 (Friendship Rd)

Future No-Build AM - Improved

11/16/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)              | 142                                                                               | 599                                                                               | 99                                                                                | 409                                                                               | 607                                                                               | 78                                                                                | 91                                                                                  | 138                                                                                 | 169                                                                                 | 244                                                                                 | 282                                                                                 | 129                                                                                 |
| Future Volume (vph)               | 142                                                                               | 599                                                                               | 99                                                                                | 409                                                                               | 607                                                                               | 78                                                                                | 91                                                                                  | 138                                                                                 | 169                                                                                 | 244                                                                                 | 282                                                                                 | 129                                                                                 |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor                 | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Frt                               | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)                 | 1787                                                                              | 3610                                                                              | 1583                                                                              | 1787                                                                              | 3610                                                                              | 1538                                                                              | 1787                                                                                | 1881                                                                                | 1568                                                                                | 1752                                                                                | 1881                                                                                | 1583                                                                                |
| Flt Permitted                     | 0.38                                                                              | 1.00                                                                              | 1.00                                                                              | 0.22                                                                              | 1.00                                                                              | 1.00                                                                              | 0.25                                                                                | 1.00                                                                                | 1.00                                                                                | 0.59                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)                 | 709                                                                               | 3610                                                                              | 1583                                                                              | 418                                                                               | 3610                                                                              | 1538                                                                              | 463                                                                                 | 1881                                                                                | 1568                                                                                | 1085                                                                                | 1881                                                                                | 1583                                                                                |
| Peak-hour factor, PHF             | 0.86                                                                              | 0.87                                                                              | 0.76                                                                              | 0.92                                                                              | 0.84                                                                              | 0.71                                                                              | 0.78                                                                                | 0.89                                                                                | 0.86                                                                                | 0.97                                                                                | 0.86                                                                                | 0.81                                                                                |
| Adj. Flow (vph)                   | 165                                                                               | 689                                                                               | 130                                                                               | 445                                                                               | 723                                                                               | 110                                                                               | 117                                                                                 | 155                                                                                 | 197                                                                                 | 252                                                                                 | 328                                                                                 | 159                                                                                 |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 86                                                                                | 0                                                                                 | 0                                                                                 | 60                                                                                | 0                                                                                   | 0                                                                                   | 154                                                                                 | 0                                                                                   | 0                                                                                   | 124                                                                                 |
| Lane Group Flow (vph)             | 165                                                                               | 689                                                                               | 44                                                                                | 445                                                                               | 723                                                                               | 50                                                                                | 117                                                                                 | 155                                                                                 | 43                                                                                  | 252                                                                                 | 328                                                                                 | 35                                                                                  |
| Heavy Vehicles (%)                | 1%                                                                                | 0%                                                                                | 2%                                                                                | 1%                                                                                | 0%                                                                                | 5%                                                                                | 1%                                                                                  | 1%                                                                                  | 3%                                                                                  | 3%                                                                                  | 1%                                                                                  | 2%                                                                                  |
| Turn Type                         | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                               | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases                  | 5                                                                                 | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   | 3                                                                                   | 8                                                                                   |                                                                                     | 7                                                                                   | 4                                                                                   |                                                                                     |
| Permitted Phases                  | 2                                                                                 |                                                                                   | 2                                                                                 | 6                                                                                 |                                                                                   | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   | 4                                                                                   |                                                                                     | 4                                                                                   |
| Actuated Green, G (s)             | 50.8                                                                              | 40.6                                                                              | 40.6                                                                              | 70.6                                                                              | 54.4                                                                              | 54.4                                                                              | 31.4                                                                                | 26.4                                                                                | 26.4                                                                                | 31.4                                                                                | 26.4                                                                                | 26.4                                                                                |
| Effective Green, g (s)            | 50.8                                                                              | 40.6                                                                              | 40.6                                                                              | 70.6                                                                              | 54.4                                                                              | 54.4                                                                              | 31.4                                                                                | 26.4                                                                                | 26.4                                                                                | 31.4                                                                                | 26.4                                                                                | 26.4                                                                                |
| Actuated g/C Ratio                | 0.42                                                                              | 0.34                                                                              | 0.34                                                                              | 0.59                                                                              | 0.45                                                                              | 0.45                                                                              | 0.26                                                                                | 0.22                                                                                | 0.22                                                                                | 0.26                                                                                | 0.22                                                                                | 0.22                                                                                |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)             | 3.0                                                                               | 5.0                                                                               | 5.0                                                                               | 3.0                                                                               | 5.0                                                                               | 5.0                                                                               | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 |
| Lane Grp Cap (vph)                | 391                                                                               | 1221                                                                              | 535                                                                               | 519                                                                               | 1636                                                                              | 697                                                                               | 176                                                                                 | 413                                                                                 | 344                                                                                 | 311                                                                                 | 413                                                                                 | 348                                                                                 |
| v/s Ratio Prot                    | 0.04                                                                              | 0.19                                                                              |                                                                                   | c0.17                                                                             | 0.20                                                                              |                                                                                   | 0.03                                                                                | 0.08                                                                                |                                                                                     | c0.03                                                                               | 0.17                                                                                |                                                                                     |
| v/s Ratio Perm                    | 0.14                                                                              |                                                                                   | 0.03                                                                              | c0.33                                                                             |                                                                                   | 0.03                                                                              | 0.15                                                                                |                                                                                     | 0.03                                                                                | c0.18                                                                               |                                                                                     | 0.02                                                                                |
| v/c Ratio                         | 0.42                                                                              | 0.56                                                                              | 0.08                                                                              | 0.86                                                                              | 0.44                                                                              | 0.07                                                                              | 0.66                                                                                | 0.38                                                                                | 0.13                                                                                | 0.81                                                                                | 0.79                                                                                | 0.10                                                                                |
| Uniform Delay, d1                 | 22.0                                                                              | 32.5                                                                              | 27.0                                                                              | 19.3                                                                              | 22.4                                                                              | 18.5                                                                              | 38.5                                                                                | 39.8                                                                                | 37.5                                                                                | 41.3                                                                                | 44.2                                                                                | 37.3                                                                                |
| Progression Factor                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.50                                                                              | 0.55                                                                              | 0.03                                                                              | 0.75                                                                                | 0.79                                                                                | 1.40                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Incremental Delay, d2             | 0.7                                                                               | 1.9                                                                               | 0.3                                                                               | 9.5                                                                               | 0.6                                                                               | 0.1                                                                               | 9.1                                                                                 | 0.6                                                                                 | 0.2                                                                                 | 14.7                                                                                | 10.1                                                                                | 0.1                                                                                 |
| Delay (s)                         | 22.7                                                                              | 34.4                                                                              | 27.3                                                                              | 38.5                                                                              | 12.9                                                                              | 0.8                                                                               | 37.9                                                                                | 32.0                                                                                | 52.8                                                                                | 56.0                                                                                | 54.3                                                                                | 37.5                                                                                |
| Level of Service                  | C                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | B                                                                                 | A                                                                                 | D                                                                                   | C                                                                                   | D                                                                                   | E                                                                                   | D                                                                                   | D                                                                                   |
| Approach Delay (s)                |                                                                                   | 31.5                                                                              |                                                                                   |                                                                                   | 20.8                                                                              |                                                                                   |                                                                                     | 42.2                                                                                |                                                                                     |                                                                                     | 51.3                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                     | D                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 33.2                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.87                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 80.0%                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

Future No-Build AM - Improved

## 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) &amp; Relocated Thunder Rd/Roy Carlson Blvd 11/16/2016



| Lane Group              | EBT   | WBL   | WBT   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↕     | ↖     | ↗     | ↖     | ↕     | ↗     | ↖     | ↕     | ↗     |
| Traffic Volume (vph)    | 13    | 7     | 8     | 41    | 377   | 54    | 47    | 727   | 2     |
| Future Volume (vph)     | 13    | 7     | 8     | 41    | 377   | 54    | 47    | 727   | 2     |
| Lane Group Flow (vph)   | 60    | 16    | 71    | 45    | 424   | 75    | 90    | 845   | 2     |
| Turn Type               | NA    | Perm  | NA    | Perm  | NA    | Perm  | Perm  | NA    | Perm  |
| Protected Phases        | 4     |       | 8     |       | 2     |       |       | 6     |       |
| Permitted Phases        |       | 8     |       | 2     |       | 2     | 6     |       | 6     |
| Detector Phase          | 4     | 8     | 8     | 2     | 2     | 2     | 6     | 6     | 6     |
| Switch Phase            |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 6.0   | 6.0   | 6.0   | 15.0  | 15.0  | 15.0  | 15.0  | 15.0  | 15.0  |
| Minimum Split (s)       | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 35.0  | 35.0  | 35.0  | 85.0  | 85.0  | 85.0  | 85.0  | 85.0  | 85.0  |
| Total Split (%)         | 29.2% | 29.2% | 29.2% | 70.8% | 70.8% | 70.8% | 70.8% | 70.8% | 70.8% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                |       |       |       |       |       |       |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |       |       |
| Recall Mode             | None  | None  | None  | C-Min | C-Min | C-Min | C-Min | C-Min | C-Min |
| v/c Ratio               | 0.40  | 0.19  | 0.44  | 0.08  | 0.14  | 0.05  | 0.11  | 0.27  | 0.00  |
| Control Delay           | 28.6  | 57.4  | 24.8  | 1.1   | 1.1   | 0.2   | 2.6   | 2.6   | 0.0   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 28.6  | 57.4  | 24.8  | 1.1   | 1.1   | 0.2   | 2.6   | 2.6   | 0.0   |
| Queue Length 50th (ft)  | 11    | 12    | 7     | 1     | 6     | 0     | 8     | 42    | 0     |
| Queue Length 95th (ft)  | 53    | 17    | 52    | 4     | 12    | 0     | 14    | 81    | m0    |
| Internal Link Dist (ft) | 491   |       | 1740  |       | 2367  |       |       | 498   |       |
| Turn Bay Length (ft)    |       |       |       | 375   |       | 375   | 200   |       | 200   |
| Base Capacity (vph)     | 446   | 329   | 446   | 550   | 3099  | 1382  | 808   | 3099  | 1404  |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.13  | 0.05  | 0.16  | 0.08  | 0.14  | 0.05  | 0.11  | 0.27  | 0.00  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

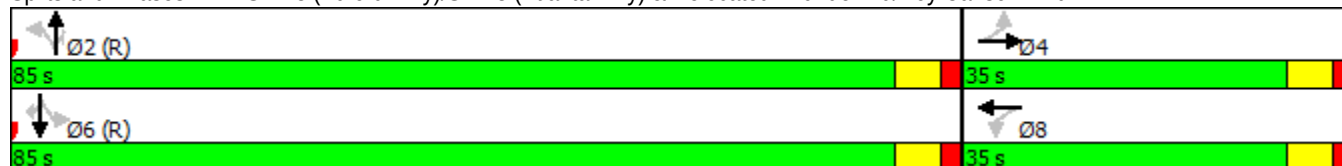
Offset: 29 (24%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) &amp; Relocated Thunder Rd/Roy Carlson Blvd



# HCM Signalized Intersection Capacity Analysis

Future No-Build AM - Improved

## 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) & Relocated Thunder Rd/Roy Carlson Blvd

|                                   | EBL  | EBT  | EBR   | WBL   | WBT  | WBR  | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|-----------------------------------|------|------|-------|-------|------|------|-------|-------|-------|-------|-------|-------|
| Movement                          |      |      |       |       |      |      |       |       |       |       |       |       |
| Lane Configurations               |      | ↔    |       | ↔     | ↔    |      | ↔     | ↔     | ↔     | ↔     | ↔     | ↔     |
| Traffic Volume (vph)              | 0    | 13   | 42    | 7     | 8    | 26   | 41    | 377   | 54    | 47    | 727   | 2     |
| Future Volume (vph)               | 0    | 13   | 42    | 7     | 8    | 26   | 41    | 377   | 54    | 47    | 727   | 2     |
| Ideal Flow (vphpl)                | 1900 | 1900 | 1900  | 1900  | 1900 | 1900 | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               |      | 6.0  |       | 6.0   | 6.0  |      | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lane Util. Factor                 |      | 1.00 |       | 1.00  | 1.00 |      | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Frt                               |      | 0.90 |       | 1.00  | 0.87 |      | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |
| Flt Protected                     |      | 1.00 |       | 0.95  | 1.00 |      | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |
| Satd. Flow (prot)                 |      | 1703 |       | 1805  | 1651 |      | 1805  | 3574  | 1583  | 1752  | 3574  | 1615  |
| Flt Permitted                     |      | 1.00 |       | 0.72  | 1.00 |      | 0.33  | 1.00  | 1.00  | 0.50  | 1.00  | 1.00  |
| Satd. Flow (perm)                 |      | 1703 |       | 1364  | 1651 |      | 635   | 3574  | 1583  | 931   | 3574  | 1615  |
| Peak-hour factor, PHF             | 0.92 | 0.92 | 0.92  | 0.44  | 0.92 | 0.42 | 0.92  | 0.89  | 0.72  | 0.52  | 0.86  | 0.92  |
| Adj. Flow (vph)                   | 0    | 14   | 46    | 16    | 9    | 62   | 45    | 424   | 75    | 90    | 845   | 2     |
| RTOR Reduction (vph)              | 0    | 44   | 0     | 0     | 59   | 0    | 0     | 0     | 11    | 0     | 0     | 0     |
| Lane Group Flow (vph)             | 0    | 16   | 0     | 16    | 12   | 0    | 45    | 424   | 64    | 90    | 845   | 2     |
| Heavy Vehicles (%)                | 0%   | 0%   | 0%    | 0%    | 0%   | 0%   | 0%    | 1%    | 2%    | 3%    | 1%    | 0%    |
| Turn Type                         |      | NA   |       | Perm  | NA   |      | Perm  | NA    | Perm  | Perm  | NA    | Perm  |
| Protected Phases                  |      | 4    |       |       | 8    |      |       | 2     |       |       | 6     |       |
| Permitted Phases                  | 4    |      |       | 8     |      |      | 2     |       | 2     | 6     |       | 6     |
| Actuated Green, G (s)             |      | 6.3  |       | 6.3   | 6.3  |      | 101.7 | 101.7 | 101.7 | 101.7 | 101.7 | 101.7 |
| Effective Green, g (s)            |      | 6.3  |       | 6.3   | 6.3  |      | 101.7 | 101.7 | 101.7 | 101.7 | 101.7 | 101.7 |
| Actuated g/C Ratio                |      | 0.05 |       | 0.05  | 0.05 |      | 0.85  | 0.85  | 0.85  | 0.85  | 0.85  | 0.85  |
| Clearance Time (s)                |      | 6.0  |       | 6.0   | 6.0  |      | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Vehicle Extension (s)             |      | 3.0  |       | 3.0   | 3.0  |      | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Lane Grp Cap (vph)                |      | 89   |       | 71    | 86   |      | 538   | 3028  | 1341  | 789   | 3028  | 1368  |
| v/s Ratio Prot                    |      | 0.01 |       |       | 0.01 |      |       | 0.12  |       |       | c0.24 |       |
| v/s Ratio Perm                    |      |      |       | c0.01 |      |      | 0.07  |       | 0.04  | 0.10  |       | 0.00  |
| v/c Ratio                         |      | 0.18 |       | 0.23  | 0.14 |      | 0.08  | 0.14  | 0.05  | 0.11  | 0.28  | 0.00  |
| Uniform Delay, d1                 |      | 54.4 |       | 54.5  | 54.3 |      | 1.5   | 1.6   | 1.5   | 1.5   | 1.8   | 1.4   |
| Progression Factor                |      | 1.00 |       | 1.00  | 1.00 |      | 0.43  | 0.60  | 0.36  | 1.23  | 1.23  | 1.00  |
| Incremental Delay, d2             |      | 1.0  |       | 1.6   | 0.8  |      | 0.3   | 0.1   | 0.1   | 0.2   | 0.2   | 0.0   |
| Delay (s)                         |      | 55.4 |       | 56.1  | 55.0 |      | 0.9   | 1.0   | 0.6   | 2.1   | 2.4   | 1.4   |
| Level of Service                  |      | E    |       | E     | E    |      | A     | A     | A     | A     | A     | A     |
| Approach Delay (s)                |      | 55.4 |       |       | 55.2 |      |       | 1.0   |       |       | 2.4   |       |
| Approach LOS                      |      | E    |       |       | E    |      |       | A     |       |       | A     |       |
| <b>Intersection Summary</b>       |      |      |       |       |      |      |       |       |       |       |       |       |
| HCM 2000 Control Delay            |      |      | 6.7   |       |      |      |       |       |       |       |       |       |
| HCM 2000 Volume to Capacity ratio |      |      | 0.28  |       |      |      |       |       |       |       |       |       |
| Actuated Cycle Length (s)         |      |      | 120.0 |       |      |      |       |       |       |       |       |       |
| Intersection Capacity Utilization |      |      | 53.4% |       |      |      |       |       |       |       |       |       |
| Analysis Period (min)             |      |      | 15    |       |      |      |       |       |       |       |       |       |
| <b>c Critical Lane Group</b>      |      |      |       |       |      |      |       |       |       |       |       |       |

## Queues

## Future No-Build AM - Improved

## 5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd

11/16/2016



| Lane Group              | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↰     | ↱     |       | ↰     | ↱     | ↰     | ↱     | ↱     | ↰     | ↱     | ↱     |
| Traffic Volume (vph)    | 1     | 6     | 416   | 26    | 234   | 22    | 465   | 185   | 119   | 624   | 40    |
| Future Volume (vph)     | 1     | 6     | 416   | 26    | 234   | 22    | 465   | 185   | 119   | 624   | 40    |
| Lane Group Flow (vph)   | 4     | 12    | 0     | 485   | 263   | 38    | 495   | 201   | 161   | 693   | 55    |
| Turn Type               | NA    | Perm  | Perm  | NA    | Perm  | Perm  | NA    | Perm  | Perm  | NA    | Perm  |
| Protected Phases        | 4     |       |       | 8     |       |       | 2     |       |       | 6     |       |
| Permitted Phases        |       | 4     | 8     |       | 8     | 2     |       | 2     | 6     |       | 6     |
| Detector Phase          | 4     | 4     | 8     | 8     | 8     | 2     | 2     | 2     | 6     | 6     | 6     |
| Switch Phase            |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 15.0  | 15.0  | 15.0  | 15.0  | 15.0  | 15.0  |
| Minimum Split (s)       | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 67.0  | 67.0  | 67.0  | 67.0  | 67.0  | 53.0  | 53.0  | 53.0  | 53.0  | 53.0  | 53.0  |
| Total Split (%)         | 55.8% | 55.8% | 55.8% | 55.8% | 55.8% | 44.2% | 44.2% | 44.2% | 44.2% | 44.2% | 44.2% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   |       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   |       | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                |       |       |       |       |       |       |       |       |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |       |       |       |       |
| Recall Mode             | None  | None  | None  | None  | None  | C-Min | C-Min | C-Min | C-Min | C-Min | C-Min |
| v/c Ratio               | 0.01  | 0.02  |       | 0.84  | 0.33  | 0.13  | 0.29  | 0.23  | 0.40  | 0.40  | 0.07  |
| Control Delay           | 16.0  | 1.8   |       | 44.6  | 5.7   | 20.3  | 18.4  | 7.1   | 18.6  | 14.8  | 2.9   |
| Queue Delay             | 0.0   | 0.0   |       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 16.0  | 1.8   |       | 44.6  | 5.7   | 20.3  | 18.4  | 7.1   | 18.6  | 14.8  | 2.9   |
| Queue Length 50th (ft)  | 2     | 0     |       | 327   | 25    | 20    | 140   | 52    | 58    | 131   | 4     |
| Queue Length 95th (ft)  | 2     | 0     |       | 262   | 63    | 34    | 218   | 109   | 119   | 224   | 6     |
| Internal Link Dist (ft) | 275   |       |       | 4179  |       |       | 3868  |       |       | 2104  |       |
| Turn Bay Length (ft)    |       | 105   |       |       | 250   | 230   |       | 230   | 200   |       | 185   |
| Base Capacity (vph)     | 965   | 714   |       | 714   | 923   | 302   | 1730  | 884   | 400   | 1730  | 817   |
| Starvation Cap Reductn  | 0     | 0     |       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     |       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     |       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.00  | 0.02  |       | 0.68  | 0.28  | 0.13  | 0.29  | 0.23  | 0.40  | 0.40  | 0.07  |

## Intersection Summary

Cycle Length: 120

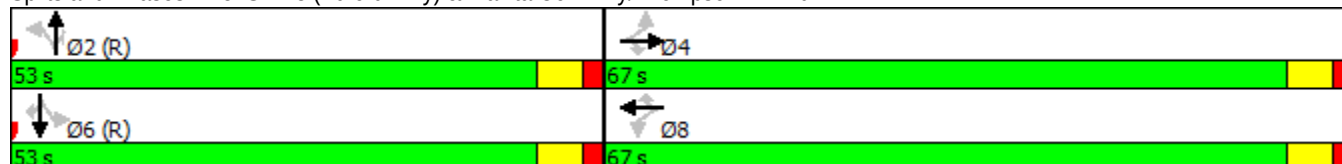
Actuated Cycle Length: 120

Offset: 72 (60%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Splits and Phases: 5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd

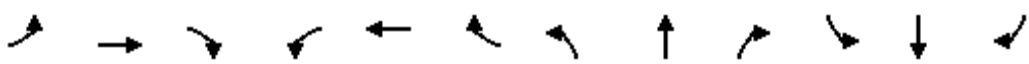




# HCM Signalized Intersection Capacity Analysis 5: SR 13 (Buford Hwy) & Makita Co. Drwy/Thompson Mill Rd

Future No-Build AM - Improved

11/16/2016

|                                   |  |      |       |      |       |      |      |      |      |       |      |      |
|-----------------------------------|------------------------------------------------------------------------------------|------|-------|------|-------|------|------|------|------|-------|------|------|
| Movement                          | EBL                                                                                | EBT  | EBR   | WBL  | WBT   | WBR  | NBL  | NBT  | NBR  | SBL   | SBT  | SBR  |
| Lane Configurations               |                                                                                    | ↩    | ↩     |      | ↩     | ↩    | ↩    | ↕    | ↩    | ↩     | ↕    | ↩    |
| Traffic Volume (vph)              | 0                                                                                  | 1    | 6     | 416  | 26    | 234  | 22   | 465  | 185  | 119   | 624  | 40   |
| Future Volume (vph)               | 0                                                                                  | 1    | 6     | 416  | 26    | 234  | 22   | 465  | 185  | 119   | 624  | 40   |
| Ideal Flow (vphpl)                | 1900                                                                               | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 | 1900 | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)               |                                                                                    | 6.0  | 6.0   |      | 6.0   | 6.0  | 6.0  | 6.0  | 6.0  | 6.0   | 6.0  | 6.0  |
| Lane Util. Factor                 |                                                                                    | 1.00 | 1.00  |      | 1.00  | 1.00 | 1.00 | 0.95 | 1.00 | 1.00  | 0.95 | 1.00 |
| Frt                               |                                                                                    | 1.00 | 0.85  |      | 1.00  | 0.85 | 1.00 | 1.00 | 0.85 | 1.00  | 1.00 | 0.85 |
| Flt Protected                     |                                                                                    | 1.00 | 1.00  |      | 0.96  | 1.00 | 0.95 | 1.00 | 1.00 | 0.95  | 1.00 | 1.00 |
| Satd. Flow (prot)                 |                                                                                    | 1900 | 1380  |      | 1816  | 1615 | 1805 | 3539 | 1599 | 1787  | 3539 | 1615 |
| Flt Permitted                     |                                                                                    | 1.00 | 1.00  |      | 0.74  | 1.00 | 0.32 | 1.00 | 1.00 | 0.44  | 1.00 | 1.00 |
| Satd. Flow (perm)                 |                                                                                    | 1900 | 1380  |      | 1406  | 1615 | 617  | 3539 | 1599 | 820   | 3539 | 1615 |
| Peak-hour factor, PHF             | 0.88                                                                               | 0.25 | 0.50  | 0.93 | 0.69  | 0.89 | 0.58 | 0.94 | 0.92 | 0.74  | 0.90 | 0.73 |
| Adj. Flow (vph)                   | 0                                                                                  | 4    | 12    | 447  | 38    | 263  | 38   | 495  | 201  | 161   | 693  | 55   |
| RTOR Reduction (vph)              | 0                                                                                  | 0    | 7     | 0    | 0     | 123  | 0    | 0    | 103  | 0     | 0    | 28   |
| Lane Group Flow (vph)             | 0                                                                                  | 4    | 5     | 0    | 485   | 140  | 38   | 495  | 98   | 161   | 693  | 27   |
| Heavy Vehicles (%)                | 0%                                                                                 | 0%   | 17%   | 0%   | 0%    | 0%   | 0%   | 2%   | 1%   | 1%    | 2%   | 0%   |
| Turn Type                         |                                                                                    | NA   | Perm  | Perm | NA    | Perm | Perm | NA   | Perm | Perm  | NA   | Perm |
| Protected Phases                  |                                                                                    | 4    |       |      | 8     |      |      | 2    |      |       | 6    |      |
| Permitted Phases                  | 4                                                                                  |      | 4     | 8    |       | 8    | 2    |      | 2    | 6     |      | 6    |
| Actuated Green, G (s)             |                                                                                    | 49.3 | 49.3  |      | 49.3  | 49.3 | 58.7 | 58.7 | 58.7 | 58.7  | 58.7 | 58.7 |
| Effective Green, g (s)            |                                                                                    | 49.3 | 49.3  |      | 49.3  | 49.3 | 58.7 | 58.7 | 58.7 | 58.7  | 58.7 | 58.7 |
| Actuated g/C Ratio                |                                                                                    | 0.41 | 0.41  |      | 0.41  | 0.41 | 0.49 | 0.49 | 0.49 | 0.49  | 0.49 | 0.49 |
| Clearance Time (s)                |                                                                                    | 6.0  | 6.0   |      | 6.0   | 6.0  | 6.0  | 6.0  | 6.0  | 6.0   | 6.0  | 6.0  |
| Vehicle Extension (s)             |                                                                                    | 3.0  | 3.0   |      | 3.0   | 3.0  | 5.0  | 5.0  | 5.0  | 5.0   | 5.0  | 5.0  |
| Lane Grp Cap (vph)                |                                                                                    | 780  | 566   |      | 577   | 663  | 301  | 1731 | 782  | 401   | 1731 | 790  |
| v/s Ratio Prot                    |                                                                                    | 0.00 |       |      |       |      |      | 0.14 |      |       | 0.20 |      |
| v/s Ratio Perm                    |                                                                                    |      | 0.00  |      | c0.34 | 0.09 | 0.06 |      | 0.06 | c0.20 |      | 0.02 |
| v/c Ratio                         |                                                                                    | 0.01 | 0.01  |      | 0.84  | 0.21 | 0.13 | 0.29 | 0.13 | 0.40  | 0.40 | 0.03 |
| Uniform Delay, d1                 |                                                                                    | 20.9 | 20.9  |      | 31.8  | 22.8 | 16.7 | 18.2 | 16.7 | 19.5  | 19.5 | 15.9 |
| Progression Factor                |                                                                                    | 1.00 | 1.00  |      | 1.00  | 1.00 | 0.92 | 0.90 | 2.08 | 0.67  | 0.66 | 0.48 |
| Incremental Delay, d2             |                                                                                    | 0.0  | 0.0   |      | 10.7  | 0.2  | 0.8  | 0.4  | 0.3  | 2.9   | 0.7  | 0.1  |
| Delay (s)                         |                                                                                    | 20.9 | 20.9  |      | 42.5  | 23.0 | 16.1 | 16.8 | 35.0 | 16.0  | 13.6 | 7.6  |
| Level of Service                  |                                                                                    | C    | C     |      | D     | C    | B    | B    | D    | B     | B    | A    |
| Approach Delay (s)                |                                                                                    | 20.9 |       |      | 35.6  |      |      | 21.8 |      |       | 13.6 |      |
| Approach LOS                      |                                                                                    | C    |       |      | D     |      |      | C    |      |       | B    |      |
| <b>Intersection Summary</b>       |                                                                                    |      |       |      |       |      |      |      |      |       |      |      |
| HCM 2000 Control Delay            |                                                                                    |      | 23.0  |      |       |      |      |      |      |       |      |      |
| HCM 2000 Volume to Capacity ratio |                                                                                    |      | 0.60  |      |       |      |      |      |      |       |      |      |
| Actuated Cycle Length (s)         |                                                                                    |      | 120.0 |      |       |      |      |      |      |       |      |      |
| Intersection Capacity Utilization |                                                                                    |      | 75.8% |      |       |      |      |      |      |       |      |      |
| Analysis Period (min)             |                                                                                    |      | 15    |      |       |      |      |      |      |       |      |      |
| <b>c Critical Lane Group</b>      |                                                                                    |      |       |      |       |      |      |      |      |       |      |      |

Queues  
6: SR 13 (Buford Hwy) & S. Hill St/Hamilton Mill Rd

Future No-Build AM - Improved

11/16/2016

|                         |  |  |  |                                                                                    |                                                                                    |  |                                                                                       |  |  |                                                                                      |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                                                                                                                 | WBT                                                                                                                                                                 | NBL                                                                               | NBT                                                                                                                                                                     | NBR                                                                                 | SBL                                                                                 | SBT                                                                                                                                                                     | SBR                                                                                 |                                                                                     |
| Lane Configurations     |  |  |  |   |   |  |   |  |  |   |  |                                                                                     |
| Traffic Volume (vph)    | 29                                                                                | 166                                                                               | 68                                                                                | 509                                                                                                                                                                 | 250                                                                                                                                                                 | 44                                                                                | 454                                                                                                                                                                     | 320                                                                                 | 233                                                                                 | 779                                                                                                                                                                     | 54                                                                                  |                                                                                     |
| Future Volume (vph)     | 29                                                                                | 166                                                                               | 68                                                                                | 509                                                                                                                                                                 | 250                                                                                                                                                                 | 44                                                                                | 454                                                                                                                                                                     | 320                                                                                 | 233                                                                                 | 779                                                                                                                                                                     | 54                                                                                  |                                                                                     |
| Lane Group Flow (vph)   | 54                                                                                | 263                                                                               | 96                                                                                | 553                                                                                                                                                                 | 579                                                                                                                                                                 | 59                                                                                | 493                                                                                                                                                                     | 432                                                                                 | 328                                                                                 | 838                                                                                                                                                                     | 59                                                                                  |                                                                                     |
| Turn Type               | Perm                                                                              | NA                                                                                | Perm                                                                              | Prot                                                                                                                                                                | NA                                                                                                                                                                  | pm+pt                                                                             | NA                                                                                                                                                                      | Free                                                                                | pm+pt                                                                               | NA                                                                                                                                                                      | Perm                                                                                |                                                                                     |
| Protected Phases        |                                                                                   | 4                                                                                 |                                                                                   | 3                                                                                                                                                                   | 8                                                                                                                                                                   | 5                                                                                 | 2                                                                                                                                                                       |                                                                                     | 1                                                                                   | 6                                                                                                                                                                       |                                                                                     |                                                                                     |
| Permitted Phases        | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                                                                                                     |                                                                                                                                                                     | 2                                                                                 |                                                                                                                                                                         | Free                                                                                | 6                                                                                   |                                                                                                                                                                         | 6                                                                                   |                                                                                     |
| Detector Phase          | 4                                                                                 | 4                                                                                 | 4                                                                                 | 3                                                                                                                                                                   | 8                                                                                                                                                                   | 5                                                                                 | 2                                                                                                                                                                       |                                                                                     | 1                                                                                   | 6                                                                                                                                                                       | 6                                                                                   |                                                                                     |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                                                                                                     |                                                                                                                                                                     |                                                                                   |                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 4.0                                                                                                                                                                 | 6.0                                                                                                                                                                 | 4.0                                                                               | 15.0                                                                                                                                                                    |                                                                                     | 4.0                                                                                 | 15.0                                                                                                                                                                    | 15.0                                                                                |                                                                                     |
| Minimum Split (s)       | 41.0                                                                              | 41.0                                                                              | 41.0                                                                              | 11.0                                                                                                                                                                | 46.0                                                                                                                                                                | 11.0                                                                              | 37.0                                                                                                                                                                    |                                                                                     | 11.0                                                                                | 40.0                                                                                                                                                                    | 40.0                                                                                |                                                                                     |
| Total Split (s)         | 41.0                                                                              | 41.0                                                                              | 41.0                                                                              | 25.0                                                                                                                                                                | 66.0                                                                                                                                                                | 11.0                                                                              | 37.0                                                                                                                                                                    |                                                                                     | 17.0                                                                                | 43.0                                                                                                                                                                    | 43.0                                                                                |                                                                                     |
| Total Split (%)         | 34.2%                                                                             | 34.2%                                                                             | 34.2%                                                                             | 20.8%                                                                                                                                                               | 55.0%                                                                                                                                                               | 9.2%                                                                              | 30.8%                                                                                                                                                                   |                                                                                     | 14.2%                                                                               | 35.8%                                                                                                                                                                   | 35.8%                                                                               |                                                                                     |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                                                                                                 | 4.0                                                                                                                                                                 | 4.0                                                                               | 4.0                                                                                                                                                                     |                                                                                     | 4.0                                                                                 | 4.0                                                                                                                                                                     | 4.0                                                                                 |                                                                                     |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                                                                                                 | 2.0                                                                                                                                                                 | 2.0                                                                               | 2.0                                                                                                                                                                     |                                                                                     | 2.0                                                                                 | 2.0                                                                                                                                                                     | 2.0                                                                                 |                                                                                     |
| Lost Time Adjust (s)    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                                                                                                 | 0.0                                                                                                                                                                 | 0.0                                                                               | 0.0                                                                                                                                                                     |                                                                                     | 0.0                                                                                 | 0.0                                                                                                                                                                     | 0.0                                                                                 |                                                                                     |
| Total Lost Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                                                                                                 | 6.0                                                                                                                                                                 | 6.0                                                                               | 6.0                                                                                                                                                                     |                                                                                     | 6.0                                                                                 | 6.0                                                                                                                                                                     | 6.0                                                                                 |                                                                                     |
| Lead/Lag                | Lag                                                                               | Lag                                                                               | Lag                                                                               | Lead                                                                                                                                                                |                                                                                                                                                                     | Lead                                                                              | Lag                                                                                                                                                                     |                                                                                     | Lead                                                                                | Lag                                                                                                                                                                     | Lag                                                                                 |                                                                                     |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                                                                                                     |                                                                                                                                                                     |                                                                                   |                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | None                                                                              | None                                                                              | None                                                                                                                                                                | None                                                                                                                                                                | None                                                                              | C-Min                                                                                                                                                                   |                                                                                     | None                                                                                | C-Min                                                                                                                                                                   | C-Min                                                                               |                                                                                     |
| v/c Ratio               | 0.40                                                                              | 0.74                                                                              | 0.23                                                                              | 1.05                                                                                                                                                                | 0.81                                                                                                                                                                | 0.23                                                                              | 0.38                                                                                                                                                                    | 0.28                                                                                | 0.77                                                                                | 0.55                                                                                                                                                                    | 0.08                                                                                |                                                                                     |
| Control Delay           | 50.2                                                                              | 58.5                                                                              | 3.4                                                                               | 100.9                                                                                                                                                               | 38.7                                                                                                                                                                | 20.2                                                                              | 30.5                                                                                                                                                                    | 0.5                                                                                 | 30.9                                                                                | 17.5                                                                                                                                                                    | 0.2                                                                                 |                                                                                     |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                                                                                                 | 0.0                                                                                                                                                                 | 0.0                                                                               | 0.0                                                                                                                                                                     | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                                                                                                     | 0.0                                                                                 |                                                                                     |
| Total Delay             | 50.2                                                                              | 58.5                                                                              | 3.4                                                                               | 100.9                                                                                                                                                               | 38.7                                                                                                                                                                | 20.2                                                                              | 30.5                                                                                                                                                                    | 0.5                                                                                 | 30.9                                                                                | 17.5                                                                                                                                                                    | 0.2                                                                                 |                                                                                     |
| Queue Length 50th (ft)  | 37                                                                                | 195                                                                               | 0                                                                                 | ~240                                                                                                                                                                | 365                                                                                                                                                                 | 23                                                                                | 146                                                                                                                                                                     | 0                                                                                   | 111                                                                                 | 173                                                                                                                                                                     | 0                                                                                   |                                                                                     |
| Queue Length 95th (ft)  | 41                                                                                | 173                                                                               | 0                                                                                 | #353                                                                                                                                                                | 380                                                                                                                                                                 | 44                                                                                | 218                                                                                                                                                                     | 0                                                                                   | 158                                                                                 | 216                                                                                                                                                                     | m0                                                                                  |                                                                                     |
| Internal Link Dist (ft) |                                                                                   | 657                                                                               |                                                                                   |                                                                                                                                                                     | 1618                                                                                                                                                                |                                                                                   | 1320                                                                                                                                                                    |                                                                                     |                                                                                     | 3868                                                                                                                                                                    |                                                                                     |                                                                                     |
| Turn Bay Length (ft)    | 180                                                                               |                                                                                   | 300                                                                               | 250                                                                                                                                                                 |                                                                                                                                                                     | 240                                                                               |                                                                                                                                                                         | 1000                                                                                | 400                                                                                 |                                                                                                                                                                         | 280                                                                                 |                                                                                     |
| Base Capacity (vph)     | 209                                                                               | 554                                                                               | 567                                                                               | 528                                                                                                                                                                 | 889                                                                                                                                                                 | 252                                                                               | 1286                                                                                                                                                                    | 1538                                                                                | 426                                                                                 | 1528                                                                                                                                                                    | 760                                                                                 |                                                                                     |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                                                                                                   | 0                                                                                                                                                                   | 0                                                                                 | 0                                                                                                                                                                       | 0                                                                                   | 0                                                                                   | 0                                                                                                                                                                       | 0                                                                                   |                                                                                     |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                                                                                                   | 0                                                                                                                                                                   | 0                                                                                 | 0                                                                                                                                                                       | 0                                                                                   | 0                                                                                   | 0                                                                                                                                                                       | 0                                                                                   |                                                                                     |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                                                                                                   | 0                                                                                                                                                                   | 0                                                                                 | 0                                                                                                                                                                       | 0                                                                                   | 0                                                                                   | 0                                                                                                                                                                       | 0                                                                                   |                                                                                     |
| Reduced v/c Ratio       | 0.26                                                                              | 0.47                                                                              | 0.17                                                                              | 1.05                                                                                                                                                                | 0.65                                                                                                                                                                | 0.23                                                                              | 0.38                                                                                                                                                                    | 0.28                                                                                | 0.77                                                                                | 0.55                                                                                                                                                                    | 0.08                                                                                |                                                                                     |

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.

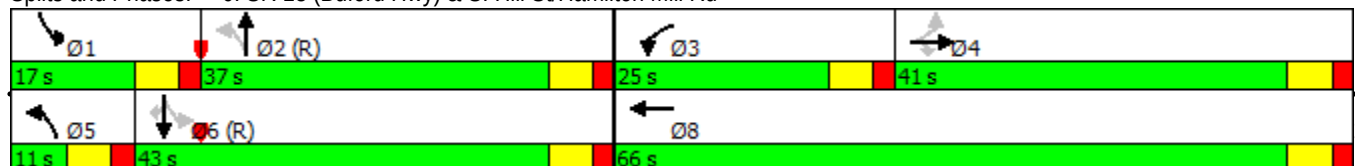
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: SR 13 (Buford Hwy) & S. Hill St/Hamilton Mill Rd



# HCM Signalized Intersection Capacity Analysis

## 6: SR 13 (Buford Hwy) & S. Hill St/Hamilton Mill Rd

Future No-Build AM - Improved

11/16/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |  |  |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (vph)              | 29                                                                                | 166                                                                               | 68                                                                                | 509                                                                               | 250                                                                               | 205                                                                               | 44                                                                                  | 454                                                                                 | 320                                                                                 | 233                                                                                 | 779                                                                                 | 54                                                                                  |
| Future Volume (vph)               | 29                                                                                | 166                                                                               | 68                                                                                | 509                                                                               | 250                                                                               | 205                                                                               | 44                                                                                  | 454                                                                                 | 320                                                                                 | 233                                                                                 | 779                                                                                 | 54                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 | 4.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.97                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |
| Frt                               | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 0.93                                                                              |                                                                                   | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)                 | 1805                                                                              | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1726                                                                              |                                                                                   | 1770                                                                                | 3539                                                                                | 1538                                                                                | 1752                                                                                | 3539                                                                                | 1583                                                                                |
| Flt Permitted                     | 0.38                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.26                                                                                | 1.00                                                                                | 1.00                                                                                | 0.35                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)                 | 718                                                                               | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1726                                                                              |                                                                                   | 490                                                                                 | 3539                                                                                | 1538                                                                                | 645                                                                                 | 3539                                                                                | 1583                                                                                |
| Peak-hour factor, PHF             | 0.54                                                                              | 0.63                                                                              | 0.71                                                                              | 0.92                                                                              | 0.81                                                                              | 0.76                                                                              | 0.75                                                                                | 0.92                                                                                | 0.74                                                                                | 0.71                                                                                | 0.93                                                                                | 0.91                                                                                |
| Adj. Flow (vph)                   | 54                                                                                | 263                                                                               | 96                                                                                | 553                                                                               | 309                                                                               | 270                                                                               | 59                                                                                  | 493                                                                                 | 432                                                                                 | 328                                                                                 | 838                                                                                 | 59                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 78                                                                                | 0                                                                                 | 31                                                                                | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 34                                                                                  |
| Lane Group Flow (vph)             | 54                                                                                | 263                                                                               | 18                                                                                | 553                                                                               | 548                                                                               | 0                                                                                 | 59                                                                                  | 493                                                                                 | 432                                                                                 | 328                                                                                 | 838                                                                                 | 25                                                                                  |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 5%                                                                                | 1%                                                                                | 4%                                                                                | 2%                                                                                  | 2%                                                                                  | 5%                                                                                  | 3%                                                                                  | 2%                                                                                  | 2%                                                                                  |
| Turn Type                         | Perm                                                                              | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                |                                                                                   | pm+pt                                                                               | NA                                                                                  | Free                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   | 3                                                                                 | 8                                                                                 |                                                                                   | 5                                                                                   | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   |                                                                                   | 2                                                                                   |                                                                                     | Free                                                                                | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             | 22.4                                                                              | 22.4                                                                              | 22.4                                                                              | 19.0                                                                              | 47.4                                                                              |                                                                                   | 47.6                                                                                | 43.6                                                                                | 120.0                                                                               | 60.6                                                                                | 50.6                                                                                | 50.6                                                                                |
| Effective Green, g (s)            | 22.4                                                                              | 22.4                                                                              | 22.4                                                                              | 19.0                                                                              | 47.4                                                                              |                                                                                   | 47.6                                                                                | 43.6                                                                                | 120.0                                                                               | 60.6                                                                                | 50.6                                                                                | 50.6                                                                                |
| Actuated g/C Ratio                | 0.19                                                                              | 0.19                                                                              | 0.19                                                                              | 0.16                                                                              | 0.39                                                                              |                                                                                   | 0.40                                                                                | 0.36                                                                                | 1.00                                                                                | 0.51                                                                                | 0.42                                                                                | 0.42                                                                                |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)             | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               |                                                                                   | 3.0                                                                                 | 5.0                                                                                 |                                                                                     | 3.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |
| Lane Grp Cap (vph)                | 134                                                                               | 354                                                                               | 301                                                                               | 528                                                                               | 681                                                                               |                                                                                   | 237                                                                                 | 1285                                                                                | 1538                                                                                | 427                                                                                 | 1492                                                                                | 667                                                                                 |
| v/s Ratio Prot                    |                                                                                   | 0.14                                                                              |                                                                                   | c0.17                                                                             | c0.32                                                                             |                                                                                   | 0.01                                                                                | 0.14                                                                                |                                                                                     | c0.07                                                                               | 0.24                                                                                |                                                                                     |
| v/s Ratio Perm                    | 0.08                                                                              |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.09                                                                                |                                                                                     | 0.28                                                                                | c0.32                                                                               |                                                                                     | 0.02                                                                                |
| v/c Ratio                         | 0.40                                                                              | 0.74                                                                              | 0.06                                                                              | 1.05                                                                              | 0.80                                                                              |                                                                                   | 0.25                                                                                | 0.38                                                                                | 0.28                                                                                | 0.77                                                                                | 0.56                                                                                | 0.04                                                                                |
| Uniform Delay, d1                 | 42.9                                                                              | 46.1                                                                              | 40.1                                                                              | 50.5                                                                              | 32.2                                                                              |                                                                                   | 23.0                                                                                | 28.3                                                                                | 0.0                                                                                 | 21.4                                                                                | 26.3                                                                                | 20.4                                                                                |
| Progression Factor                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 0.59                                                                                | 1.00                                                                                |
| Incremental Delay, d2             | 2.0                                                                               | 8.2                                                                               | 0.1                                                                               | 52.1                                                                              | 6.8                                                                               |                                                                                   | 0.6                                                                                 | 0.9                                                                                 | 0.5                                                                                 | 7.3                                                                                 | 1.4                                                                                 | 0.1                                                                                 |
| Delay (s)                         | 44.9                                                                              | 54.3                                                                              | 40.2                                                                              | 102.6                                                                             | 39.0                                                                              |                                                                                   | 23.6                                                                                | 29.1                                                                                | 0.5                                                                                 | 25.6                                                                                | 16.9                                                                                | 20.5                                                                                |
| Level of Service                  | D                                                                                 | D                                                                                 | D                                                                                 | F                                                                                 | D                                                                                 |                                                                                   | C                                                                                   | C                                                                                   | A                                                                                   | C                                                                                   | B                                                                                   | C                                                                                   |
| Approach Delay (s)                |                                                                                   | 49.8                                                                              |                                                                                   |                                                                                   | 70.1                                                                              |                                                                                   |                                                                                     | 16.2                                                                                |                                                                                     |                                                                                     | 19.4                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                     | B                                                                                   |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 37.2                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.88                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                     |                                                                                     | 24.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 76.1%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM Unsignalized Intersection Capacity Analysis

## 7: Pvt. Drwy/Bryant Rd & Thompson Mill Rd

Future No-Build AM - Improved

11/16/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                    |  |                                                                                     |                                                                                     |  |                                                                                     |
| Traffic Volume (veh/h)            | 5                                                                                 | 212                                                                               | 1                                                                                 | 0                                                                                 | 619                                                                               | 28                                                                                | 0                                                                                  | 0                                                                                   | 0                                                                                   | 13                                                                                  | 0                                                                                   | 6                                                                                   |
| Future Volume (Veh/h)             | 5                                                                                 | 212                                                                               | 1                                                                                 | 0                                                                                 | 619                                                                               | 28                                                                                | 0                                                                                  | 0                                                                                   | 0                                                                                   | 13                                                                                  | 0                                                                                   | 6                                                                                   |
| Sign Control                      |                                                                                   | Free                                                                              |                                                                                   |                                                                                   | Free                                                                              |                                                                                   |                                                                                    | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Grade                             |                                                                                   | 0%                                                                                |                                                                                   |                                                                                   | 0%                                                                                |                                                                                   |                                                                                    | 0%                                                                                  |                                                                                     |                                                                                     | 0%                                                                                  |                                                                                     |
| Peak Hour Factor                  | 0.42                                                                              | 0.83                                                                              | 0.25                                                                              | 0.92                                                                              | 0.94                                                                              | 0.68                                                                              | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.60                                                                                | 0.92                                                                                | 0.75                                                                                |
| Hourly flow rate (vph)            | 12                                                                                | 255                                                                               | 4                                                                                 | 0                                                                                 | 659                                                                               | 41                                                                                | 0                                                                                  | 0                                                                                   | 0                                                                                   | 22                                                                                  | 0                                                                                   | 8                                                                                   |
| Pedestrians                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane Width (ft)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Walking Speed (ft/s)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Percent Blockage                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Right turn flare (veh)            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median type                       | None                                                                              |                                                                                   |                                                                                   | None                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median storage (veh)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Upstream signal (ft)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| pX, platoon unblocked             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC, conflicting volume            | 700                                                                               |                                                                                   |                                                                                   | 259                                                                               |                                                                                   |                                                                                   | 968                                                                                | 981                                                                                 | 257                                                                                 | 960                                                                                 | 962                                                                                 | 680                                                                                 |
| vC1, stage 1 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC2, stage 2 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vCu, unblocked vol                | 700                                                                               |                                                                                   |                                                                                   | 259                                                                               |                                                                                   |                                                                                   | 968                                                                                | 981                                                                                 | 257                                                                                 | 960                                                                                 | 962                                                                                 | 680                                                                                 |
| tC, single (s)                    | 4.1                                                                               |                                                                                   |                                                                                   | 4.1                                                                               |                                                                                   |                                                                                   | 7.1                                                                                | 6.5                                                                                 | 6.2                                                                                 | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 |
| tC, 2 stage (s)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| tF (s)                            | 2.2                                                                               |                                                                                   |                                                                                   | 2.2                                                                               |                                                                                   |                                                                                   | 3.5                                                                                | 4.0                                                                                 | 3.3                                                                                 | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 |
| p0 queue free %                   | 99                                                                                |                                                                                   |                                                                                   | 100                                                                               |                                                                                   |                                                                                   | 100                                                                                | 100                                                                                 | 100                                                                                 | 91                                                                                  | 100                                                                                 | 98                                                                                  |
| cM capacity (veh/h)               | 906                                                                               |                                                                                   |                                                                                   | 1317                                                                              |                                                                                   |                                                                                   | 229                                                                                | 248                                                                                 | 787                                                                                 | 236                                                                                 | 254                                                                                 | 455                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total                      | 271                                                                               | 700                                                                               | 0                                                                                 | 30                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left                       | 12                                                                                | 0                                                                                 | 0                                                                                 | 22                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right                      | 4                                                                                 | 41                                                                                | 0                                                                                 | 8                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| cSH                               | 906                                                                               | 1317                                                                              | 1700                                                                              | 270                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume to Capacity                | 0.01                                                                              | 0.00                                                                              | 0.00                                                                              | 0.11                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Queue Length 95th (ft)            | 1                                                                                 | 0                                                                                 | 0                                                                                 | 9                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 0.5                                                                               | 0.0                                                                               | 0.0                                                                               | 20.0                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane LOS                          | A                                                                                 |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 0.5                                                                               | 0.0                                                                               | 0.0                                                                               | 20.0                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Average Delay                     |                                                                                   |                                                                                   | 0.7                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 44.3%                                                                             | ICU Level of Service                                                              |                                                                                   |                                                                                   |                                                                                    | A                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

HCM Unsignalized Intersection Capacity Analysis  
8: N. Bogan Rd & Thompson Mill Rd

Future No-Build AM - Improved

11/16/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |  |                                                                                   |  |                                                                                   |                                                                                    |  |  |                                                                                     |  |  |
| Sign Control                      |                                                                                   | Stop                                                                              |                                                                                   |                                                                                   | Stop                                                                              |                                                                                   |                                                                                    | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Traffic Volume (vph)              | 56                                                                                | 111                                                                               | 69                                                                                | 54                                                                                | 406                                                                               | 9                                                                                 | 119                                                                                | 69                                                                                  | 17                                                                                  | 8                                                                                   | 98                                                                                  | 127                                                                                 |
| Future Volume (vph)               | 56                                                                                | 111                                                                               | 69                                                                                | 54                                                                                | 406                                                                               | 9                                                                                 | 119                                                                                | 69                                                                                  | 17                                                                                  | 8                                                                                   | 98                                                                                  | 127                                                                                 |
| Peak Hour Factor                  | 0.74                                                                              | 0.80                                                                              | 0.75                                                                              | 0.85                                                                              | 0.95                                                                              | 0.45                                                                              | 0.72                                                                               | 0.87                                                                                | 0.80                                                                                | 0.50                                                                                | 0.93                                                                                | 0.78                                                                                |
| Hourly flow rate (vph)            | 76                                                                                | 139                                                                               | 92                                                                                | 64                                                                                | 427                                                                               | 20                                                                                | 165                                                                                | 79                                                                                  | 21                                                                                  | 16                                                                                  | 105                                                                                 | 163                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | EB 2                                                                              | WB 1                                                                              | NB 1                                                                              | NB 2                                                                              | SB 1                                                                              | SB 2                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total (vph)                | 215                                                                               | 92                                                                                | 511                                                                               | 244                                                                               | 21                                                                                | 121                                                                               | 163                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left (vph)                 | 76                                                                                | 0                                                                                 | 64                                                                                | 165                                                                               | 0                                                                                 | 16                                                                                | 0                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right (vph)                | 0                                                                                 | 92                                                                                | 20                                                                                | 0                                                                                 | 21                                                                                | 0                                                                                 | 163                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Hadj (s)                          | 0.08                                                                              | -0.60                                                                             | 0.00                                                                              | 0.14                                                                              | -0.60                                                                             | 0.03                                                                              | -0.60                                                                              |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Departure Headway (s)             | 6.1                                                                               | 3.2                                                                               | 5.6                                                                               | 6.4                                                                               | 3.2                                                                               | 6.7                                                                               | 3.2                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Degree Utilization, x             | 0.37                                                                              | 0.08                                                                              | 0.79                                                                              | 0.44                                                                              | 0.02                                                                              | 0.22                                                                              | 0.14                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Capacity (veh/h)                  | 530                                                                               | 1121                                                                              | 631                                                                               | 506                                                                               | 1121                                                                              | 471                                                                               | 1121                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 12.7                                                                              | 6.5                                                                               | 26.0                                                                              | 14.3                                                                              | 6.3                                                                               | 11.6                                                                              | 6.7                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 10.8                                                                              |                                                                                   | 26.0                                                                              | 13.7                                                                              |                                                                                   | 8.8                                                                               |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      | B                                                                                 |                                                                                   | D                                                                                 | B                                                                                 |                                                                                   | A                                                                                 |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Delay                             |                                                                                   |                                                                                   | 16.6                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 55.1%                                                                             | ICU Level of Service                                                              |                                                                                   |                                                                                   |                                                                                    | B                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

Intersection: 8: N. Bogan Rd & Thompson Mill Rd

| Movement              | EB   | WB   | NB  | SB  | SB |
|-----------------------|------|------|-----|-----|----|
| Directions Served     | LT   | LTR  | LT  | LT  | R  |
| Maximum Queue (ft)    | 77   | 158  | 54  | 52  | 56 |
| Average Queue (ft)    | 52   | 78   | 44  | 35  | 22 |
| 95th Queue (ft)       | 78   | 146  | 62  | 49  | 66 |
| Link Distance (ft)    | 2455 | 1026 | 849 | 592 |    |
| Upstream Blk Time (%) |      |      |     |     |    |
| Queuing Penalty (veh) |      |      |     |     |    |
| Storage Bay Dist (ft) |      |      |     | 100 |    |
| Storage Blk Time (%)  |      |      |     |     |    |
| Queuing Penalty (veh) |      |      |     |     |    |

## Queues

## Future No-Build PM - Improved

## 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)

11/16/2016



| Lane Group              | EBL   | EBT   | WBT   | WBR   | NBL   | NBT   | NBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↰     | ↗↗    | ↰↰↰   | ↗     | ↰     | ↗     | ↗     |
| Traffic Volume (vph)    | 472   | 1297  | 550   | 135   | 347   | 1     | 562   |
| Future Volume (vph)     | 472   | 1297  | 550   | 135   | 347   | 1     | 562   |
| Lane Group Flow (vph)   | 576   | 1457  | 567   | 173   | 206   | 211   | 618   |
| Turn Type               | Prot  | NA    | NA    | Perm  | Perm  | NA    | Perm  |
| Protected Phases        | 5     | 2     | 6     |       |       | 8     |       |
| Permitted Phases        |       |       |       | 6     | 8     |       | 8     |
| Detector Phase          | 5     | 2     | 6     | 6     | 8     | 8     | 8     |
| Switch Phase            |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 4.0   | 15.0  | 15.0  | 15.0  | 6.0   | 6.0   | 6.0   |
| Minimum Split (s)       | 11.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 47.0  | 71.0  | 24.0  | 24.0  | 49.0  | 49.0  | 49.0  |
| Total Split (%)         | 39.2% | 59.2% | 20.0% | 20.0% | 40.8% | 40.8% | 40.8% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lead  |       | Lag   | Lag   |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |
| Recall Mode             | None  | C-Min | C-Min | C-Min | None  | None  | None  |
| v/c Ratio               | 0.96  | 0.75  | 0.71  | 0.44  | 0.34  | 0.35  | 0.98  |
| Control Delay           | 53.9  | 17.6  | 53.7  | 10.4  | 30.1  | 30.2  | 64.8  |
| Queue Delay             | 0.0   | 2.7   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 53.9  | 20.3  | 53.7  | 10.4  | 30.1  | 30.2  | 64.8  |
| Queue Length 50th (ft)  | 431   | 493   | 155   | 0     | 122   | 125   | 422   |
| Queue Length 95th (ft)  | #565  | 617   | 199   | 38    | 174   | 47    | #673  |
| Internal Link Dist (ft) |       | 591   | 1139  |       |       | 825   |       |
| Turn Bay Length (ft)    |       |       |       | 840   |       |       | 510   |
| Base Capacity (vph)     | 610   | 1955  | 803   | 395   | 608   | 610   | 631   |
| Starvation Cap Reductn  | 0     | 367   | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.94  | 0.92  | 0.71  | 0.44  | 0.34  | 0.35  | 0.98  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 73 (61%), Referenced to phase 2:EBT and 6:WBT, Start of Green

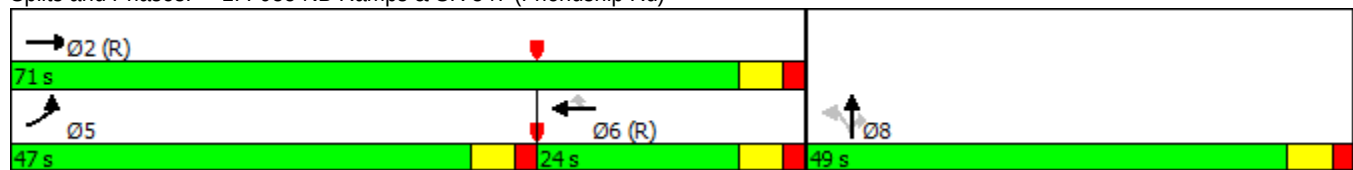
Natural Cycle: 90

Control Type: Actuated-Coordinated

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)



Baseline

Synchro 9 Report  
Page 1

# HCM Signalized Intersection Capacity Analysis

## 1: I-985 NB Ramps & SR 347 (Friendship Rd)

Future No-Build PM - Improved

11/16/2016

|                                   |  |                                                                                    |  |  |                                                                                                                                                                      |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                                                                                                                 | EBR                                                                               | WBL                                                                               | WBT                                                                                                                                                                                                                                                   | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |   |                                                                                   |                                                                                   |    |  |  |  |  |                                                                                     |                                                                                     |                                                                                     |
| Traffic Volume (vph)              | 472                                                                               | 1297                                                                                                                                                                | 0                                                                                 | 0                                                                                 | 550                                                                                                                                                                                                                                                   | 135                                                                               | 347                                                                                 | 1                                                                                   | 562                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Future Volume (vph)               | 472                                                                               | 1297                                                                                                                                                                | 0                                                                                 | 0                                                                                 | 550                                                                                                                                                                                                                                                   | 135                                                                               | 347                                                                                 | 1                                                                                   | 562                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                                                                                                                | 1900                                                                              | 1900                                                                              | 1900                                                                                                                                                                                                                                                  | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                                                                                                                 |                                                                                   |                                                                                   | 6.0                                                                                                                                                                                                                                                   | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Util. Factor                 | 1.00                                                                              | 0.95                                                                                                                                                                |                                                                                   |                                                                                   | 0.91                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Frt                               | 1.00                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (prot)                 | 1787                                                                              | 3610                                                                                                                                                                |                                                                                   |                                                                                   | 5136                                                                                                                                                                                                                                                  | 1599                                                                              | 1698                                                                                | 1704                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Permitted                     | 0.95                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (perm)                 | 1787                                                                              | 3610                                                                                                                                                                |                                                                                   |                                                                                   | 5136                                                                                                                                                                                                                                                  | 1599                                                                              | 1698                                                                                | 1704                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Peak-hour factor, PHF             | 0.82                                                                              | 0.89                                                                                                                                                                | 0.92                                                                              | 0.92                                                                              | 0.97                                                                                                                                                                                                                                                  | 0.78                                                                              | 0.84                                                                                | 0.25                                                                                | 0.91                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Adj. Flow (vph)                   | 576                                                                               | 1457                                                                                                                                                                | 0                                                                                 | 0                                                                                 | 567                                                                                                                                                                                                                                                   | 173                                                                               | 413                                                                                 | 4                                                                                   | 618                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                                                                                                                                                                                     | 146                                                                               | 0                                                                                   | 0                                                                                   | 53                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 576                                                                               | 1457                                                                                                                                                                | 0                                                                                 | 0                                                                                 | 567                                                                                                                                                                                                                                                   | 27                                                                                | 206                                                                                 | 211                                                                                 | 565                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Heavy Vehicles (%)                | 1%                                                                                | 0%                                                                                                                                                                  | 0%                                                                                | 0%                                                                                | 1%                                                                                                                                                                                                                                                    | 1%                                                                                | 1%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  |
| Turn Type                         | Prot                                                                              | NA                                                                                                                                                                  |                                                                                   |                                                                                   | NA                                                                                                                                                                                                                                                    | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Protected Phases                  | 5                                                                                 | 2                                                                                                                                                                   |                                                                                   |                                                                                   | 6                                                                                                                                                                                                                                                     |                                                                                   |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Permitted Phases                  |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Actuated Green, G (s)             | 40.2                                                                              | 65.0                                                                                                                                                                |                                                                                   |                                                                                   | 18.8                                                                                                                                                                                                                                                  | 18.8                                                                              | 43.0                                                                                | 43.0                                                                                | 43.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Effective Green, g (s)            | 40.2                                                                              | 65.0                                                                                                                                                                |                                                                                   |                                                                                   | 18.8                                                                                                                                                                                                                                                  | 18.8                                                                              | 43.0                                                                                | 43.0                                                                                | 43.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Actuated g/C Ratio                | 0.34                                                                              | 0.54                                                                                                                                                                |                                                                                   |                                                                                   | 0.16                                                                                                                                                                                                                                                  | 0.16                                                                              | 0.36                                                                                | 0.36                                                                                | 0.36                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                                                                                                                 |                                                                                   |                                                                                   | 6.0                                                                                                                                                                                                                                                   | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Vehicle Extension (s)             | 3.0                                                                               | 5.0                                                                                                                                                                 |                                                                                   |                                                                                   | 5.0                                                                                                                                                                                                                                                   | 5.0                                                                               | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Grp Cap (vph)                | 598                                                                               | 1955                                                                                                                                                                |                                                                                   |                                                                                   | 804                                                                                                                                                                                                                                                   | 250                                                                               | 608                                                                                 | 610                                                                                 | 578                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Prot                    | c0.32                                                                             | c0.40                                                                                                                                                               |                                                                                   |                                                                                   | 0.11                                                                                                                                                                                                                                                  |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       | 0.02                                                                              | 0.12                                                                                | 0.12                                                                                | c0.35                                                                               |                                                                                     |                                                                                     |                                                                                     |
| v/c Ratio                         | 0.96                                                                              | 0.75                                                                                                                                                                |                                                                                   |                                                                                   | 0.71                                                                                                                                                                                                                                                  | 0.11                                                                              | 0.34                                                                                | 0.35                                                                                | 0.98                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Uniform Delay, d1                 | 39.2                                                                              | 21.1                                                                                                                                                                |                                                                                   |                                                                                   | 48.0                                                                                                                                                                                                                                                  | 43.4                                                                              | 28.1                                                                                | 28.2                                                                                | 38.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Progression Factor                | 0.71                                                                              | 0.72                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Incremental Delay, d2             | 23.9                                                                              | 2.1                                                                                                                                                                 |                                                                                   |                                                                                   | 5.2                                                                                                                                                                                                                                                   | 0.9                                                                               | 0.3                                                                                 | 0.3                                                                                 | 31.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Delay (s)                         | 51.7                                                                              | 17.4                                                                                                                                                                |                                                                                   |                                                                                   | 53.1                                                                                                                                                                                                                                                  | 44.3                                                                              | 28.5                                                                                | 28.5                                                                                | 69.6                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  | D                                                                                 | B                                                                                                                                                                   |                                                                                   |                                                                                   | D                                                                                                                                                                                                                                                     | D                                                                                 | C                                                                                   | C                                                                                   | E                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                |                                                                                   | 27.1                                                                                                                                                                |                                                                                   |                                                                                   | 51.1                                                                                                                                                                                                                                                  |                                                                                   |                                                                                     | 53.0                                                                                |                                                                                     |                                                                                     | 0.0                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                                                                                                   |                                                                                   |                                                                                   | D                                                                                                                                                                                                                                                     |                                                                                   |                                                                                     | D                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                                                                                                     | 38.8                                                                              |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     | D                                                                                   |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                                                                                                     | 0.95                                                                              |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                                                                                                     | 120.0                                                                             |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     | 18.0                                                                                |
| Intersection Capacity Utilization |                                                                                   |                                                                                                                                                                     | 80.7%                                                                             |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     | D                                                                                   |
| Analysis Period (min)             |                                                                                   |                                                                                                                                                                     | 15                                                                                |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



## Queues

## 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)

Future No-Build PM - Improved

11/16/2016



| Lane Group              | EBT   | EBR   | WBL   | WBT   | SBL   | SBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↑↑↑   | ↑     | ↵     | ↑↑    | ↵     | ↑     |
| Traffic Volume (vph)    | 1464  | 408   | 162   | 746   | 320   | 353   |
| Future Volume (vph)     | 1464  | 408   | 162   | 746   | 320   | 353   |
| Lane Group Flow (vph)   | 1541  | 504   | 198   | 820   | 421   | 420   |
| Turn Type               | NA    | Perm  | Prot  | NA    | Perm  | Perm  |
| Protected Phases        | 2     |       | 1     | 6     |       |       |
| Permitted Phases        |       | 2     |       |       | 4     | 4     |
| Detector Phase          | 2     | 2     | 1     | 6     | 4     | 4     |
| Switch Phase            |       |       |       |       |       |       |
| Minimum Initial (s)     | 15.0  | 15.0  | 4.0   | 15.0  | 6.0   | 6.0   |
| Minimum Split (s)       | 24.0  | 24.0  | 11.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 54.0  | 54.0  | 18.0  | 72.0  | 48.0  | 48.0  |
| Total Split (%)         | 45.0% | 45.0% | 15.0% | 60.0% | 40.0% | 40.0% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lag   | Lag   | Lead  |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |
| Recall Mode             | C-Min | C-Min | None  | C-Min | None  | None  |
| v/c Ratio               | 0.63  | 0.50  | 0.62  | 0.37  | 0.83  | 0.76  |
| Control Delay           | 16.4  | 1.6   | 43.7  | 14.8  | 53.9  | 32.8  |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.1   | 0.0   |
| Total Delay             | 16.4  | 1.6   | 43.7  | 14.8  | 53.9  | 32.8  |
| Queue Length 50th (ft)  | 174   | 5     | 72    | 315   | 304   | 193   |
| Queue Length 95th (ft)  | m201  | m1    | 91    | 394   | 310   | 252   |
| Internal Link Dist (ft) | 904   |       |       | 591   |       |       |
| Turn Bay Length (ft)    |       | 375   | 380   |       |       |       |
| Base Capacity (vph)     | 2463  | 1016  | 346   | 2207  | 631   | 653   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 57    | 0     | 0     | 0     | 5     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.64  | 0.50  | 0.57  | 0.37  | 0.67  | 0.64  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

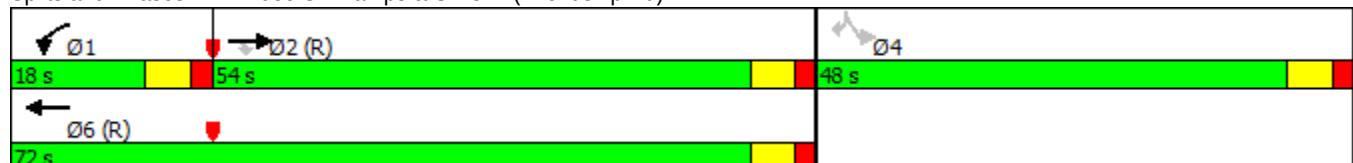
Offset: 6 (5%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)



# HCM Signalized Intersection Capacity Analysis

## 2: I-985 SB Ramps & SR 347 (Friendship Rd)

Future No-Build PM - Improved

11/16/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |  |  |  |                                                                                   |                                                                                     |                                                                                     |                                                                                     |  |                                                                                     |  |
| Traffic Volume (vph)              | 0                                                                                 | 1464                                                                              | 408                                                                               | 162                                                                               | 746                                                                               | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 320                                                                                 | 0                                                                                   | 353                                                                                 |
| Future Volume (vph)               | 0                                                                                 | 1464                                                                              | 408                                                                               | 162                                                                               | 746                                                                               | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 320                                                                                 | 0                                                                                   | 353                                                                                 |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 6.0                                                                                 |                                                                                     | 6.0                                                                                 |
| Lane Util. Factor                 |                                                                                   | 0.91                                                                              | 1.00                                                                              | 0.97                                                                              | 0.95                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Frt                               |                                                                                   | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     | 0.85                                                                                |
| Flt Protected                     |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 0.95                                                                                |                                                                                     | 1.00                                                                                |
| Satd. Flow (prot)                 |                                                                                   | 5187                                                                              | 1583                                                                              | 3467                                                                              | 3574                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 1805                                                                                |                                                                                     | 1583                                                                                |
| Flt Permitted                     |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 0.95                                                                                |                                                                                     | 1.00                                                                                |
| Satd. Flow (perm)                 |                                                                                   | 5187                                                                              | 1583                                                                              | 3467                                                                              | 3574                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 1805                                                                                |                                                                                     | 1583                                                                                |
| Peak-hour factor, PHF             | 0.92                                                                              | 0.95                                                                              | 0.81                                                                              | 0.82                                                                              | 0.91                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.76                                                                                | 0.92                                                                                | 0.84                                                                                |
| Adj. Flow (vph)                   | 0                                                                                 | 1541                                                                              | 504                                                                               | 198                                                                               | 820                                                                               | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 421                                                                                 | 0                                                                                   | 420                                                                                 |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 265                                                                               | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 110                                                                                 |
| Lane Group Flow (vph)             | 0                                                                                 | 1541                                                                              | 239                                                                               | 198                                                                               | 820                                                                               | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 421                                                                                 | 0                                                                                   | 310                                                                                 |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 2%                                                                                | 1%                                                                                | 1%                                                                                | 0%                                                                                | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 2%                                                                                  |
| Turn Type                         |                                                                                   | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                |                                                                                   |                                                                                     |                                                                                     |                                                                                     | Perm                                                                                |                                                                                     | Perm                                                                                |
| Protected Phases                  |                                                                                   | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Permitted Phases                  |                                                                                   |                                                                                   | 2                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 4                                                                                   |                                                                                     | 4                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 57.0                                                                              | 57.0                                                                              | 11.1                                                                              | 74.1                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 33.9                                                                                |                                                                                     | 33.9                                                                                |
| Effective Green, g (s)            |                                                                                   | 57.0                                                                              | 57.0                                                                              | 11.1                                                                              | 74.1                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 33.9                                                                                |                                                                                     | 33.9                                                                                |
| Actuated g/C Ratio                |                                                                                   | 0.48                                                                              | 0.48                                                                              | 0.09                                                                              | 0.62                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 0.28                                                                                |                                                                                     | 0.28                                                                                |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 6.0                                                                                 |                                                                                     | 6.0                                                                                 |
| Vehicle Extension (s)             |                                                                                   | 5.0                                                                               | 5.0                                                                               | 3.0                                                                               | 5.0                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 3.0                                                                                 |                                                                                     | 3.0                                                                                 |
| Lane Grp Cap (vph)                |                                                                                   | 2463                                                                              | 751                                                                               | 320                                                                               | 2206                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 509                                                                                 |                                                                                     | 447                                                                                 |
| v/s Ratio Prot                    |                                                                                   | c0.30                                                                             |                                                                                   | c0.06                                                                             | 0.23                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                   | 0.15                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     | c0.23                                                                               |                                                                                     | 0.20                                                                                |
| v/c Ratio                         |                                                                                   | 0.63                                                                              | 0.32                                                                              | 0.62                                                                              | 0.37                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 0.83                                                                                |                                                                                     | 0.69                                                                                |
| Uniform Delay, d1                 |                                                                                   | 23.5                                                                              | 19.5                                                                              | 52.4                                                                              | 11.4                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 40.3                                                                                |                                                                                     | 38.4                                                                                |
| Progression Factor                |                                                                                   | 0.62                                                                              | 0.18                                                                              | 0.69                                                                              | 1.16                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Incremental Delay, d2             |                                                                                   | 0.9                                                                               | 0.8                                                                               | 3.0                                                                               | 0.4                                                                               |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 10.6                                                                                |                                                                                     | 4.6                                                                                 |
| Delay (s)                         |                                                                                   | 15.5                                                                              | 4.4                                                                               | 39.3                                                                              | 13.7                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 50.9                                                                                |                                                                                     | 43.1                                                                                |
| Level of Service                  |                                                                                   | B                                                                                 | A                                                                                 | D                                                                                 | B                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     | D                                                                                   |                                                                                     | D                                                                                   |
| Approach Delay (s)                |                                                                                   | 12.7                                                                              |                                                                                   |                                                                                   | 18.7                                                                              |                                                                                   |                                                                                     | 0.0                                                                                 |                                                                                     |                                                                                     | 47.0                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | B                                                                                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                     | A                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 21.7                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                     |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.69                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                     |                                                                                     |                                                                                     | 18.0                                                                                |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 80.7%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                     |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

## Future No-Build PM - Improved

## 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)

11/16/2016

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations     |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 193                                                                               | 871                                                                               | 75                                                                                | 301                                                                               | 612                                                                               | 237                                                                               | 114                                                                                | 356                                                                                 | 356                                                                                 | 173                                                                                 | 160                                                                                 | 103                                                                                 |
| Future Volume (vph)     | 193                                                                               | 871                                                                               | 75                                                                                | 301                                                                               | 612                                                                               | 237                                                                               | 114                                                                                | 356                                                                                 | 356                                                                                 | 173                                                                                 | 160                                                                                 | 103                                                                                 |
| Lane Group Flow (vph)   | 222                                                                               | 1075                                                                              | 89                                                                                | 338                                                                               | 703                                                                               | 279                                                                               | 123                                                                                | 445                                                                                 | 424                                                                                 | 184                                                                                 | 193                                                                                 | 110                                                                                 |
| Turn Type               | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                              | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases        | 5                                                                                 | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   | 3                                                                                  | 8                                                                                   |                                                                                     | 7                                                                                   | 4                                                                                   |                                                                                     |
| Permitted Phases        | 2                                                                                 |                                                                                   | 2                                                                                 | 6                                                                                 |                                                                                   | 6                                                                                 | 8                                                                                  |                                                                                     | 8                                                                                   | 4                                                                                   |                                                                                     | 4                                                                                   |
| Detector Phase          | 5                                                                                 | 2                                                                                 | 2                                                                                 | 1                                                                                 | 6                                                                                 | 6                                                                                 | 3                                                                                  | 8                                                                                   | 8                                                                                   | 7                                                                                   | 4                                                                                   | 4                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 4.0                                                                               | 15.0                                                                              | 15.0                                                                              | 4.0                                                                               | 15.0                                                                              | 15.0                                                                              | 4.0                                                                                | 6.0                                                                                 | 6.0                                                                                 | 4.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Minimum Split (s)       | 11.0                                                                              | 37.0                                                                              | 37.0                                                                              | 11.0                                                                              | 37.0                                                                              | 37.0                                                                              | 11.0                                                                               | 42.0                                                                                | 42.0                                                                                | 11.0                                                                                | 42.0                                                                                | 42.0                                                                                |
| Total Split (s)         | 22.0                                                                              | 43.0                                                                              | 43.0                                                                              | 23.0                                                                              | 44.0                                                                              | 44.0                                                                              | 12.0                                                                               | 42.0                                                                                | 42.0                                                                                | 12.0                                                                                | 42.0                                                                                | 42.0                                                                                |
| Total Split (%)         | 18.3%                                                                             | 35.8%                                                                             | 35.8%                                                                             | 19.2%                                                                             | 36.7%                                                                             | 36.7%                                                                             | 10.0%                                                                              | 35.0%                                                                               | 35.0%                                                                               | 10.0%                                                                               | 35.0%                                                                               | 35.0%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Lost Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lead/Lag                | Lead                                                                              | Lag                                                                               | Lag                                                                               | Lead                                                                              | Lag                                                                               | Lag                                                                               | Lead                                                                               | Lag                                                                                 | Lag                                                                                 | Lead                                                                                | Lag                                                                                 | Lag                                                                                 |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | C-Min                                                                             | C-Min                                                                             | None                                                                              | C-Min                                                                             | C-Min                                                                             | None                                                                               | None                                                                                | None                                                                                | None                                                                                | None                                                                                | None                                                                                |
| v/c Ratio               | 0.58                                                                              | 0.89                                                                              | 0.15                                                                              | 1.07                                                                              | 0.53                                                                              | 0.37                                                                              | 0.33                                                                               | 0.88                                                                                | 0.64                                                                                | 1.12                                                                                | 0.39                                                                                | 0.21                                                                                |
| Control Delay           | 23.1                                                                              | 48.4                                                                              | 1.7                                                                               | 105.7                                                                             | 23.1                                                                              | 4.1                                                                               | 18.9                                                                               | 53.3                                                                                | 16.6                                                                                | 135.2                                                                               | 37.4                                                                                | 3.7                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 23.1                                                                              | 48.4                                                                              | 1.7                                                                               | 105.7                                                                             | 23.1                                                                              | 4.1                                                                               | 18.9                                                                               | 53.3                                                                                | 16.6                                                                                | 135.2                                                                               | 37.4                                                                                | 3.7                                                                                 |
| Queue Length 50th (ft)  | 93                                                                                | 424                                                                               | 0                                                                                 | ~227                                                                              | 282                                                                               | 44                                                                                | 58                                                                                 | 339                                                                                 | 184                                                                                 | ~107                                                                                | 119                                                                                 | 0                                                                                   |
| Queue Length 95th (ft)  | 141                                                                               | 451                                                                               | 5                                                                                 | #419                                                                              | 303                                                                               | 23                                                                                | 88                                                                                 | 405                                                                                 | 252                                                                                 | #230                                                                                | 168                                                                                 | 27                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 1576                                                                              |                                                                                   |                                                                                   | 3513                                                                              |                                                                                   |                                                                                    | 1183                                                                                |                                                                                     |                                                                                     | 1183                                                                                |                                                                                     |
| Turn Bay Length (ft)    | 250                                                                               |                                                                                   | 370                                                                               | 300                                                                               |                                                                                   | 310                                                                               |                                                                                    |                                                                                     | 500                                                                                 | 300                                                                                 |                                                                                     | 215                                                                                 |
| Base Capacity (vph)     | 426                                                                               | 1213                                                                              | 612                                                                               | 315                                                                               | 1328                                                                              | 753                                                                               | 370                                                                                | 558                                                                                 | 697                                                                                 | 165                                                                                 | 543                                                                                 | 574                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.52                                                                              | 0.89                                                                              | 0.15                                                                              | 1.07                                                                              | 0.53                                                                              | 0.37                                                                              | 0.33                                                                               | 0.80                                                                                | 0.61                                                                                | 1.12                                                                                | 0.36                                                                                | 0.19                                                                                |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 68 (57%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

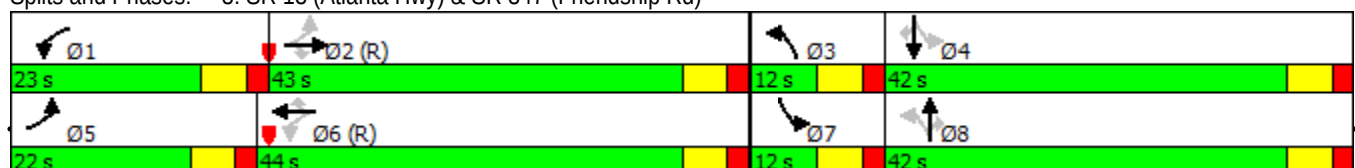
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

## Splits and Phases: 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)



# HCM Signalized Intersection Capacity Analysis

## 3: SR 13 (Atlanta Hwy) & SR 347 (Friendship Rd)

Future No-Build PM - Improved

11/16/2016

|                        |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement               | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations    |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)   | 193                                                                               | 871                                                                               | 75                                                                                | 301                                                                               | 612                                                                               | 237                                                                               | 114                                                                                | 356                                                                                 | 356                                                                                 | 173                                                                                 | 160                                                                                 | 103                                                                                 |
| Future Volume (vph)    | 193                                                                               | 871                                                                               | 75                                                                                | 301                                                                               | 612                                                                               | 237                                                                               | 114                                                                                | 356                                                                                 | 356                                                                                 | 173                                                                                 | 160                                                                                 | 103                                                                                 |
| Ideal Flow (vphpl)     | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)    | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor      | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Frt                    | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                               | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected          | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                               | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)      | 1805                                                                              | 3610                                                                              | 1553                                                                              | 1787                                                                              | 3610                                                                              | 1568                                                                              | 1787                                                                               | 1863                                                                                | 1599                                                                                | 1752                                                                                | 1810                                                                                | 1599                                                                                |
| Flt Permitted          | 0.29                                                                              | 1.00                                                                              | 1.00                                                                              | 0.09                                                                              | 1.00                                                                              | 1.00                                                                              | 0.55                                                                               | 1.00                                                                                | 1.00                                                                                | 0.15                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)      | 552                                                                               | 3610                                                                              | 1553                                                                              | 171                                                                               | 3610                                                                              | 1568                                                                              | 1033                                                                               | 1863                                                                                | 1599                                                                                | 286                                                                                 | 1810                                                                                | 1599                                                                                |
| Peak-hour factor, PHF  | 0.87                                                                              | 0.81                                                                              | 0.84                                                                              | 0.89                                                                              | 0.87                                                                              | 0.85                                                                              | 0.93                                                                               | 0.80                                                                                | 0.84                                                                                | 0.94                                                                                | 0.83                                                                                | 0.94                                                                                |
| Adj. Flow (vph)        | 222                                                                               | 1075                                                                              | 89                                                                                | 338                                                                               | 703                                                                               | 279                                                                               | 123                                                                                | 445                                                                                 | 424                                                                                 | 184                                                                                 | 193                                                                                 | 110                                                                                 |
| RTOR Reduction (vph)   | 0                                                                                 | 0                                                                                 | 59                                                                                | 0                                                                                 | 0                                                                                 | 176                                                                               | 0                                                                                  | 0                                                                                   | 226                                                                                 | 0                                                                                   | 0                                                                                   | 80                                                                                  |
| Lane Group Flow (vph)  | 222                                                                               | 1075                                                                              | 30                                                                                | 338                                                                               | 703                                                                               | 103                                                                               | 123                                                                                | 445                                                                                 | 198                                                                                 | 184                                                                                 | 193                                                                                 | 30                                                                                  |
| Heavy Vehicles (%)     | 0%                                                                                | 0%                                                                                | 4%                                                                                | 1%                                                                                | 0%                                                                                | 3%                                                                                | 1%                                                                                 | 2%                                                                                  | 1%                                                                                  | 3%                                                                                  | 5%                                                                                  | 1%                                                                                  |
| Turn Type              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                              | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases       | 5                                                                                 | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   | 3                                                                                  | 8                                                                                   |                                                                                     | 7                                                                                   | 4                                                                                   |                                                                                     |
| Permitted Phases       | 2                                                                                 |                                                                                   | 2                                                                                 | 6                                                                                 |                                                                                   | 6                                                                                 | 8                                                                                  |                                                                                     | 8                                                                                   | 4                                                                                   |                                                                                     | 4                                                                                   |
| Actuated Green, G (s)  | 53.5                                                                              | 40.3                                                                              | 40.3                                                                              | 61.1                                                                              | 44.1                                                                              | 44.1                                                                              | 38.7                                                                               | 32.7                                                                                | 32.7                                                                                | 38.7                                                                                | 32.7                                                                                | 32.7                                                                                |
| Effective Green, g (s) | 53.5                                                                              | 40.3                                                                              | 40.3                                                                              | 61.1                                                                              | 44.1                                                                              | 44.1                                                                              | 38.7                                                                               | 32.7                                                                                | 32.7                                                                                | 38.7                                                                                | 32.7                                                                                | 32.7                                                                                |
| Actuated g/C Ratio     | 0.45                                                                              | 0.34                                                                              | 0.34                                                                              | 0.51                                                                              | 0.37                                                                              | 0.37                                                                              | 0.32                                                                               | 0.27                                                                                | 0.27                                                                                | 0.32                                                                                | 0.27                                                                                | 0.27                                                                                |
| Clearance Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)  | 3.0                                                                               | 5.0                                                                               | 5.0                                                                               | 3.0                                                                               | 5.0                                                                               | 5.0                                                                               | 3.0                                                                                | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 |
| Lane Grp Cap (vph)     | 383                                                                               | 1212                                                                              | 521                                                                               | 316                                                                               | 1326                                                                              | 576                                                                               | 370                                                                                | 507                                                                                 | 435                                                                                 | 165                                                                                 | 493                                                                                 | 435                                                                                 |
| v/s Ratio Prot         | 0.06                                                                              | 0.30                                                                              |                                                                                   | c0.15                                                                             | c0.19                                                                             |                                                                                   | 0.02                                                                               | 0.24                                                                                |                                                                                     | c0.06                                                                               | 0.11                                                                                |                                                                                     |
| v/s Ratio Perm         | 0.19                                                                              |                                                                                   | 0.02                                                                              | c0.39                                                                             |                                                                                   | 0.07                                                                              | 0.09                                                                               |                                                                                     | 0.12                                                                                | c0.30                                                                               |                                                                                     | 0.02                                                                                |
| v/c Ratio              | 0.58                                                                              | 0.89                                                                              | 0.06                                                                              | 1.07                                                                              | 0.53                                                                              | 0.18                                                                              | 0.33                                                                               | 0.88                                                                                | 0.45                                                                                | 1.12                                                                                | 0.39                                                                                | 0.07                                                                                |
| Uniform Delay, d1      | 21.6                                                                              | 37.7                                                                              | 27.0                                                                              | 37.2                                                                              | 29.8                                                                              | 25.7                                                                              | 29.7                                                                               | 41.7                                                                                | 36.2                                                                                | 38.7                                                                                | 35.5                                                                                | 32.4                                                                                |
| Progression Factor     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.10                                                                              | 0.69                                                                              | 0.78                                                                              | 0.65                                                                               | 0.83                                                                                | 1.22                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Incremental Delay, d2  | 2.1                                                                               | 9.8                                                                               | 0.2                                                                               | 68.2                                                                              | 1.4                                                                               | 0.6                                                                               | 0.5                                                                                | 15.2                                                                                | 0.7                                                                                 | 104.3                                                                               | 0.5                                                                                 | 0.1                                                                                 |
| Delay (s)              | 23.7                                                                              | 47.5                                                                              | 27.2                                                                              | 109.0                                                                             | 22.1                                                                              | 20.5                                                                              | 19.7                                                                               | 49.9                                                                                | 44.8                                                                                | 143.0                                                                               | 36.1                                                                                | 32.4                                                                                |
| Level of Service       | C                                                                                 | D                                                                                 | C                                                                                 | F                                                                                 | C                                                                                 | C                                                                                 | B                                                                                  | D                                                                                   | D                                                                                   | F                                                                                   | D                                                                                   | C                                                                                   |
| Approach Delay (s)     |                                                                                   | 42.4                                                                              |                                                                                   |                                                                                   | 44.0                                                                              |                                                                                   |                                                                                    | 44.0                                                                                |                                                                                     |                                                                                     | 75.6                                                                                |                                                                                     |
| Approach LOS           |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                    | D                                                                                   |                                                                                     |                                                                                     | E                                                                                   |                                                                                     |

### Intersection Summary

|                                   |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 47.1  | HCM 2000 Level of Service | D    |
| HCM 2000 Volume to Capacity ratio | 1.12  |                           |      |
| Actuated Cycle Length (s)         | 120.0 | Sum of lost time (s)      | 24.0 |
| Intersection Capacity Utilization | 89.1% | ICU Level of Service      | E    |
| Analysis Period (min)             | 15    |                           |      |
| c Critical Lane Group             |       |                           |      |

## Queues

Future No-Build PM - Improved

## 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) &amp; Relocated Thunder Rd/Roy Carlson Blvd 11/16/2016



| Lane Group              | EBT   | WBL   | WBT   | NBL   | NBT   | NBR   | SBL   | SBT   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↔     | ↰     | ↱     | ↰     | ↱     | ↱     | ↰     | ↱     |
| Traffic Volume (vph)    | 12    | 80    | 14    | 18    | 778   | 21    | 15    | 471   |
| Future Volume (vph)     | 12    | 80    | 14    | 18    | 778   | 21    | 15    | 471   |
| Lane Group Flow (vph)   | 68    | 99    | 175   | 20    | 884   | 28    | 30    | 589   |
| Turn Type               | NA    | Perm  | NA    | Perm  | NA    | Perm  | Perm  | NA    |
| Protected Phases        | 4     |       | 8     |       | 2     |       |       | 6     |
| Permitted Phases        |       | 8     |       | 2     |       | 2     | 6     |       |
| Detector Phase          | 4     | 8     | 8     | 2     | 2     | 2     | 6     | 6     |
| Switch Phase            |       |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 6.0   | 6.0   | 6.0   | 15.0  | 15.0  | 15.0  | 15.0  | 15.0  |
| Minimum Split (s)       | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 41.0  | 41.0  | 41.0  | 79.0  | 79.0  | 79.0  | 79.0  | 79.0  |
| Total Split (%)         | 34.2% | 34.2% | 34.2% | 65.8% | 65.8% | 65.8% | 65.8% | 65.8% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                |       |       |       |       |       |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |       |
| Recall Mode             | None  | None  | None  | C-Min | C-Min | C-Min | C-Min | C-Min |
| v/c Ratio               | 0.26  | 0.63  | 0.51  | 0.03  | 0.32  | 0.02  | 0.07  | 0.21  |
| Control Delay           | 18.0  | 66.9  | 14.3  | 0.8   | 0.9   | 0.0   | 5.8   | 5.8   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 18.0  | 66.9  | 14.3  | 0.8   | 0.9   | 0.0   | 5.8   | 5.8   |
| Queue Length 50th (ft)  | 9     | 74    | 10    | 1     | 12    | 0     | 7     | 78    |
| Queue Length 95th (ft)  | 49    | 112   | 73    | m2    | 19    | 0     | m8    | m84   |
| Internal Link Dist (ft) | 491   |       | 1743  |       | 2367  |       |       | 498   |
| Turn Bay Length (ft)    |       |       |       | 375   |       | 375   | 200   |       |
| Base Capacity (vph)     | 532   | 369   | 591   | 634   | 2747  | 1189  | 457   | 2747  |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.13  | 0.27  | 0.30  | 0.03  | 0.32  | 0.02  | 0.07  | 0.21  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

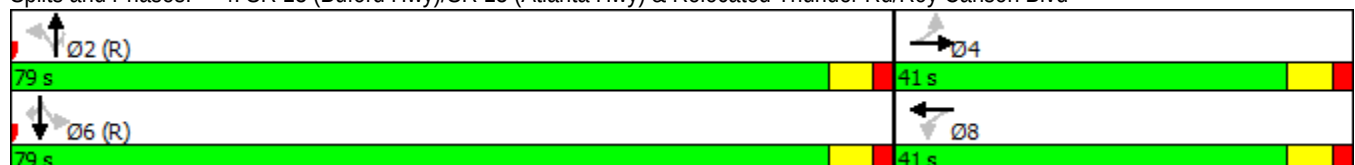
Offset: 15 (13%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) &amp; Relocated Thunder Rd/Roy Carlson Blvd



# HCM Signalized Intersection Capacity Analysis

Future No-Build PM - Improved

4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) & Relocated Thunder Rd/Roy Carlson Blvd 11/16/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (vph)              | 0                                                                                 | 12                                                                                | 51                                                                                | 80                                                                                | 14                                                                                | 91                                                                                | 18                                                                                 | 778                                                                                 | 21                                                                                  | 15                                                                                  | 471                                                                                 | 0                                                                                   |
| Future Volume (vph)               | 0                                                                                 | 12                                                                                | 51                                                                                | 80                                                                                | 14                                                                                | 91                                                                                | 18                                                                                 | 778                                                                                 | 21                                                                                  | 15                                                                                  | 471                                                                                 | 0                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Lane Util. Factor                 |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                               | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                |                                                                                     |
| Frt                               |                                                                                   | 0.89                                                                              |                                                                                   | 1.00                                                                              | 0.86                                                                              |                                                                                   | 1.00                                                                               | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Flt Protected                     |                                                                                   | 1.00                                                                              |                                                                                   | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                               | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (prot)                 |                                                                                   | 1693                                                                              |                                                                                   | 1687                                                                              | 1639                                                                              |                                                                                   | 1805                                                                               | 3539                                                                                | 1524                                                                                | 1805                                                                                | 3539                                                                                |                                                                                     |
| Flt Permitted                     |                                                                                   | 1.00                                                                              |                                                                                   | 0.71                                                                              | 1.00                                                                              |                                                                                   | 0.43                                                                               | 1.00                                                                                | 1.00                                                                                | 0.31                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (perm)                 |                                                                                   | 1693                                                                              |                                                                                   | 1266                                                                              | 1639                                                                              |                                                                                   | 816                                                                                | 3539                                                                                | 1524                                                                                | 589                                                                                 | 3539                                                                                |                                                                                     |
| Peak-hour factor, PHF             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.81                                                                              | 0.92                                                                              | 0.57                                                                              | 0.92                                                                               | 0.88                                                                                | 0.75                                                                                | 0.50                                                                                | 0.80                                                                                | 0.92                                                                                |
| Adj. Flow (vph)                   | 0                                                                                 | 13                                                                                | 55                                                                                | 99                                                                                | 15                                                                                | 160                                                                               | 20                                                                                 | 884                                                                                 | 28                                                                                  | 30                                                                                  | 589                                                                                 | 0                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 48                                                                                | 0                                                                                 | 0                                                                                 | 140                                                                               | 0                                                                                 | 0                                                                                  | 0                                                                                   | 6                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 0                                                                                 | 20                                                                                | 0                                                                                 | 99                                                                                | 35                                                                                | 0                                                                                 | 20                                                                                 | 884                                                                                 | 22                                                                                  | 30                                                                                  | 589                                                                                 | 0                                                                                   |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 7%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                 | 2%                                                                                  | 6%                                                                                  | 0%                                                                                  | 2%                                                                                  | 0%                                                                                  |
| Turn Type                         |                                                                                   | NA                                                                                |                                                                                   | Perm                                                                              | NA                                                                                |                                                                                   | Perm                                                                               | NA                                                                                  | Perm                                                                                | Perm                                                                                | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                    | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                   | 2                                                                                  |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 14.8                                                                              |                                                                                   | 14.8                                                                              | 14.8                                                                              |                                                                                   | 93.2                                                                               | 93.2                                                                                | 93.2                                                                                | 93.2                                                                                | 93.2                                                                                |                                                                                     |
| Effective Green, g (s)            |                                                                                   | 14.8                                                                              |                                                                                   | 14.8                                                                              | 14.8                                                                              |                                                                                   | 93.2                                                                               | 93.2                                                                                | 93.2                                                                                | 93.2                                                                                | 93.2                                                                                |                                                                                     |
| Actuated g/C Ratio                |                                                                                   | 0.12                                                                              |                                                                                   | 0.12                                                                              | 0.12                                                                              |                                                                                   | 0.78                                                                               | 0.78                                                                                | 0.78                                                                                | 0.78                                                                                | 0.78                                                                                |                                                                                     |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Vehicle Extension (s)             |                                                                                   | 3.0                                                                               |                                                                                   | 3.0                                                                               | 3.0                                                                               |                                                                                   | 5.0                                                                                | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |                                                                                     |
| Lane Grp Cap (vph)                |                                                                                   | 208                                                                               |                                                                                   | 156                                                                               | 202                                                                               |                                                                                   | 633                                                                                | 2748                                                                                | 1183                                                                                | 457                                                                                 | 2748                                                                                |                                                                                     |
| v/s Ratio Prot                    |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   | 0.02                                                                              |                                                                                   |                                                                                    | 0.25                                                                                |                                                                                     |                                                                                     | 0.17                                                                                |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                   |                                                                                   | 0.08                                                                              |                                                                                   |                                                                                   | 0.02                                                                               |                                                                                     | 0.01                                                                                | 0.05                                                                                |                                                                                     |                                                                                     |
| v/c Ratio                         |                                                                                   | 0.10                                                                              |                                                                                   | 0.63                                                                              | 0.17                                                                              |                                                                                   | 0.03                                                                               | 0.32                                                                                | 0.02                                                                                | 0.07                                                                                | 0.21                                                                                |                                                                                     |
| Uniform Delay, d1                 |                                                                                   | 46.7                                                                              |                                                                                   | 50.0                                                                              | 47.1                                                                              |                                                                                   | 3.1                                                                                | 4.0                                                                                 | 3.0                                                                                 | 3.2                                                                                 | 3.6                                                                                 |                                                                                     |
| Progression Factor                |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.17                                                                               | 0.14                                                                                | 0.00                                                                                | 1.32                                                                                | 1.40                                                                                |                                                                                     |
| Incremental Delay, d2             |                                                                                   | 0.2                                                                               |                                                                                   | 8.2                                                                               | 0.4                                                                               |                                                                                   | 0.1                                                                                | 0.3                                                                                 | 0.0                                                                                 | 0.2                                                                                 | 0.1                                                                                 |                                                                                     |
| Delay (s)                         |                                                                                   | 46.9                                                                              |                                                                                   | 58.2                                                                              | 47.5                                                                              |                                                                                   | 0.6                                                                                | 0.9                                                                                 | 0.0                                                                                 | 4.4                                                                                 | 5.2                                                                                 |                                                                                     |
| Level of Service                  |                                                                                   | D                                                                                 |                                                                                   | E                                                                                 | D                                                                                 |                                                                                   | A                                                                                  | A                                                                                   | A                                                                                   | A                                                                                   | A                                                                                   |                                                                                     |
| Approach Delay (s)                |                                                                                   | 46.9                                                                              |                                                                                   |                                                                                   | 51.4                                                                              |                                                                                   |                                                                                    | 0.8                                                                                 |                                                                                     |                                                                                     | 5.1                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                    | A                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 11.2                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                    |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.36                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                    |                                                                                     | 12.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 45.0%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                    |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

Future No-Build PM - Improved

5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd

11/16/2016

|                         |  |  |  |  |  |  |   |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 |
| Lane Configurations     |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 23                                                                                | 17                                                                                | 21                                                                                | 287                                                                               | 7                                                                                 | 118                                                                               | 6                                                                                   | 695                                                                                 | 384                                                                                 | 168                                                                                 | 490                                                                                 |
| Future Volume (vph)     | 23                                                                                | 17                                                                                | 21                                                                                | 287                                                                               | 7                                                                                 | 118                                                                               | 6                                                                                   | 695                                                                                 | 384                                                                                 | 168                                                                                 | 490                                                                                 |
| Lane Group Flow (vph)   | 0                                                                                 | 76                                                                                | 42                                                                                | 0                                                                                 | 331                                                                               | 148                                                                               | 12                                                                                  | 837                                                                                 | 404                                                                                 | 193                                                                                 | 605                                                                                 |
| Turn Type               | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                | Perm                                                                                | NA                                                                                  |
| Protected Phases        |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |
| Permitted Phases        | 4                                                                                 |                                                                                   | 4                                                                                 | 8                                                                                 |                                                                                   | 8                                                                                 | 2                                                                                   |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     |
| Detector Phase          | 4                                                                                 | 4                                                                                 | 4                                                                                 | 8                                                                                 | 8                                                                                 | 8                                                                                 | 2                                                                                   | 2                                                                                   | 2                                                                                   | 6                                                                                   | 6                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 15.0                                                                                | 15.0                                                                                | 15.0                                                                                | 15.0                                                                                | 15.0                                                                                |
| Minimum Split (s)       | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                                | 24.0                                                                                | 24.0                                                                                | 24.0                                                                                | 24.0                                                                                |
| Total Split (s)         | 48.0                                                                              | 48.0                                                                              | 48.0                                                                              | 48.0                                                                              | 48.0                                                                              | 48.0                                                                              | 72.0                                                                                | 72.0                                                                                | 72.0                                                                                | 72.0                                                                                | 72.0                                                                                |
| Total Split (%)         | 40.0%                                                                             | 40.0%                                                                             | 40.0%                                                                             | 40.0%                                                                             | 40.0%                                                                             | 40.0%                                                                             | 60.0%                                                                               | 60.0%                                                                               | 60.0%                                                                               | 60.0%                                                                               | 60.0%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    |                                                                                   | 0.0                                                                               | 0.0                                                                               |                                                                                   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Lost Time (s)     |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lead/Lag                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | C-Min                                                                               | C-Min                                                                               | C-Min                                                                               | C-Min                                                                               | C-Min                                                                               |
| v/c Ratio               |                                                                                   | 0.20                                                                              | 0.09                                                                              |                                                                                   | 0.88                                                                              | 0.26                                                                              | 0.03                                                                                | 0.39                                                                                | 0.35                                                                                | 0.57                                                                                | 0.28                                                                                |
| Control Delay           |                                                                                   | 31.3                                                                              | 8.3                                                                               |                                                                                   | 63.7                                                                              | 5.6                                                                               | 6.5                                                                                 | 6.1                                                                                 | 0.7                                                                                 | 19.4                                                                                | 6.5                                                                                 |
| Queue Delay             |                                                                                   | 0.0                                                                               | 0.0                                                                               |                                                                                   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             |                                                                                   | 31.3                                                                              | 8.3                                                                               |                                                                                   | 63.7                                                                              | 5.6                                                                               | 6.5                                                                                 | 6.1                                                                                 | 0.7                                                                                 | 19.4                                                                                | 6.5                                                                                 |
| Queue Length 50th (ft)  |                                                                                   | 44                                                                                | 0                                                                                 |                                                                                   | 240                                                                               | 1                                                                                 | 1                                                                                   | 48                                                                                  | 0                                                                                   | 82                                                                                  | 61                                                                                  |
| Queue Length 95th (ft)  |                                                                                   | 33                                                                                | 4                                                                                 |                                                                                   | 131                                                                               | 31                                                                                | m2                                                                                  | 65                                                                                  | m4                                                                                  | 216                                                                                 | 73                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 275                                                                               |                                                                                   |                                                                                   | 4179                                                                              |                                                                                   |                                                                                     | 3868                                                                                |                                                                                     |                                                                                     | 2104                                                                                |
| Turn Bay Length (ft)    |                                                                                   |                                                                                   | 105                                                                               |                                                                                   |                                                                                   | 250                                                                               | 230                                                                                 |                                                                                     | 230                                                                                 | 200                                                                                 |                                                                                     |
| Base Capacity (vph)     |                                                                                   | 447                                                                               | 565                                                                               |                                                                                   | 452                                                                               | 660                                                                               | 460                                                                                 | 2172                                                                                | 1140                                                                                | 339                                                                                 | 2130                                                                                |
| Starvation Cap Reductn  |                                                                                   | 0                                                                                 | 0                                                                                 |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   |                                                                                   | 0                                                                                 | 0                                                                                 |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     |                                                                                   | 0                                                                                 | 0                                                                                 |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       |                                                                                   | 0.17                                                                              | 0.07                                                                              |                                                                                   | 0.73                                                                              | 0.22                                                                              | 0.03                                                                                | 0.39                                                                                | 0.35                                                                                | 0.57                                                                                | 0.28                                                                                |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 62 (52%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd

|                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |  |  |  |
| Ø2 (R)                                                                              |                                                                                     |                                                                                     | Ø4                                                                                   |                                                                                       |                                                                                       |
| 72 s                                                                                |                                                                                     |                                                                                     | 48 s                                                                                 |                                                                                       |                                                                                       |
|  |  |  |  |  |  |
| Ø6 (R)                                                                              |                                                                                     |                                                                                     | Ø8                                                                                   |                                                                                       |                                                                                       |
| 72 s                                                                                |                                                                                     |                                                                                     | 48 s                                                                                 |                                                                                       |                                                                                       |

# HCM Signalized Intersection Capacity Analysis

## 5: SR 13 (Buford Hwy) & Makita Co. Drwy/Thompson Mill Rd

Future No-Build PM - Improved

11/16/2016

|                                   |  |  |  |  |  |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)              | 23                                                                                | 17                                                                                | 21                                                                                | 287                                                                               | 7                                                                                 | 118                                                                               | 6                                                                                   | 695                                                                                 | 384                                                                                 | 168                                                                                 | 490                                                                                 | 0                                                                                   |
| Future Volume (vph)               | 23                                                                                | 17                                                                                | 21                                                                                | 287                                                                               | 7                                                                                 | 118                                                                               | 6                                                                                   | 695                                                                                 | 384                                                                                 | 168                                                                                 | 490                                                                                 | 0                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Lane Util. Factor                 |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                |                                                                                     |
| Frt                               |                                                                                   | 1.00                                                                              | 0.85                                                                              |                                                                                   | 1.00                                                                              | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Flt Protected                     |                                                                                   | 0.98                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                              | 1.00                                                                              | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (prot)                 |                                                                                   | 1860                                                                              | 1538                                                                              |                                                                                   | 1814                                                                              | 1615                                                                              | 1805                                                                                | 3574                                                                                | 1615                                                                                | 1805                                                                                | 3505                                                                                |                                                                                     |
| Flt Permitted                     |                                                                                   | 0.67                                                                              | 1.00                                                                              |                                                                                   | 0.68                                                                              | 1.00                                                                              | 0.40                                                                                | 1.00                                                                                | 1.00                                                                                | 0.29                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (perm)                 |                                                                                   | 1278                                                                              | 1538                                                                              |                                                                                   | 1295                                                                              | 1615                                                                              | 759                                                                                 | 3574                                                                                | 1615                                                                                | 559                                                                                 | 3505                                                                                |                                                                                     |
| Peak-hour factor, PHF             | 0.69                                                                              | 0.40                                                                              | 0.50                                                                              | 0.91                                                                              | 0.44                                                                              | 0.80                                                                              | 0.50                                                                                | 0.83                                                                                | 0.95                                                                                | 0.87                                                                                | 0.81                                                                                | 0.73                                                                                |
| Adj. Flow (vph)                   | 33                                                                                | 42                                                                                | 42                                                                                | 315                                                                               | 16                                                                                | 148                                                                               | 12                                                                                  | 837                                                                                 | 404                                                                                 | 193                                                                                 | 605                                                                                 | 0                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 30                                                                                | 0                                                                                 | 0                                                                                 | 104                                                                               | 0                                                                                   | 0                                                                                   | 158                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 0                                                                                 | 76                                                                                | 12                                                                                | 0                                                                                 | 331                                                                               | 44                                                                                | 12                                                                                  | 837                                                                                 | 246                                                                                 | 193                                                                                 | 605                                                                                 | 0                                                                                   |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 5%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                  | 1%                                                                                  | 0%                                                                                  | 0%                                                                                  | 3%                                                                                  | 0%                                                                                  |
| Turn Type                         | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                | Perm                                                                                | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   | 4                                                                                 | 8                                                                                 |                                                                                   | 8                                                                                 | 2                                                                                   |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 35.0                                                                              | 35.0                                                                              |                                                                                   | 35.0                                                                              | 35.0                                                                              | 73.0                                                                                | 73.0                                                                                | 73.0                                                                                | 73.0                                                                                | 73.0                                                                                |                                                                                     |
| Effective Green, g (s)            |                                                                                   | 35.0                                                                              | 35.0                                                                              |                                                                                   | 35.0                                                                              | 35.0                                                                              | 73.0                                                                                | 73.0                                                                                | 73.0                                                                                | 73.0                                                                                | 73.0                                                                                |                                                                                     |
| Actuated g/C Ratio                |                                                                                   | 0.29                                                                              | 0.29                                                                              |                                                                                   | 0.29                                                                              | 0.29                                                                              | 0.61                                                                                | 0.61                                                                                | 0.61                                                                                | 0.61                                                                                | 0.61                                                                                |                                                                                     |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Vehicle Extension (s)             |                                                                                   | 3.0                                                                               | 3.0                                                                               |                                                                                   | 3.0                                                                               | 3.0                                                                               | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |                                                                                     |
| Lane Grp Cap (vph)                |                                                                                   | 372                                                                               | 448                                                                               |                                                                                   | 377                                                                               | 471                                                                               | 461                                                                                 | 2174                                                                                | 982                                                                                 | 340                                                                                 | 2132                                                                                |                                                                                     |
| v/s Ratio Prot                    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     | 0.23                                                                                |                                                                                     |                                                                                     | 0.17                                                                                |                                                                                     |
| v/s Ratio Perm                    |                                                                                   | 0.06                                                                              | 0.01                                                                              |                                                                                   | 0.26                                                                              | 0.03                                                                              | 0.02                                                                                |                                                                                     | 0.15                                                                                | 0.35                                                                                |                                                                                     |                                                                                     |
| v/c Ratio                         |                                                                                   | 0.20                                                                              | 0.03                                                                              |                                                                                   | 0.88                                                                              | 0.09                                                                              | 0.03                                                                                | 0.39                                                                                | 0.25                                                                                | 0.57                                                                                | 0.28                                                                                |                                                                                     |
| Uniform Delay, d1                 |                                                                                   | 32.0                                                                              | 30.3                                                                              |                                                                                   | 40.5                                                                              | 30.9                                                                              | 9.4                                                                                 | 12.0                                                                                | 10.9                                                                                | 14.1                                                                                | 11.1                                                                                |                                                                                     |
| Progression Factor                |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.55                                                                                | 0.44                                                                                | 0.10                                                                                | 0.71                                                                                | 0.51                                                                                |                                                                                     |
| Incremental Delay, d2             |                                                                                   | 0.3                                                                               | 0.0                                                                               |                                                                                   | 20.0                                                                              | 0.1                                                                               | 0.1                                                                                 | 0.4                                                                                 | 0.4                                                                                 | 6.7                                                                                 | 0.3                                                                                 |                                                                                     |
| Delay (s)                         |                                                                                   | 32.3                                                                              | 30.4                                                                              |                                                                                   | 60.4                                                                              | 31.0                                                                              | 5.2                                                                                 | 5.6                                                                                 | 1.5                                                                                 | 16.7                                                                                | 6.0                                                                                 |                                                                                     |
| Level of Service                  |                                                                                   | C                                                                                 | C                                                                                 |                                                                                   | E                                                                                 | C                                                                                 | A                                                                                   | A                                                                                   | A                                                                                   | B                                                                                   | A                                                                                   |                                                                                     |
| Approach Delay (s)                |                                                                                   | 31.6                                                                              |                                                                                   |                                                                                   | 51.3                                                                              |                                                                                   |                                                                                     | 4.3                                                                                 |                                                                                     |                                                                                     | 8.6                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                     | A                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   | 15.3                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   | 0.67                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   | 69.6%                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



## Queues

## Future No-Build PM - Improved

6: SR 13 (Buford Hwy) &amp; S. Hill St/Hamilton Mill Rd

11/16/2016

|                         |  |  |  |  |  |  |   |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | NBL                                                                               | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations     |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 78                                                                                | 279                                                                               | 55                                                                                | 405                                                                               | 222                                                                               | 83                                                                                | 884                                                                                 | 770                                                                                 | 268                                                                                 | 571                                                                                 | 44                                                                                  |
| Future Volume (vph)     | 78                                                                                | 279                                                                               | 55                                                                                | 405                                                                               | 222                                                                               | 83                                                                                | 884                                                                                 | 770                                                                                 | 268                                                                                 | 571                                                                                 | 44                                                                                  |
| Lane Group Flow (vph)   | 89                                                                                | 291                                                                               | 68                                                                                | 460                                                                               | 500                                                                               | 122                                                                               | 971                                                                                 | 837                                                                                 | 315                                                                                 | 680                                                                                 | 50                                                                                  |
| Turn Type               | Perm                                                                              | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                | pm+pt                                                                             | NA                                                                                  | Free                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases        |                                                                                   | 4                                                                                 |                                                                                   | 3                                                                                 | 8                                                                                 | 5                                                                                 | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases        | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 2                                                                                 |                                                                                     | Free                                                                                | 6                                                                                   |                                                                                     | 6                                                                                   |
| Detector Phase          | 4                                                                                 | 4                                                                                 | 4                                                                                 | 3                                                                                 | 8                                                                                 | 5                                                                                 | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   | 6                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 4.0                                                                               | 6.0                                                                               | 4.0                                                                               | 15.0                                                                                |                                                                                     | 4.0                                                                                 | 15.0                                                                                | 15.0                                                                                |
| Minimum Split (s)       | 41.0                                                                              | 41.0                                                                              | 41.0                                                                              | 11.0                                                                              | 46.0                                                                              | 11.0                                                                              | 37.0                                                                                |                                                                                     | 11.0                                                                                | 40.0                                                                                | 40.0                                                                                |
| Total Split (s)         | 41.0                                                                              | 41.0                                                                              | 41.0                                                                              | 22.0                                                                              | 63.0                                                                              | 15.0                                                                              | 37.0                                                                                |                                                                                     | 20.0                                                                                | 42.0                                                                                | 42.0                                                                                |
| Total Split (%)         | 34.2%                                                                             | 34.2%                                                                             | 34.2%                                                                             | 18.3%                                                                             | 52.5%                                                                             | 12.5%                                                                             | 30.8%                                                                               |                                                                                     | 16.7%                                                                               | 35.0%                                                                               | 35.0%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                 |                                                                                     | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                 |                                                                                     | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 |                                                                                     | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Lost Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lead/Lag                | Lag                                                                               | Lag                                                                               | Lag                                                                               | Lead                                                                              |                                                                                   | Lead                                                                              | Lag                                                                                 |                                                                                     | Lead                                                                                | Lag                                                                                 | Lag                                                                                 |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | C-Min                                                                               |                                                                                     | None                                                                                | C-Min                                                                               | C-Min                                                                               |
| v/c Ratio               | 0.50                                                                              | 0.77                                                                              | 0.16                                                                              | 1.04                                                                              | 0.72                                                                              | 0.35                                                                              | 0.78                                                                                | 0.53                                                                                | 1.11                                                                                | 0.48                                                                                | 0.07                                                                                |
| Control Delay           | 51.2                                                                              | 58.5                                                                              | 0.8                                                                               | 102.9                                                                             | 34.0                                                                              | 20.1                                                                              | 40.9                                                                                | 1.3                                                                                 | 110.3                                                                               | 25.5                                                                                | 0.7                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 51.2                                                                              | 58.5                                                                              | 0.8                                                                               | 102.9                                                                             | 34.0                                                                              | 20.1                                                                              | 40.9                                                                                | 1.3                                                                                 | 110.3                                                                               | 25.5                                                                                | 0.7                                                                                 |
| Queue Length 50th (ft)  | 62                                                                                | 215                                                                               | 0                                                                                 | ~197                                                                              | 295                                                                               | 47                                                                                | 350                                                                                 | 0                                                                                   | ~195                                                                                | 214                                                                                 | 1                                                                                   |
| Queue Length 95th (ft)  | 105                                                                               | 290                                                                               | 0                                                                                 | #292                                                                              | 350                                                                               | 69                                                                                | #525                                                                                | 0                                                                                   | #365                                                                                | 295                                                                                 | m5                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 657                                                                               |                                                                                   |                                                                                   | 1618                                                                              |                                                                                   | 1320                                                                                |                                                                                     |                                                                                     | 3868                                                                                |                                                                                     |
| Turn Bay Length (ft)    | 180                                                                               |                                                                                   | 300                                                                               | 250                                                                               |                                                                                   | 240                                                                               |                                                                                     | 1000                                                                                | 400                                                                                 |                                                                                     | 280                                                                                 |
| Base Capacity (vph)     | 260                                                                               | 554                                                                               | 567                                                                               | 444                                                                               | 844                                                                               | 357                                                                               | 1252                                                                                | 1568                                                                                | 284                                                                                 | 1405                                                                                | 723                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.34                                                                              | 0.53                                                                              | 0.12                                                                              | 1.04                                                                              | 0.59                                                                              | 0.34                                                                              | 0.78                                                                                | 0.53                                                                                | 1.11                                                                                | 0.48                                                                                | 0.07                                                                                |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 125

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.

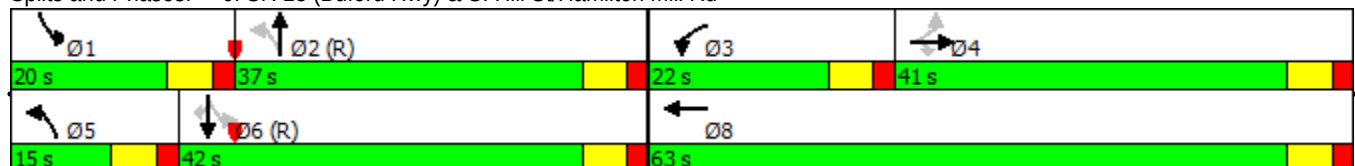
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: SR 13 (Buford Hwy) &amp; S. Hill St/Hamilton Mill Rd



# HCM Signalized Intersection Capacity Analysis

## 6: SR 13 (Buford Hwy) & S. Hill St/Hamilton Mill Rd

Future No-Build PM - Improved

11/16/2016

|                        |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement               | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations    |  |  |  |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (vph)   | 78                                                                                | 279                                                                               | 55                                                                                | 405                                                                               | 222                                                                               | 189                                                                               | 83                                                                                 | 884                                                                                 | 770                                                                                 | 268                                                                                 | 571                                                                                 | 44                                                                                  |
| Future Volume (vph)    | 78                                                                                | 279                                                                               | 55                                                                                | 405                                                                               | 222                                                                               | 189                                                                               | 83                                                                                 | 884                                                                                 | 770                                                                                 | 268                                                                                 | 571                                                                                 | 44                                                                                  |
| Ideal Flow (vphpl)     | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)    | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                | 6.0                                                                                 | 4.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor      | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.97                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                               | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |
| Frt                    | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 0.93                                                                              |                                                                                   | 1.00                                                                               | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected          | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                               | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)      | 1805                                                                              | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1720                                                                              |                                                                                   | 1805                                                                               | 3574                                                                                | 1568                                                                                | 1770                                                                                | 3539                                                                                | 1615                                                                                |
| Flt Permitted          | 0.47                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.33                                                                               | 1.00                                                                                | 1.00                                                                                | 0.11                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)      | 893                                                                               | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1720                                                                              |                                                                                   | 634                                                                                | 3574                                                                                | 1568                                                                                | 198                                                                                 | 3539                                                                                | 1615                                                                                |
| Peak-hour factor, PHF  | 0.88                                                                              | 0.96                                                                              | 0.81                                                                              | 0.88                                                                              | 0.86                                                                              | 0.78                                                                              | 0.68                                                                               | 0.91                                                                                | 0.92                                                                                | 0.85                                                                                | 0.84                                                                                | 0.88                                                                                |
| Adj. Flow (vph)        | 89                                                                                | 291                                                                               | 68                                                                                | 460                                                                               | 258                                                                               | 242                                                                               | 122                                                                                | 971                                                                                 | 837                                                                                 | 315                                                                                 | 680                                                                                 | 50                                                                                  |
| RTOR Reduction (vph)   | 0                                                                                 | 0                                                                                 | 54                                                                                | 0                                                                                 | 33                                                                                | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 30                                                                                  |
| Lane Group Flow (vph)  | 89                                                                                | 291                                                                               | 14                                                                                | 460                                                                               | 467                                                                               | 0                                                                                 | 122                                                                                | 971                                                                                 | 837                                                                                 | 315                                                                                 | 680                                                                                 | 20                                                                                  |
| Heavy Vehicles (%)     | 0%                                                                                | 0%                                                                                | 0%                                                                                | 5%                                                                                | 1%                                                                                | 4%                                                                                | 0%                                                                                 | 1%                                                                                  | 3%                                                                                  | 2%                                                                                  | 2%                                                                                  | 0%                                                                                  |
| Turn Type              | Perm                                                                              | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                |                                                                                   | pm+pt                                                                              | NA                                                                                  | Free                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases       |                                                                                   | 4                                                                                 |                                                                                   | 3                                                                                 | 8                                                                                 |                                                                                   | 5                                                                                  | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases       | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   |                                                                                   | 2                                                                                  |                                                                                     | Free                                                                                | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)  | 23.9                                                                              | 23.9                                                                              | 23.9                                                                              | 16.0                                                                              | 45.9                                                                              |                                                                                   | 50.5                                                                               | 42.1                                                                                | 120.0                                                                               | 61.7                                                                                | 47.7                                                                                | 47.7                                                                                |
| Effective Green, g (s) | 23.9                                                                              | 23.9                                                                              | 23.9                                                                              | 16.0                                                                              | 45.9                                                                              |                                                                                   | 50.5                                                                               | 42.1                                                                                | 120.0                                                                               | 61.7                                                                                | 47.7                                                                                | 47.7                                                                                |
| Actuated g/C Ratio     | 0.20                                                                              | 0.20                                                                              | 0.20                                                                              | 0.13                                                                              | 0.38                                                                              |                                                                                   | 0.42                                                                               | 0.35                                                                                | 1.00                                                                                | 0.51                                                                                | 0.40                                                                                | 0.40                                                                                |
| Clearance Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)  | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               |                                                                                   | 3.0                                                                                | 5.0                                                                                 |                                                                                     | 3.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |
| Lane Grp Cap (vph)     | 177                                                                               | 378                                                                               | 321                                                                               | 444                                                                               | 657                                                                               |                                                                                   | 348                                                                                | 1253                                                                                | 1568                                                                                | 285                                                                                 | 1406                                                                                | 641                                                                                 |
| v/s Ratio Prot         |                                                                                   | 0.15                                                                              |                                                                                   | c0.14                                                                             | c0.27                                                                             |                                                                                   | 0.02                                                                               | 0.27                                                                                |                                                                                     | c0.13                                                                               | 0.19                                                                                |                                                                                     |
| v/s Ratio Perm         | 0.10                                                                              |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.12                                                                               |                                                                                     | c0.53                                                                               | c0.44                                                                               |                                                                                     | 0.01                                                                                |
| v/c Ratio              | 0.50                                                                              | 0.77                                                                              | 0.04                                                                              | 1.04                                                                              | 0.71                                                                              |                                                                                   | 0.35                                                                               | 0.77                                                                                | 0.53                                                                                | 1.11                                                                                | 0.48                                                                                | 0.03                                                                                |
| Uniform Delay, d1      | 42.8                                                                              | 45.4                                                                              | 38.8                                                                              | 52.0                                                                              | 31.4                                                                              |                                                                                   | 21.8                                                                               | 34.7                                                                                | 0.0                                                                                 | 32.6                                                                                | 27.0                                                                                | 22.1                                                                                |
| Progression Factor     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 0.81                                                                                | 0.86                                                                                | 1.00                                                                                |
| Incremental Delay, d2  | 2.2                                                                               | 9.1                                                                               | 0.1                                                                               | 52.3                                                                              | 3.6                                                                               |                                                                                   | 0.6                                                                                | 4.7                                                                                 | 1.3                                                                                 | 82.9                                                                                | 1.1                                                                                 | 0.1                                                                                 |
| Delay (s)              | 45.0                                                                              | 54.6                                                                              | 38.9                                                                              | 104.3                                                                             | 35.0                                                                              |                                                                                   | 22.4                                                                               | 39.5                                                                                | 1.3                                                                                 | 109.2                                                                               | 24.2                                                                                | 22.1                                                                                |
| Level of Service       | D                                                                                 | D                                                                                 | D                                                                                 | F                                                                                 | D                                                                                 |                                                                                   | C                                                                                  | D                                                                                   | A                                                                                   | F                                                                                   | C                                                                                   | C                                                                                   |
| Approach Delay (s)     |                                                                                   | 50.3                                                                              |                                                                                   |                                                                                   | 68.2                                                                              |                                                                                   |                                                                                    | 21.8                                                                                |                                                                                     |                                                                                     | 49.8                                                                                |                                                                                     |
| Approach LOS           |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                    | C                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |

### Intersection Summary

|                                   |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 41.6  | HCM 2000 Level of Service | D    |
| HCM 2000 Volume to Capacity ratio | 1.05  |                           |      |
| Actuated Cycle Length (s)         | 120.0 | Sum of lost time (s)      | 24.0 |
| Intersection Capacity Utilization | 87.5% | ICU Level of Service      | E    |
| Analysis Period (min)             | 15    |                           |      |
| c Critical Lane Group             |       |                           |      |

# HCM Unsignalized Intersection Capacity Analysis

## 7: Pvt. Drwy/Bryant Rd & Thompson Mill Rd

Future No-Build PM - Improved

11/16/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                    |  |                                                                                     |                                                                                     |  |                                                                                     |
| Traffic Volume (veh/h)            | 5                                                                                 | 512                                                                               | 0                                                                                 | 0                                                                                 | 292                                                                               | 7                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 28                                                                                  | 0                                                                                   | 8                                                                                   |
| Future Volume (Veh/h)             | 5                                                                                 | 512                                                                               | 0                                                                                 | 0                                                                                 | 292                                                                               | 7                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 28                                                                                  | 0                                                                                   | 8                                                                                   |
| Sign Control                      |                                                                                   | Free                                                                              |                                                                                   |                                                                                   | Free                                                                              |                                                                                   |                                                                                    | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Grade                             |                                                                                   | 0%                                                                                |                                                                                   |                                                                                   | 0%                                                                                |                                                                                   |                                                                                    | 0%                                                                                  |                                                                                     |                                                                                     | 0%                                                                                  |                                                                                     |
| Peak Hour Factor                  | 0.31                                                                              | 0.80                                                                              | 0.25                                                                              | 0.92                                                                              | 0.96                                                                              | 0.58                                                                              | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.61                                                                                | 0.92                                                                                | 0.67                                                                                |
| Hourly flow rate (vph)            | 16                                                                                | 640                                                                               | 0                                                                                 | 0                                                                                 | 304                                                                               | 12                                                                                | 0                                                                                  | 0                                                                                   | 0                                                                                   | 46                                                                                  | 0                                                                                   | 12                                                                                  |
| Pedestrians                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane Width (ft)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Walking Speed (ft/s)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Percent Blockage                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Right turn flare (veh)            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median type                       |                                                                                   | None                                                                              |                                                                                   |                                                                                   | None                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median storage (veh)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Upstream signal (ft)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| pX, platoon unblocked             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC, conflicting volume            | 316                                                                               |                                                                                   |                                                                                   | 640                                                                               |                                                                                   |                                                                                   | 994                                                                                | 988                                                                                 | 640                                                                                 | 982                                                                                 | 982                                                                                 | 310                                                                                 |
| vC1, stage 1 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC2, stage 2 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vCu, unblocked vol                | 316                                                                               |                                                                                   |                                                                                   | 640                                                                               |                                                                                   |                                                                                   | 994                                                                                | 988                                                                                 | 640                                                                                 | 982                                                                                 | 982                                                                                 | 310                                                                                 |
| tC, single (s)                    | 4.1                                                                               |                                                                                   |                                                                                   | 4.1                                                                               |                                                                                   |                                                                                   | 7.1                                                                                | 6.5                                                                                 | 6.2                                                                                 | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 |
| tC, 2 stage (s)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| tF (s)                            | 2.2                                                                               |                                                                                   |                                                                                   | 2.2                                                                               |                                                                                   |                                                                                   | 3.5                                                                                | 4.0                                                                                 | 3.3                                                                                 | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 |
| p0 queue free %                   | 99                                                                                |                                                                                   |                                                                                   | 100                                                                               |                                                                                   |                                                                                   | 100                                                                                | 100                                                                                 | 100                                                                                 | 80                                                                                  | 100                                                                                 | 98                                                                                  |
| cM capacity (veh/h)               | 1256                                                                              |                                                                                   |                                                                                   | 954                                                                               |                                                                                   |                                                                                   | 220                                                                                | 246                                                                                 | 479                                                                                 | 228                                                                                 | 248                                                                                 | 735                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total                      | 656                                                                               | 316                                                                               | 0                                                                                 | 58                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left                       | 16                                                                                | 0                                                                                 | 0                                                                                 | 46                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right                      | 0                                                                                 | 12                                                                                | 0                                                                                 | 12                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| cSH                               | 1256                                                                              | 954                                                                               | 1700                                                                              | 266                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume to Capacity                | 0.01                                                                              | 0.00                                                                              | 0.00                                                                              | 0.22                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Queue Length 95th (ft)            | 1                                                                                 | 0                                                                                 | 0                                                                                 | 20                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 0.4                                                                               | 0.0                                                                               | 0.0                                                                               | 22.3                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane LOS                          | A                                                                                 |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 0.4                                                                               | 0.0                                                                               | 0.0                                                                               | 22.3                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Average Delay                     |                                                                                   |                                                                                   | 1.5                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 40.9%                                                                             | ICU Level of Service                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

HCM Unsignalized Intersection Capacity Analysis  
8: N. Bogan Rd & Thompson Mill Rd

Future No-Build PM - Improved

11/16/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |  |                                                                                   |  |                                                                                   |                                                                                    |  |  |                                                                                     |  |  |
| Sign Control                      |                                                                                   | Stop                                                                              |                                                                                   |                                                                                   | Stop                                                                              |                                                                                   |                                                                                    | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Traffic Volume (vph)              | 74                                                                                | 343                                                                               | 112                                                                               | 58                                                                                | 167                                                                               | 15                                                                                | 74                                                                                 | 150                                                                                 | 87                                                                                  | 15                                                                                  | 158                                                                                 | 50                                                                                  |
| Future Volume (vph)               | 74                                                                                | 343                                                                               | 112                                                                               | 58                                                                                | 167                                                                               | 15                                                                                | 74                                                                                 | 150                                                                                 | 87                                                                                  | 15                                                                                  | 158                                                                                 | 50                                                                                  |
| Peak Hour Factor                  | 0.83                                                                              | 0.90                                                                              | 0.79                                                                              | 0.92                                                                              | 0.86                                                                              | 0.88                                                                              | 0.92                                                                               | 0.81                                                                                | 0.77                                                                                | 0.70                                                                                | 0.75                                                                                | 0.80                                                                                |
| Hourly flow rate (vph)            | 89                                                                                | 381                                                                               | 142                                                                               | 63                                                                                | 194                                                                               | 17                                                                                | 80                                                                                 | 185                                                                                 | 113                                                                                 | 21                                                                                  | 211                                                                                 | 63                                                                                  |
| Direction, Lane #                 | EB 1                                                                              | EB 2                                                                              | WB 1                                                                              | NB 1                                                                              | NB 2                                                                              | SB 1                                                                              | SB 2                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total (vph)                | 470                                                                               | 142                                                                               | 274                                                                               | 265                                                                               | 113                                                                               | 232                                                                               | 63                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left (vph)                 | 89                                                                                | 0                                                                                 | 63                                                                                | 80                                                                                | 0                                                                                 | 21                                                                                | 0                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right (vph)                | 0                                                                                 | 142                                                                               | 17                                                                                | 0                                                                                 | 113                                                                               | 0                                                                                 | 63                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Hadj (s)                          | 0.04                                                                              | -0.60                                                                             | 0.01                                                                              | 0.06                                                                              | -0.58                                                                             | 0.02                                                                              | -0.60                                                                              |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Departure Headway (s)             | 6.5                                                                               | 3.2                                                                               | 6.9                                                                               | 7.2                                                                               | 3.2                                                                               | 7.3                                                                               | 3.2                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Degree Utilization, x             | 0.85                                                                              | 0.13                                                                              | 0.53                                                                              | 0.53                                                                              | 0.10                                                                              | 0.47                                                                              | 0.06                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Capacity (veh/h)                  | 534                                                                               | 1121                                                                              | 458                                                                               | 458                                                                               | 1121                                                                              | 448                                                                               | 1121                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 35.5                                                                              | 6.7                                                                               | 17.4                                                                              | 18.0                                                                              | 6.6                                                                               | 16.5                                                                              | 6.4                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 28.8                                                                              |                                                                                   | 17.4                                                                              | 14.6                                                                              |                                                                                   | 14.3                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      | D                                                                                 |                                                                                   | C                                                                                 | B                                                                                 |                                                                                   | B                                                                                 |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Delay                             |                                                                                   |                                                                                   | 20.6                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 69.5%                                                                             | ICU Level of Service                                                              |                                                                                   |                                                                                   |                                                                                    | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

Intersection: 8: N. Bogan Rd & Thompson Mill Rd

| Movement              | EB   | EB  | WB   | NB  | SB  |
|-----------------------|------|-----|------|-----|-----|
| Directions Served     | LT   | R   | LTR  | LT  | LT  |
| Maximum Queue (ft)    | 92   | 55  | 75   | 54  | 51  |
| Average Queue (ft)    | 61   | 11  | 52   | 44  | 38  |
| 95th Queue (ft)       | 96   | 48  | 75   | 64  | 55  |
| Link Distance (ft)    | 2455 |     | 1026 | 849 | 592 |
| Upstream Blk Time (%) |      |     |      |     |     |
| Queuing Penalty (veh) |      |     |      |     |     |
| Storage Bay Dist (ft) |      | 100 |      |     |     |
| Storage Blk Time (%)  | 0    |     |      |     |     |
| Queuing Penalty (veh) | 0    |     |      |     |     |

## **Future “Build” Intersection Analysis**

## Queues

Future Build AM

## 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)

11/16/2016



| Lane Group              | EBL   | EBT   | WBT   | WBR   | NBL   | NBT   | NBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     |       |       |       |       |       |       |       |
| Traffic Volume (vph)    | 398   | 416   | 1296  | 328   | 392   | 4     | 87    |
| Future Volume (vph)     | 398   | 416   | 1296  | 328   | 392   | 4     | 87    |
| Lane Group Flow (vph)   | 468   | 443   | 1507  | 426   | 233   | 231   | 121   |
| Turn Type               | Prot  | NA    | NA    | Perm  | Perm  | NA    | Perm  |
| Protected Phases        | 5     | 2     | 6     |       |       | 8     |       |
| Permitted Phases        |       |       |       | 6     | 8     |       | 8     |
| Detector Phase          | 5     | 2     | 6     | 6     | 8     | 8     | 8     |
| Switch Phase            |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 4.0   | 15.0  | 15.0  | 15.0  | 6.0   | 6.0   | 6.0   |
| Minimum Split (s)       | 11.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 44.0  | 91.0  | 47.0  | 47.0  | 29.0  | 29.0  | 29.0  |
| Total Split (%)         | 36.7% | 75.8% | 39.2% | 39.2% | 24.2% | 24.2% | 24.2% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lead  |       | Lag   | Lag   |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |
| Recall Mode             | None  | C-Min | C-Min | C-Min | None  | None  | None  |
| v/c Ratio               | 0.91  | 0.17  | 0.76  | 0.49  | 0.84  | 0.82  | 0.32  |
| Control Delay           | 42.7  | 11.8  | 36.4  | 4.7   | 72.3  | 70.6  | 9.6   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 2.9   | 2.7   | 0.0   |
| Total Delay             | 42.7  | 11.8  | 36.4  | 4.7   | 75.2  | 73.4  | 9.6   |
| Queue Length 50th (ft)  | 385   | 154   | 392   | 0     | 181   | 178   | 0     |
| Queue Length 95th (ft)  | #471  | 213   | 430   | 24    | #277  | 137   | 24    |
| Internal Link Dist (ft) |       | 591   | 1139  |       |       | 825   |       |
| Turn Bay Length (ft)    |       |       |       | 840   |       |       | 510   |
| Base Capacity (vph)     | 560   | 2598  | 1978  | 877   | 310   | 312   | 407   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 18    | 0     | 26    | 27    | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.84  | 0.17  | 0.77  | 0.49  | 0.82  | 0.81  | 0.30  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 87 (73%), Referenced to phase 2:EBT and 6:WBT, Start of Green

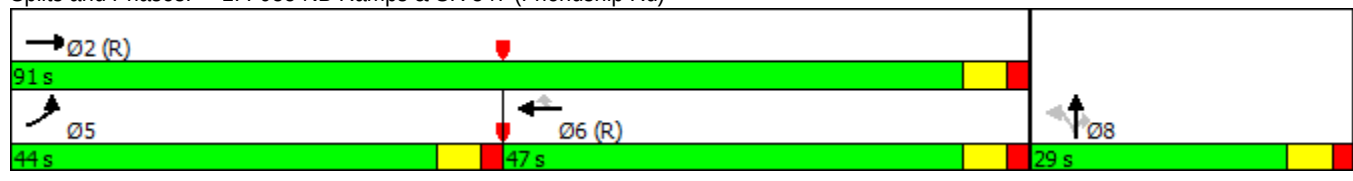
Natural Cycle: 90

Control Type: Actuated-Coordinated

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)



Baseline

Synchro 9 Report  
Page 1

# HCM Signalized Intersection Capacity Analysis

## 1: I-985 NB Ramps & SR 347 (Friendship Rd)

Future Build AM

11/16/2016

|                                   |  |                                                                                    |  |  |                                                                                                                                                                      |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                                                                                                                 | EBR                                                                               | WBL                                                                               | WBT                                                                                                                                                                                                                                                   | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |   |                                                                                   |                                                                                   |    |  |  |  |  |                                                                                     |                                                                                     |                                                                                     |
| Traffic Volume (vph)              | 398                                                                               | 416                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1296                                                                                                                                                                                                                                                  | 328                                                                               | 392                                                                                 | 4                                                                                   | 87                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Future Volume (vph)               | 398                                                                               | 416                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1296                                                                                                                                                                                                                                                  | 328                                                                               | 392                                                                                 | 4                                                                                   | 87                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                                                                                                                | 1900                                                                              | 1900                                                                              | 1900                                                                                                                                                                                                                                                  | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                                                                                                                 |                                                                                   |                                                                                   | 6.0                                                                                                                                                                                                                                                   | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Util. Factor                 | 1.00                                                                              | 0.95                                                                                                                                                                |                                                                                   |                                                                                   | 0.91                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Frt                               | 1.00                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (prot)                 | 1770                                                                              | 3574                                                                                                                                                                |                                                                                   |                                                                                   | 5136                                                                                                                                                                                                                                                  | 1599                                                                              | 1618                                                                                | 1628                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Permitted                     | 0.95                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (perm)                 | 1770                                                                              | 3574                                                                                                                                                                |                                                                                   |                                                                                   | 5136                                                                                                                                                                                                                                                  | 1599                                                                              | 1618                                                                                | 1628                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Peak-hour factor, PHF             | 0.85                                                                              | 0.94                                                                                                                                                                | 0.92                                                                              | 0.92                                                                              | 0.86                                                                                                                                                                                                                                                  | 0.77                                                                              | 0.86                                                                                | 0.50                                                                                | 0.72                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Adj. Flow (vph)                   | 468                                                                               | 443                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1507                                                                                                                                                                                                                                                  | 426                                                                               | 456                                                                                 | 8                                                                                   | 121                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                                                                                                                                                                                     | 262                                                                               | 0                                                                                   | 0                                                                                   | 100                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 468                                                                               | 443                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1507                                                                                                                                                                                                                                                  | 164                                                                               | 233                                                                                 | 231                                                                                 | 21                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Heavy Vehicles (%)                | 2%                                                                                | 1%                                                                                                                                                                  | 0%                                                                                | 0%                                                                                | 1%                                                                                                                                                                                                                                                    | 1%                                                                                | 6%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  |
| Turn Type                         | Prot                                                                              | NA                                                                                                                                                                  |                                                                                   |                                                                                   | NA                                                                                                                                                                                                                                                    | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Protected Phases                  | 5                                                                                 | 2                                                                                                                                                                   |                                                                                   |                                                                                   | 6                                                                                                                                                                                                                                                     |                                                                                   |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Permitted Phases                  |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Actuated Green, G (s)             | 35.0                                                                              | 87.2                                                                                                                                                                |                                                                                   |                                                                                   | 46.2                                                                                                                                                                                                                                                  | 46.2                                                                              | 20.8                                                                                | 20.8                                                                                | 20.8                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Effective Green, g (s)            | 35.0                                                                              | 87.2                                                                                                                                                                |                                                                                   |                                                                                   | 46.2                                                                                                                                                                                                                                                  | 46.2                                                                              | 20.8                                                                                | 20.8                                                                                | 20.8                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Actuated g/C Ratio                | 0.29                                                                              | 0.73                                                                                                                                                                |                                                                                   |                                                                                   | 0.39                                                                                                                                                                                                                                                  | 0.39                                                                              | 0.17                                                                                | 0.17                                                                                | 0.17                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                                                                                                                 |                                                                                   |                                                                                   | 6.0                                                                                                                                                                                                                                                   | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Vehicle Extension (s)             | 3.0                                                                               | 5.0                                                                                                                                                                 |                                                                                   |                                                                                   | 5.0                                                                                                                                                                                                                                                   | 5.0                                                                               | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Grp Cap (vph)                | 516                                                                               | 2597                                                                                                                                                                |                                                                                   |                                                                                   | 1977                                                                                                                                                                                                                                                  | 615                                                                               | 280                                                                                 | 282                                                                                 | 279                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Prot                    | c0.26                                                                             | 0.12                                                                                                                                                                |                                                                                   |                                                                                   | c0.29                                                                                                                                                                                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       | 0.10                                                                              | c0.14                                                                               | 0.14                                                                                | 0.01                                                                                |                                                                                     |                                                                                     |                                                                                     |
| v/c Ratio                         | 0.91                                                                              | 0.17                                                                                                                                                                |                                                                                   |                                                                                   | 0.76                                                                                                                                                                                                                                                  | 0.27                                                                              | 0.83                                                                                | 0.82                                                                                | 0.08                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Uniform Delay, d1                 | 40.9                                                                              | 5.1                                                                                                                                                                 |                                                                                   |                                                                                   | 32.1                                                                                                                                                                                                                                                  | 25.3                                                                              | 47.9                                                                                | 47.8                                                                                | 41.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Progression Factor                | 0.56                                                                              | 2.18                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Incremental Delay, d2             | 16.9                                                                              | 0.1                                                                                                                                                                 |                                                                                   |                                                                                   | 2.8                                                                                                                                                                                                                                                   | 1.1                                                                               | 18.6                                                                                | 16.7                                                                                | 0.1                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Delay (s)                         | 39.7                                                                              | 11.3                                                                                                                                                                |                                                                                   |                                                                                   | 35.0                                                                                                                                                                                                                                                  | 26.4                                                                              | 66.5                                                                                | 64.5                                                                                | 41.7                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  | D                                                                                 | B                                                                                                                                                                   |                                                                                   |                                                                                   | C                                                                                                                                                                                                                                                     | C                                                                                 | E                                                                                   | E                                                                                   | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                |                                                                                   | 25.9                                                                                                                                                                |                                                                                   |                                                                                   | 33.1                                                                                                                                                                                                                                                  |                                                                                   |                                                                                     | 60.6                                                                                |                                                                                     |                                                                                     | 0.0                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                                                                                                   |                                                                                   |                                                                                   | C                                                                                                                                                                                                                                                     |                                                                                   |                                                                                     | E                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                                                                                                     | 35.8                                                                              |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   | HCM 2000 Level of Service                                                           |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                                                                                                     | 0.83                                                                              |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                                                                                                     | 120.0                                                                             |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   | Sum of lost time (s)                                                                |                                                                                     | 18.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                                                                                                     | 77.7%                                                                             |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   | ICU Level of Service                                                                |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                                                                                                     | 15                                                                                |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



## Queues

## 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)

Future Build AM

11/16/2016



| Lane Group              | EBT   | EBR   | WBL   | WBT   | SBL   | SBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↑↑↑   | ↑     | ↵     | ↑↑    | ↵     | ↑     |
| Traffic Volume (vph)    | 693   | 422   | 496   | 1221  | 118   | 548   |
| Future Volume (vph)     | 693   | 422   | 496   | 1221  | 118   | 548   |
| Lane Group Flow (vph)   | 806   | 469   | 570   | 1489  | 139   | 652   |
| Turn Type               | NA    | Perm  | Prot  | NA    | Perm  | Perm  |
| Protected Phases        | 2     |       | 1     | 6     |       |       |
| Permitted Phases        |       | 2     |       |       | 4     | 4     |
| Detector Phase          | 2     | 2     | 1     | 6     | 4     | 4     |
| Switch Phase            |       |       |       |       |       |       |
| Minimum Initial (s)     | 15.0  | 15.0  | 4.0   | 15.0  | 6.0   | 6.0   |
| Minimum Split (s)       | 24.0  | 24.0  | 11.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 33.0  | 33.0  | 29.0  | 62.0  | 58.0  | 58.0  |
| Total Split (%)         | 27.5% | 27.5% | 24.2% | 51.7% | 48.3% | 48.3% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lag   | Lag   | Lead  |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |
| Recall Mode             | C-Min | C-Min | None  | C-Min | None  | None  |
| v/c Ratio               | 0.63  | 0.63  | 0.88  | 0.87  | 0.19  | 0.95  |
| Control Delay           | 39.8  | 9.7   | 47.3  | 17.8  | 22.4  | 54.6  |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 1.6   | 0.0   | 0.0   |
| Total Delay             | 39.8  | 9.7   | 47.3  | 19.4  | 22.4  | 54.6  |
| Queue Length 50th (ft)  | 126   | 20    | 162   | 508   | 65    | 420   |
| Queue Length 95th (ft)  | 198   | 135   | #258  | 541   | 101   | #582  |
| Internal Link Dist (ft) | 904   |       |       | 591   |       |       |
| Turn Bay Length (ft)    |       | 375   | 380   |       |       |       |
| Base Capacity (vph)     | 1270  | 743   | 664   | 1703  | 782   | 712   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 93    | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.63  | 0.63  | 0.86  | 0.92  | 0.18  | 0.92  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 15 (13%), Referenced to phase 2:EBT and 6:WBT, Start of Green

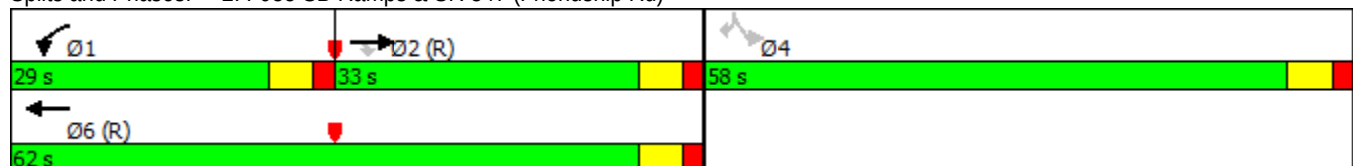
Natural Cycle: 80

Control Type: Actuated-Coordinated

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)



# HCM Signalized Intersection Capacity Analysis

## 2: I-985 SB Ramps & SR 347 (Friendship Rd)

Future Build AM

11/16/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   | ↑↑↑                                                                               | ↑                                                                                 | ↑↑                                                                                | ↑↑                                                                                |                                                                                   |                                                                                    |                                                                                     |                                                                                     | ↑                                                                                   |                                                                                     | ↑                                                                                   |
| Traffic Volume (vph)              | 0                                                                                 | 693                                                                               | 422                                                                               | 496                                                                               | 1221                                                                              | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 118                                                                                 | 0                                                                                   | 548                                                                                 |
| Future Volume (vph)               | 0                                                                                 | 693                                                                               | 422                                                                               | 496                                                                               | 1221                                                                              | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 118                                                                                 | 0                                                                                   | 548                                                                                 |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 6.0                                                                                 |                                                                                     | 6.0                                                                                 |
| Lane Util. Factor                 |                                                                                   | 0.91                                                                              | 1.00                                                                              | 0.97                                                                              | 0.95                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Frt                               |                                                                                   | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     | 0.85                                                                                |
| Flt Protected                     |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.95                                                                                |                                                                                     | 1.00                                                                                |
| Satd. Flow (prot)                 |                                                                                   | 5085                                                                              | 1568                                                                              | 3467                                                                              | 3505                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 1805                                                                                |                                                                                     | 1538                                                                                |
| Flt Permitted                     |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.95                                                                                |                                                                                     | 1.00                                                                                |
| Satd. Flow (perm)                 |                                                                                   | 5085                                                                              | 1568                                                                              | 3467                                                                              | 3505                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 1805                                                                                |                                                                                     | 1538                                                                                |
| Peak-hour factor, PHF             | 0.92                                                                              | 0.86                                                                              | 0.90                                                                              | 0.87                                                                              | 0.82                                                                              | 0.92                                                                              | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.85                                                                                | 0.92                                                                                | 0.84                                                                                |
| Adj. Flow (vph)                   | 0                                                                                 | 806                                                                               | 469                                                                               | 570                                                                               | 1489                                                                              | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 139                                                                                 | 0                                                                                   | 652                                                                                 |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 352                                                                               | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 48                                                                                  |
| Lane Group Flow (vph)             | 0                                                                                 | 806                                                                               | 117                                                                               | 570                                                                               | 1489                                                                              | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 139                                                                                 | 0                                                                                   | 604                                                                                 |
| Heavy Vehicles (%)                | 0%                                                                                | 2%                                                                                | 3%                                                                                | 1%                                                                                | 3%                                                                                | 0%                                                                                | 0%                                                                                 | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 5%                                                                                  |
| Turn Type                         |                                                                                   | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                |                                                                                   |                                                                                    |                                                                                     |                                                                                     | Perm                                                                                |                                                                                     | Perm                                                                                |
| Protected Phases                  |                                                                                   | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Permitted Phases                  |                                                                                   |                                                                                   | 2                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 4                                                                                   |                                                                                     | 4                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 30.0                                                                              | 30.0                                                                              | 22.3                                                                              | 58.3                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 49.7                                                                                |                                                                                     | 49.7                                                                                |
| Effective Green, g (s)            |                                                                                   | 30.0                                                                              | 30.0                                                                              | 22.3                                                                              | 58.3                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 49.7                                                                                |                                                                                     | 49.7                                                                                |
| Actuated g/C Ratio                |                                                                                   | 0.25                                                                              | 0.25                                                                              | 0.19                                                                              | 0.49                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.41                                                                                |                                                                                     | 0.41                                                                                |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 6.0                                                                                 |                                                                                     | 6.0                                                                                 |
| Vehicle Extension (s)             |                                                                                   | 5.0                                                                               | 5.0                                                                               | 3.0                                                                               | 5.0                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 3.0                                                                                 |                                                                                     | 3.0                                                                                 |
| Lane Grp Cap (vph)                |                                                                                   | 1271                                                                              | 392                                                                               | 644                                                                               | 1702                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 747                                                                                 |                                                                                     | 636                                                                                 |
| v/s Ratio Prot                    |                                                                                   | 0.16                                                                              |                                                                                   | 0.16                                                                              | c0.42                                                                             |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                   | 0.07                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.08                                                                                |                                                                                     | c0.39                                                                               |
| v/c Ratio                         |                                                                                   | 0.63                                                                              | 0.30                                                                              | 0.89                                                                              | 0.87                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.19                                                                                |                                                                                     | 0.95                                                                                |
| Uniform Delay, d1                 |                                                                                   | 40.1                                                                              | 36.5                                                                              | 47.6                                                                              | 27.6                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 22.3                                                                                |                                                                                     | 33.9                                                                                |
| Progression Factor                |                                                                                   | 0.92                                                                              | 1.71                                                                              | 0.74                                                                              | 0.44                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Incremental Delay, d2             |                                                                                   | 2.0                                                                               | 1.6                                                                               | 9.9                                                                               | 4.6                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.1                                                                                 |                                                                                     | 23.6                                                                                |
| Delay (s)                         |                                                                                   | 38.8                                                                              | 64.1                                                                              | 45.0                                                                              | 16.8                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 22.4                                                                                |                                                                                     | 57.6                                                                                |
| Level of Service                  |                                                                                   | D                                                                                 | E                                                                                 | D                                                                                 | B                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     | C                                                                                   |                                                                                     | E                                                                                   |
| Approach Delay (s)                |                                                                                   | 48.1                                                                              |                                                                                   |                                                                                   | 24.6                                                                              |                                                                                   |                                                                                    | 0.0                                                                                 |                                                                                     |                                                                                     | 51.4                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                    | A                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 37.0                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                    |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.96                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                    |                                                                                     |                                                                                     | 18.0                                                                                |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 77.7%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                    |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

Future Build AM

## 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)

11/16/2016



| Lane Group              | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     |       |       |       |       |       |       |       |       |       |       |       |       |
| Traffic Volume (vph)    | 142   | 599   | 113   | 607   | 607   | 78    | 95    | 153   | 222   | 244   | 333   | 129   |
| Future Volume (vph)     | 142   | 599   | 113   | 607   | 607   | 78    | 95    | 153   | 222   | 244   | 333   | 129   |
| Lane Group Flow (vph)   | 165   | 689   | 149   | 660   | 723   | 110   | 122   | 172   | 258   | 252   | 387   | 159   |
| Turn Type               | pm+pt | NA    | Perm  | pm+pt | NA    | Perm  | pm+pt | NA    | Perm  | pm+pt | NA    | Perm  |
| Protected Phases        | 5     | 2     |       | 1     | 6     |       | 3     | 8     |       | 7     | 4     |       |
| Permitted Phases        | 2     |       | 2     | 6     |       | 6     | 8     |       | 8     | 4     |       | 4     |
| Detector Phase          | 5     | 2     | 2     | 1     | 6     | 6     | 3     | 8     | 8     | 7     | 4     | 4     |
| Switch Phase            |       |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 4.0   | 15.0  | 15.0  | 4.0   | 15.0  | 15.0  | 4.0   | 6.0   | 6.0   | 4.0   | 6.0   | 6.0   |
| Minimum Split (s)       | 11.0  | 37.0  | 37.0  | 11.0  | 37.0  | 37.0  | 11.0  | 42.0  | 42.0  | 11.0  | 42.0  | 42.0  |
| Total Split (s)         | 18.0  | 37.0  | 37.0  | 30.0  | 49.0  | 49.0  | 11.0  | 42.0  | 42.0  | 11.0  | 42.0  | 42.0  |
| Total Split (%)         | 15.0% | 30.8% | 30.8% | 25.0% | 40.8% | 40.8% | 9.2%  | 35.0% | 35.0% | 9.2%  | 35.0% | 35.0% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |       |       |       |       |       |
| Recall Mode             | None  | C-Min | C-Min | None  | C-Min | C-Min | None  | None  | None  | None  | None  | None  |
| v/c Ratio               | 0.44  | 0.61  | 0.24  | 1.44  | 0.47  | 0.15  | 0.73  | 0.37  | 0.46  | 0.76  | 0.85  | 0.30  |
| Control Delay           | 19.9  | 39.2  | 2.9   | 232.4 | 15.8  | 0.4   | 47.9  | 30.2  | 12.2  | 50.0  | 59.9  | 3.8   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 19.9  | 39.2  | 2.9   | 232.4 | 15.8  | 0.4   | 47.9  | 30.2  | 12.2  | 50.0  | 59.9  | 3.8   |
| Queue Length 50th (ft)  | 60    | 241   | 0     | ~586  | 128   | 0     | 80    | 124   | 102   | 148   | 284   | 0     |
| Queue Length 95th (ft)  | 103   | 314   | 3     | m#754 | m202  | m2    | 46    | 193   | 181   | 208   | 357   | 17    |
| Internal Link Dist (ft) |       | 1576  |       |       | 3513  |       |       | 1183  |       |       | 1183  |       |
| Turn Bay Length (ft)    | 250   |       | 370   | 300   |       | 310   |       |       | 500   | 300   |       | 215   |
| Base Capacity (vph)     | 398   | 1121  | 623   | 458   | 1533  | 731   | 166   | 558   | 629   | 333   | 553   | 608   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.41  | 0.61  | 0.24  | 1.44  | 0.47  | 0.15  | 0.73  | 0.31  | 0.41  | 0.76  | 0.70  | 0.26  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 78 (65%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.

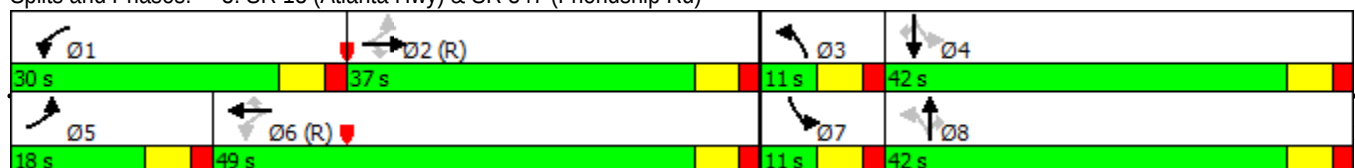
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)



# HCM Signalized Intersection Capacity Analysis

## 3: SR 13 (Atlanta Hwy) & SR 347 (Friendship Rd)

Future Build AM

11/16/2016

|                        |  |  |  |  |  |  |   |  |  |  |  |  |
|------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement               | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations    |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)   | 142                                                                               | 599                                                                               | 113                                                                               | 607                                                                               | 607                                                                               | 78                                                                                | 95                                                                                  | 153                                                                                 | 222                                                                                 | 244                                                                                 | 333                                                                                 | 129                                                                                 |
| Future Volume (vph)    | 142                                                                               | 599                                                                               | 113                                                                               | 607                                                                               | 607                                                                               | 78                                                                                | 95                                                                                  | 153                                                                                 | 222                                                                                 | 244                                                                                 | 333                                                                                 | 129                                                                                 |
| Ideal Flow (vphpl)     | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)    | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor      | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Frt                    | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected          | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)      | 1787                                                                              | 3610                                                                              | 1583                                                                              | 1656                                                                              | 3610                                                                              | 1538                                                                              | 1787                                                                                | 1863                                                                                | 1495                                                                                | 1752                                                                                | 1845                                                                                | 1583                                                                                |
| Flt Permitted          | 0.38                                                                              | 1.00                                                                              | 1.00                                                                              | 0.20                                                                              | 1.00                                                                              | 1.00                                                                              | 0.20                                                                                | 1.00                                                                                | 1.00                                                                                | 0.57                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)      | 709                                                                               | 3610                                                                              | 1583                                                                              | 352                                                                               | 3610                                                                              | 1538                                                                              | 370                                                                                 | 1863                                                                                | 1495                                                                                | 1054                                                                                | 1845                                                                                | 1583                                                                                |
| Peak-hour factor, PHF  | 0.86                                                                              | 0.87                                                                              | 0.76                                                                              | 0.92                                                                              | 0.84                                                                              | 0.71                                                                              | 0.78                                                                                | 0.89                                                                                | 0.86                                                                                | 0.97                                                                                | 0.86                                                                                | 0.81                                                                                |
| Adj. Flow (vph)        | 165                                                                               | 689                                                                               | 149                                                                               | 660                                                                               | 723                                                                               | 110                                                                               | 122                                                                                 | 172                                                                                 | 258                                                                                 | 252                                                                                 | 387                                                                                 | 159                                                                                 |
| RTOR Reduction (vph)   | 0                                                                                 | 0                                                                                 | 103                                                                               | 0                                                                                 | 0                                                                                 | 63                                                                                | 0                                                                                   | 0                                                                                   | 194                                                                                 | 0                                                                                   | 0                                                                                   | 120                                                                                 |
| Lane Group Flow (vph)  | 165                                                                               | 689                                                                               | 46                                                                                | 660                                                                               | 723                                                                               | 47                                                                                | 122                                                                                 | 172                                                                                 | 64                                                                                  | 252                                                                                 | 387                                                                                 | 39                                                                                  |
| Heavy Vehicles (%)     | 1%                                                                                | 0%                                                                                | 2%                                                                                | 9%                                                                                | 0%                                                                                | 5%                                                                                | 1%                                                                                  | 2%                                                                                  | 8%                                                                                  | 3%                                                                                  | 3%                                                                                  | 2%                                                                                  |
| Turn Type              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                               | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases       | 5                                                                                 | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   | 3                                                                                   | 8                                                                                   |                                                                                     | 7                                                                                   | 4                                                                                   |                                                                                     |
| Permitted Phases       | 2                                                                                 |                                                                                   | 2                                                                                 | 6                                                                                 |                                                                                   | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   | 4                                                                                   |                                                                                     | 4                                                                                   |
| Actuated Green, G (s)  | 47.6                                                                              | 37.3                                                                              | 37.3                                                                              | 67.3                                                                              | 51.0                                                                              | 51.0                                                                              | 34.7                                                                                | 29.7                                                                                | 29.7                                                                                | 34.7                                                                                | 29.7                                                                                | 29.7                                                                                |
| Effective Green, g (s) | 47.6                                                                              | 37.3                                                                              | 37.3                                                                              | 67.3                                                                              | 51.0                                                                              | 51.0                                                                              | 34.7                                                                                | 29.7                                                                                | 29.7                                                                                | 34.7                                                                                | 29.7                                                                                | 29.7                                                                                |
| Actuated g/C Ratio     | 0.40                                                                              | 0.31                                                                              | 0.31                                                                              | 0.56                                                                              | 0.42                                                                              | 0.42                                                                              | 0.29                                                                                | 0.25                                                                                | 0.25                                                                                | 0.29                                                                                | 0.25                                                                                | 0.25                                                                                |
| Clearance Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)  | 3.0                                                                               | 5.0                                                                               | 5.0                                                                               | 3.0                                                                               | 5.0                                                                               | 5.0                                                                               | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 |
| Lane Grp Cap (vph)     | 373                                                                               | 1122                                                                              | 492                                                                               | 458                                                                               | 1534                                                                              | 653                                                                               | 166                                                                                 | 461                                                                                 | 370                                                                                 | 333                                                                                 | 456                                                                                 | 391                                                                                 |
| v/s Ratio Prot         | 0.04                                                                              | 0.19                                                                              |                                                                                   | c0.29                                                                             | 0.20                                                                              |                                                                                   | 0.03                                                                                | 0.09                                                                                |                                                                                     | c0.03                                                                               | c0.21                                                                               |                                                                                     |
| v/s Ratio Perm         | 0.14                                                                              |                                                                                   | 0.03                                                                              | c0.52                                                                             |                                                                                   | 0.03                                                                              | 0.18                                                                                |                                                                                     | 0.04                                                                                | 0.19                                                                                |                                                                                     | 0.02                                                                                |
| v/c Ratio              | 0.44                                                                              | 0.61                                                                              | 0.09                                                                              | 1.44                                                                              | 0.47                                                                              | 0.07                                                                              | 0.73                                                                                | 0.37                                                                                | 0.17                                                                                | 0.76                                                                                | 0.85                                                                                | 0.10                                                                                |
| Uniform Delay, d1      | 24.1                                                                              | 35.2                                                                              | 29.4                                                                              | 26.9                                                                              | 24.8                                                                              | 20.5                                                                              | 37.3                                                                                | 37.4                                                                                | 35.5                                                                                | 38.8                                                                                | 43.0                                                                                | 34.8                                                                                |
| Progression Factor     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.31                                                                              | 0.58                                                                              | 0.08                                                                              | 0.74                                                                                | 0.77                                                                                | 2.40                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Incremental Delay, d2  | 0.8                                                                               | 2.5                                                                               | 0.4                                                                               | 203.9                                                                             | 0.5                                                                               | 0.1                                                                               | 15.3                                                                                | 0.5                                                                                 | 0.2                                                                                 | 9.4                                                                                 | 13.7                                                                                | 0.1                                                                                 |
| Delay (s)              | 24.9                                                                              | 37.7                                                                              | 29.7                                                                              | 239.3                                                                             | 14.8                                                                              | 1.8                                                                               | 42.9                                                                                | 29.2                                                                                | 85.4                                                                                | 48.3                                                                                | 56.7                                                                                | 35.0                                                                                |
| Level of Service       | C                                                                                 | D                                                                                 | C                                                                                 | F                                                                                 | B                                                                                 | A                                                                                 | D                                                                                   | C                                                                                   | F                                                                                   | D                                                                                   | E                                                                                   | C                                                                                   |
| Approach Delay (s)     |                                                                                   | 34.4                                                                              |                                                                                   |                                                                                   | 113.1                                                                             |                                                                                   |                                                                                     | 58.5                                                                                |                                                                                     |                                                                                     | 49.7                                                                                |                                                                                     |
| Approach LOS           |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                     | E                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |

### Intersection Summary

|                                   |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 71.6  | HCM 2000 Level of Service | E    |
| HCM 2000 Volume to Capacity ratio | 1.27  |                           |      |
| Actuated Cycle Length (s)         | 120.0 | Sum of lost time (s)      | 24.0 |
| Intersection Capacity Utilization | 93.0% | ICU Level of Service      | F    |
| Analysis Period (min)             | 15    |                           |      |
| c Critical Lane Group             |       |                           |      |

## Queues

Future Build AM

## 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) &amp; Relocated Thunder Rd/Roy Carlson Blvd 11/16/2016



| Lane Group              | EBT   | WBL   | WBT   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↕     | ↶     | ↷     | ↶     | ↕     | ↷     | ↶     | ↕     | ↷     |
| Traffic Volume (vph)    | 13    | 75    | 8     | 41    | 377   | 295   | 310   | 727   | 2     |
| Future Volume (vph)     | 13    | 75    | 8     | 41    | 377   | 295   | 310   | 727   | 2     |
| Lane Group Flow (vph)   | 60    | 82    | 116   | 45    | 424   | 321   | 337   | 845   | 2     |
| Turn Type               | NA    | Perm  | NA    | Perm  | NA    | Perm  | pm+pt | NA    | Perm  |
| Protected Phases        | 4     |       | 8     |       | 2     |       | 1     | 6     |       |
| Permitted Phases        |       | 8     |       | 2     |       | 2     | 6     |       | 6     |
| Detector Phase          | 4     | 8     | 8     | 2     | 2     | 2     | 1     | 6     | 6     |
| Switch Phase            |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 6.0   | 6.0   | 6.0   | 15.0  | 15.0  | 15.0  | 5.0   | 15.0  | 15.0  |
| Minimum Split (s)       | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 11.0  | 24.0  | 24.0  |
| Total Split (s)         | 29.0  | 29.0  | 29.0  | 52.0  | 52.0  | 52.0  | 39.0  | 91.0  | 91.0  |
| Total Split (%)         | 24.2% | 24.2% | 24.2% | 43.3% | 43.3% | 43.3% | 32.5% | 75.8% | 75.8% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                |       |       |       | Lag   | Lag   | Lag   | Lead  |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |       |       |
| Recall Mode             | None  | None  | None  | C-Min | C-Min | C-Min | None  | C-Min | C-Min |
| v/c Ratio               | 0.26  | 0.59  | 0.45  | 0.13  | 0.21  | 0.34  | 0.47  | 0.30  | 0.00  |
| Control Delay           | 20.6  | 67.1  | 16.3  | 9.6   | 7.8   | 4.0   | 2.4   | 1.2   | 0.0   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 20.6  | 67.1  | 16.3  | 9.6   | 7.8   | 4.0   | 2.4   | 1.2   | 0.0   |
| Queue Length 50th (ft)  | 10    | 61    | 6     | 5     | 32    | 2     | 11    | 13    | 0     |
| Queue Length 95th (ft)  | 49    | 110   | 60    | 51    | 155   | 182   | m28   | m32   | m0    |
| Internal Link Dist (ft) | 491   |       | 1743  |       | 2367  |       |       | 498   |       |
| Turn Bay Length (ft)    |       |       |       | 375   |       | 375   | 200   |       | 200   |
| Base Capacity (vph)     | 363   | 242   | 366   | 353   | 1988  | 951   | 782   | 2823  | 1281  |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.17  | 0.34  | 0.32  | 0.13  | 0.21  | 0.34  | 0.43  | 0.30  | 0.00  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

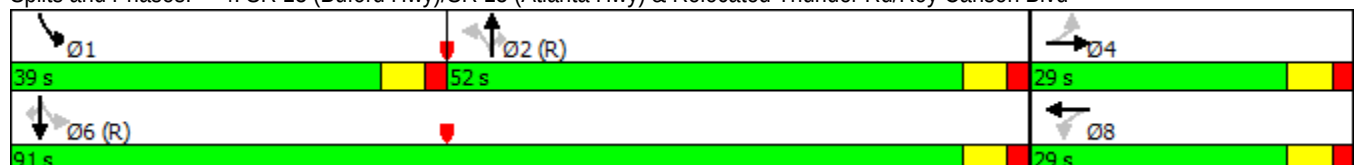
Offset: 30 (25%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) &amp; Relocated Thunder Rd/Roy Carlson Blvd



# HCM Signalized Intersection Capacity Analysis

Future Build AM

4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) & Relocated Thunder Rd/Roy Carlson Blvd 11/16/2016

|                                   |  |  |  |  |  |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (vph)              | 0                                                                                 | 13                                                                                | 42                                                                                | 75                                                                                | 8                                                                                 | 98                                                                                | 41                                                                                  | 377                                                                                 | 295                                                                                 | 310                                                                                 | 727                                                                                 | 2                                                                                   |
| Future Volume (vph)               | 0                                                                                 | 13                                                                                | 42                                                                                | 75                                                                                | 8                                                                                 | 98                                                                                | 41                                                                                  | 377                                                                                 | 295                                                                                 | 310                                                                                 | 727                                                                                 | 2                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor                 |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |
| Frt                               |                                                                                   | 0.90                                                                              |                                                                                   | 1.00                                                                              | 0.86                                                                              |                                                                                   | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected                     |                                                                                   | 1.00                                                                              |                                                                                   | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)                 |                                                                                   | 1703                                                                              |                                                                                   | 1671                                                                              | 1462                                                                              |                                                                                   | 1805                                                                                | 3574                                                                                | 1455                                                                                | 1504                                                                                | 3574                                                                                | 1615                                                                                |
| Flt Permitted                     |                                                                                   | 1.00                                                                              |                                                                                   | 0.72                                                                              | 1.00                                                                              |                                                                                   | 0.33                                                                                | 1.00                                                                                | 1.00                                                                                | 0.45                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)                 |                                                                                   | 1703                                                                              |                                                                                   | 1263                                                                              | 1462                                                                              |                                                                                   | 635                                                                                 | 3574                                                                                | 1455                                                                                | 716                                                                                 | 3574                                                                                | 1615                                                                                |
| Peak-hour factor, PHF             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.89                                                                                | 0.92                                                                                | 0.92                                                                                | 0.86                                                                                | 0.92                                                                                |
| Adj. Flow (vph)                   | 0                                                                                 | 14                                                                                | 46                                                                                | 82                                                                                | 9                                                                                 | 107                                                                               | 45                                                                                  | 424                                                                                 | 321                                                                                 | 337                                                                                 | 845                                                                                 | 2                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 41                                                                                | 0                                                                                 | 0                                                                                 | 95                                                                                | 0                                                                                 | 0                                                                                   | 0                                                                                   | 143                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 0                                                                                 | 19                                                                                | 0                                                                                 | 82                                                                                | 21                                                                                | 0                                                                                 | 45                                                                                  | 424                                                                                 | 178                                                                                 | 337                                                                                 | 845                                                                                 | 2                                                                                   |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 8%                                                                                | 0%                                                                                | 13%                                                                               | 0%                                                                                  | 1%                                                                                  | 11%                                                                                 | 20%                                                                                 | 1%                                                                                  | 0%                                                                                  |
| Turn Type                         |                                                                                   | NA                                                                                |                                                                                   | Perm                                                                              | NA                                                                                |                                                                                   | Perm                                                                                | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                   | 2                                                                                   |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 13.2                                                                              |                                                                                   | 13.2                                                                              | 13.2                                                                              |                                                                                   | 66.7                                                                                | 66.7                                                                                | 66.7                                                                                | 94.8                                                                                | 94.8                                                                                | 94.8                                                                                |
| Effective Green, g (s)            |                                                                                   | 13.2                                                                              |                                                                                   | 13.2                                                                              | 13.2                                                                              |                                                                                   | 66.7                                                                                | 66.7                                                                                | 66.7                                                                                | 94.8                                                                                | 94.8                                                                                | 94.8                                                                                |
| Actuated g/C Ratio                |                                                                                   | 0.11                                                                              |                                                                                   | 0.11                                                                              | 0.11                                                                              |                                                                                   | 0.56                                                                                | 0.56                                                                                | 0.56                                                                                | 0.79                                                                                | 0.79                                                                                | 0.79                                                                                |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)             |                                                                                   | 3.0                                                                               |                                                                                   | 3.0                                                                               | 3.0                                                                               |                                                                                   | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 3.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |
| Lane Grp Cap (vph)                |                                                                                   | 187                                                                               |                                                                                   | 138                                                                               | 160                                                                               |                                                                                   | 352                                                                                 | 1986                                                                                | 808                                                                                 | 710                                                                                 | 2823                                                                                | 1275                                                                                |
| v/s Ratio Prot                    |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                     | 0.12                                                                                |                                                                                     | c0.09                                                                               | 0.24                                                                                |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                   |                                                                                   | c0.06                                                                             |                                                                                   |                                                                                   | 0.07                                                                                |                                                                                     | 0.12                                                                                | c0.29                                                                               |                                                                                     | 0.00                                                                                |
| v/c Ratio                         |                                                                                   | 0.10                                                                              |                                                                                   | 0.59                                                                              | 0.13                                                                              |                                                                                   | 0.13                                                                                | 0.21                                                                                | 0.22                                                                                | 0.47                                                                                | 0.30                                                                                | 0.00                                                                                |
| Uniform Delay, d1                 |                                                                                   | 48.1                                                                              |                                                                                   | 50.8                                                                              | 48.2                                                                              |                                                                                   | 12.7                                                                                | 13.4                                                                                | 13.5                                                                                | 3.8                                                                                 | 3.5                                                                                 | 2.6                                                                                 |
| Progression Factor                |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.51                                                                                | 0.49                                                                                | 1.39                                                                                | 0.56                                                                                | 0.30                                                                                | 1.00                                                                                |
| Incremental Delay, d2             |                                                                                   | 0.2                                                                               |                                                                                   | 6.7                                                                               | 0.4                                                                               |                                                                                   | 0.7                                                                                 | 0.2                                                                                 | 0.6                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Delay (s)                         |                                                                                   | 48.3                                                                              |                                                                                   | 57.6                                                                              | 48.6                                                                              |                                                                                   | 7.2                                                                                 | 6.8                                                                                 | 19.3                                                                                | 2.2                                                                                 | 1.1                                                                                 | 2.6                                                                                 |
| Level of Service                  |                                                                                   | D                                                                                 |                                                                                   | E                                                                                 | D                                                                                 |                                                                                   | A                                                                                   | A                                                                                   | B                                                                                   | A                                                                                   | A                                                                                   | A                                                                                   |
| Approach Delay (s)                |                                                                                   | 48.3                                                                              |                                                                                   |                                                                                   | 52.3                                                                              |                                                                                   |                                                                                     | 11.9                                                                                |                                                                                     |                                                                                     | 1.4                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                     | B                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 10.9                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                     |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.51                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                     |                                                                                     | 18.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 58.4%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

Future Build AM

## 5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd

11/16/2016

|                         | →     | ↘     | ↙     | ←     | ↖     | ↗     | ↑     | ↘     | ↙     | ↓     | ↖     |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Group              | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations     | ↖     | ↗     |       | ↖     | ↗     | ↗     | ↑↑    | ↗     | ↗     | ↑↑    | ↗     |
| Traffic Volume (vph)    | 1     | 6     | 416   | 26    | 236   | 22    | 691   | 185   | 120   | 687   | 40    |
| Future Volume (vph)     | 1     | 6     | 416   | 26    | 236   | 22    | 691   | 185   | 120   | 687   | 40    |
| Lane Group Flow (vph)   | 4     | 12    | 0     | 485   | 265   | 38    | 735   | 201   | 162   | 763   | 55    |
| Turn Type               | NA    | Perm  | Perm  | NA    | Perm  | Perm  | NA    | Perm  | Perm  | NA    | Perm  |
| Protected Phases        | 4     |       |       | 8     |       |       | 2     |       |       | 6     |       |
| Permitted Phases        |       | 4     | 8     |       | 8     | 2     |       | 2     | 6     |       | 6     |
| Detector Phase          | 4     | 4     | 8     | 8     | 8     | 2     | 2     | 2     | 6     | 6     | 6     |
| Switch Phase            |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 15.0  | 15.0  | 15.0  | 15.0  | 15.0  | 15.0  |
| Minimum Split (s)       | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 59.0  | 59.0  | 59.0  | 59.0  | 59.0  | 61.0  | 61.0  | 61.0  | 61.0  | 61.0  | 61.0  |
| Total Split (%)         | 49.2% | 49.2% | 49.2% | 49.2% | 49.2% | 50.8% | 50.8% | 50.8% | 50.8% | 50.8% | 50.8% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   |       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   |       | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                |       |       |       |       |       |       |       |       |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |       |       |       |       |
| Recall Mode             | None  | None  | None  | None  | None  | C-Min | C-Min | C-Min | C-Min | C-Min | C-Min |
| v/c Ratio               | 0.01  | 0.02  |       | 0.89  | 0.38  | 0.13  | 0.42  | 0.22  | 0.54  | 0.42  | 0.06  |
| Control Delay           | 19.0  | 2.5   |       | 53.4  | 13.2  | 13.1  | 14.3  | 1.0   | 22.6  | 13.6  | 2.4   |
| Queue Delay             | 0.0   | 0.0   |       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 19.0  | 2.5   |       | 53.4  | 13.2  | 13.1  | 14.3  | 1.0   | 22.6  | 13.6  | 2.4   |
| Queue Length 50th (ft)  | 2     | 0     |       | 336   | 66    | 8     | 184   | 3     | 73    | 176   | 5     |
| Queue Length 95th (ft)  | 3     | 0     |       | 300   | 122   | m13   | 107   | m8    | 94    | 215   | 11    |
| Internal Link Dist (ft) | 275   |       |       | 4179  |       |       | 3868  |       |       | 2104  |       |
| Turn Bay Length (ft)    |       | 105   |       |       | 250   | 230   |       | 230   | 200   |       | 185   |
| Base Capacity (vph)     | 839   | 624   |       | 620   | 786   | 291   | 1745  | 917   | 300   | 1796  | 854   |
| Starvation Cap Reductn  | 0     | 0     |       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     |       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     |       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.00  | 0.02  |       | 0.78  | 0.34  | 0.13  | 0.42  | 0.22  | 0.54  | 0.42  | 0.06  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

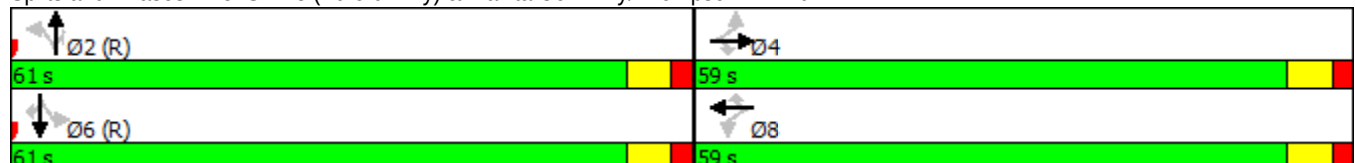
Offset: 64 (53%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd



# HCM Signalized Intersection Capacity Analysis

## 5: SR 13 (Buford Hwy) & Makita Co. Drwy/Thompson Mill Rd

Future Build AM

11/16/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)              | 0                                                                                 | 1                                                                                 | 6                                                                                 | 416                                                                               | 26                                                                                | 236                                                                               | 22                                                                                  | 691                                                                                 | 185                                                                                 | 120                                                                                 | 687                                                                                 | 40                                                                                  |
| Future Volume (vph)               | 0                                                                                 | 1                                                                                 | 6                                                                                 | 416                                                                               | 26                                                                                | 236                                                                               | 22                                                                                  | 691                                                                                 | 185                                                                                 | 120                                                                                 | 687                                                                                 | 40                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor                 |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |
| Frt                               |                                                                                   | 1.00                                                                              | 0.85                                                                              |                                                                                   | 1.00                                                                              | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected                     |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.96                                                                              | 1.00                                                                              | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)                 |                                                                                   | 1900                                                                              | 1380                                                                              |                                                                                   | 1816                                                                              | 1615                                                                              | 1805                                                                                | 3406                                                                                | 1599                                                                                | 1787                                                                                | 3505                                                                                | 1615                                                                                |
| Flt Permitted                     |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.74                                                                              | 1.00                                                                              | 0.30                                                                                | 1.00                                                                                | 1.00                                                                                | 0.31                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)                 |                                                                                   | 1900                                                                              | 1380                                                                              |                                                                                   | 1406                                                                              | 1615                                                                              | 568                                                                                 | 3406                                                                                | 1599                                                                                | 587                                                                                 | 3505                                                                                | 1615                                                                                |
| Peak-hour factor, PHF             | 0.54                                                                              | 0.25                                                                              | 0.50                                                                              | 0.93                                                                              | 0.69                                                                              | 0.89                                                                              | 0.58                                                                                | 0.94                                                                                | 0.92                                                                                | 0.74                                                                                | 0.90                                                                                | 0.73                                                                                |
| Adj. Flow (vph)                   | 0                                                                                 | 4                                                                                 | 12                                                                                | 447                                                                               | 38                                                                                | 265                                                                               | 38                                                                                  | 735                                                                                 | 201                                                                                 | 162                                                                                 | 763                                                                                 | 55                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 7                                                                                 | 0                                                                                 | 0                                                                                 | 80                                                                                | 0                                                                                   | 0                                                                                   | 98                                                                                  | 0                                                                                   | 0                                                                                   | 27                                                                                  |
| Lane Group Flow (vph)             | 0                                                                                 | 4                                                                                 | 5                                                                                 | 0                                                                                 | 485                                                                               | 185                                                                               | 38                                                                                  | 735                                                                                 | 103                                                                                 | 162                                                                                 | 763                                                                                 | 28                                                                                  |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 17%                                                                               | 0%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                  | 6%                                                                                  | 1%                                                                                  | 1%                                                                                  | 3%                                                                                  | 0%                                                                                  |
| Turn Type                         |                                                                                   | NA                                                                                | Perm                                                                              | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                | Perm                                                                                | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   | 4                                                                                 | 8                                                                                 |                                                                                   | 8                                                                                 | 2                                                                                   |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 46.5                                                                              | 46.5                                                                              |                                                                                   | 46.5                                                                              | 46.5                                                                              | 61.5                                                                                | 61.5                                                                                | 61.5                                                                                | 61.5                                                                                | 61.5                                                                                | 61.5                                                                                |
| Effective Green, g (s)            |                                                                                   | 46.5                                                                              | 46.5                                                                              |                                                                                   | 46.5                                                                              | 46.5                                                                              | 61.5                                                                                | 61.5                                                                                | 61.5                                                                                | 61.5                                                                                | 61.5                                                                                | 61.5                                                                                |
| Actuated g/C Ratio                |                                                                                   | 0.39                                                                              | 0.39                                                                              |                                                                                   | 0.39                                                                              | 0.39                                                                              | 0.51                                                                                | 0.51                                                                                | 0.51                                                                                | 0.51                                                                                | 0.51                                                                                | 0.51                                                                                |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)             |                                                                                   | 3.0                                                                               | 3.0                                                                               |                                                                                   | 3.0                                                                               | 3.0                                                                               | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |
| Lane Grp Cap (vph)                |                                                                                   | 736                                                                               | 534                                                                               |                                                                                   | 544                                                                               | 625                                                                               | 291                                                                                 | 1745                                                                                | 819                                                                                 | 300                                                                                 | 1796                                                                                | 827                                                                                 |
| v/s Ratio Prot                    |                                                                                   | 0.00                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     | 0.22                                                                                |                                                                                     |                                                                                     | 0.22                                                                                |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                   | 0.00                                                                              |                                                                                   | c0.34                                                                             | 0.11                                                                              | 0.07                                                                                |                                                                                     | 0.06                                                                                | c0.28                                                                               |                                                                                     | 0.02                                                                                |
| v/c Ratio                         |                                                                                   | 0.01                                                                              | 0.01                                                                              |                                                                                   | 0.89                                                                              | 0.30                                                                              | 0.13                                                                                | 0.42                                                                                | 0.13                                                                                | 0.54                                                                                | 0.42                                                                                | 0.03                                                                                |
| Uniform Delay, d1                 |                                                                                   | 22.6                                                                              | 22.6                                                                              |                                                                                   | 34.4                                                                              | 25.4                                                                              | 15.3                                                                                | 18.2                                                                                | 15.2                                                                                | 19.7                                                                                | 18.2                                                                                | 14.5                                                                                |
| Progression Factor                |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.67                                                                                | 0.70                                                                                | 0.22                                                                                | 0.68                                                                                | 0.66                                                                                | 0.47                                                                                |
| Incremental Delay, d2             |                                                                                   | 0.0                                                                               | 0.0                                                                               |                                                                                   | 16.7                                                                              | 0.3                                                                               | 0.7                                                                                 | 0.6                                                                                 | 0.3                                                                                 | 6.6                                                                                 | 0.7                                                                                 | 0.1                                                                                 |
| Delay (s)                         |                                                                                   | 22.6                                                                              | 22.6                                                                              |                                                                                   | 51.1                                                                              | 25.7                                                                              | 10.9                                                                                | 13.4                                                                                | 3.5                                                                                 | 20.0                                                                                | 12.7                                                                                | 6.8                                                                                 |
| Level of Service                  |                                                                                   | C                                                                                 | C                                                                                 |                                                                                   | D                                                                                 | C                                                                                 | B                                                                                   | B                                                                                   | A                                                                                   | C                                                                                   | B                                                                                   | A                                                                                   |
| Approach Delay (s)                |                                                                                   | 22.6                                                                              |                                                                                   |                                                                                   | 42.1                                                                              |                                                                                   |                                                                                     | 11.3                                                                                |                                                                                     |                                                                                     | 13.6                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                     | B                                                                                   |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 20.7                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.69                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 77.7%                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



## Queues

Future Build AM

## 6: SR 13 (Buford Hwy) &amp; S. Hill St/Hamilton Mill Rd

11/16/2016



| Lane Group              | EBL   | EBT   | EBR   | WBL   | WBT   | NBL   | NBT   | NBR  | SBL   | SBT   | SBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|
| Lane Configurations     |       |       |       |       |       |       |       |      |       |       |       |
| Traffic Volume (vph)    | 38    | 166   | 68    | 509   | 250   | 44    | 645   | 320  | 241   | 831   | 57    |
| Future Volume (vph)     | 38    | 166   | 68    | 509   | 250   | 44    | 645   | 320  | 241   | 831   | 57    |
| Lane Group Flow (vph)   | 70    | 263   | 96    | 553   | 613   | 59    | 701   | 432  | 339   | 894   | 63    |
| Turn Type               | Perm  | NA    | Perm  | Prot  | NA    | pm+pt | NA    | Free | pm+pt | NA    | Perm  |
| Protected Phases        |       | 4     |       | 3     | 8     | 5     | 2     |      | 1     | 6     |       |
| Permitted Phases        | 4     |       | 4     |       |       | 2     |       | Free | 6     |       | 6     |
| Detector Phase          | 4     | 4     | 4     | 3     | 8     | 5     | 2     |      | 1     | 6     | 6     |
| Switch Phase            |       |       |       |       |       |       |       |      |       |       |       |
| Minimum Initial (s)     | 6.0   | 6.0   | 6.0   | 4.0   | 6.0   | 4.0   | 15.0  |      | 4.0   | 15.0  | 15.0  |
| Minimum Split (s)       | 41.0  | 41.0  | 41.0  | 11.0  | 46.0  | 11.0  | 37.0  |      | 11.0  | 40.0  | 40.0  |
| Total Split (s)         | 41.0  | 41.0  | 41.0  | 23.0  | 64.0  | 11.0  | 38.0  |      | 18.0  | 45.0  | 45.0  |
| Total Split (%)         | 34.2% | 34.2% | 34.2% | 19.2% | 53.3% | 9.2%  | 31.7% |      | 15.0% | 37.5% | 37.5% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |      | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |      | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |      | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |      | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lag   | Lag   | Lag   | Lead  |       | Lead  | Lag   |      | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |      |       |       |       |
| Recall Mode             | None  | None  | None  | None  | None  | None  | C-Min |      | None  | C-Min | C-Min |
| v/c Ratio               | 0.67  | 0.68  | 0.20  | 1.17  | 0.87  | 0.25  | 0.57  | 0.28 | 0.98  | 0.59  | 0.08  |
| Control Delay           | 71.9  | 52.5  | 0.9   | 142.8 | 43.1  | 21.4  | 35.1  | 0.5  | 62.0  | 25.0  | 0.4   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   |
| Total Delay             | 71.9  | 52.5  | 0.9   | 142.8 | 43.1  | 21.4  | 35.1  | 0.5  | 62.0  | 25.0  | 0.4   |
| Queue Length 50th (ft)  | 51    | 193   | 0     | ~263  | 406   | 22    | 225   | 0    | 113   | 293   | 1     |
| Queue Length 95th (ft)  | 51    | 164   | 0     | #376  | 396   | 45    | 335   | 0    | #232  | 425   | m3    |
| Internal Link Dist (ft) |       | 657   |       |       | 1618  |       | 1320  |      |       | 3868  |       |
| Turn Bay Length (ft)    | 180   |       | 300   | 250   |       | 240   |       | 1000 | 400   |       | 280   |
| Base Capacity (vph)     | 150   | 554   | 606   | 472   | 854   | 232   | 1223  | 1538 | 346   | 1516  | 749   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0    | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0    | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0    | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.47  | 0.47  | 0.16  | 1.17  | 0.72  | 0.25  | 0.57  | 0.28 | 0.98  | 0.59  | 0.08  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 15 (13%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 125

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.

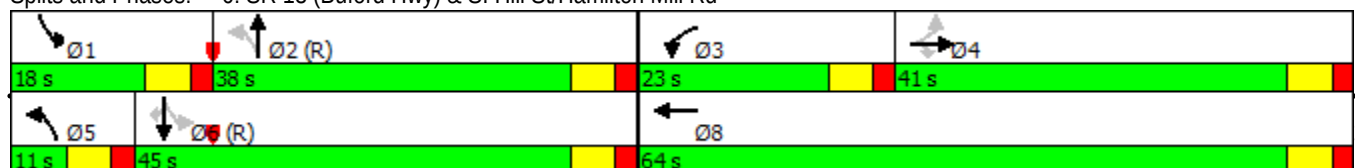
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 6: SR 13 (Buford Hwy) &amp; S. Hill St/Hamilton Mill Rd



# HCM Signalized Intersection Capacity Analysis

## 6: SR 13 (Buford Hwy) & S. Hill St/Hamilton Mill Rd

Future Build AM

11/16/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |  |  |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (vph)              | 38                                                                                | 166                                                                               | 68                                                                                | 509                                                                               | 250                                                                               | 231                                                                               | 44                                                                                  | 645                                                                                 | 320                                                                                 | 241                                                                                 | 831                                                                                 | 57                                                                                  |
| Future Volume (vph)               | 38                                                                                | 166                                                                               | 68                                                                                | 509                                                                               | 250                                                                               | 231                                                                               | 44                                                                                  | 645                                                                                 | 320                                                                                 | 241                                                                                 | 831                                                                                 | 57                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 | 4.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.97                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |
| Frt                               | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 0.93                                                                              |                                                                                   | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)                 | 1752                                                                              | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1708                                                                              |                                                                                   | 1770                                                                                | 3438                                                                                | 1538                                                                                | 1752                                                                                | 3505                                                                                | 1553                                                                                |
| Flt Permitted                     | 0.28                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.24                                                                                | 1.00                                                                                | 1.00                                                                                | 0.23                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)                 | 517                                                                               | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1708                                                                              |                                                                                   | 447                                                                                 | 3438                                                                                | 1538                                                                                | 420                                                                                 | 3505                                                                                | 1553                                                                                |
| Peak-hour factor, PHF             | 0.54                                                                              | 0.63                                                                              | 0.71                                                                              | 0.92                                                                              | 0.81                                                                              | 0.76                                                                              | 0.75                                                                                | 0.92                                                                                | 0.74                                                                                | 0.71                                                                                | 0.93                                                                                | 0.91                                                                                |
| Adj. Flow (vph)                   | 70                                                                                | 263                                                                               | 96                                                                                | 553                                                                               | 309                                                                               | 304                                                                               | 59                                                                                  | 701                                                                                 | 432                                                                                 | 339                                                                                 | 894                                                                                 | 63                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 77                                                                                | 0                                                                                 | 35                                                                                | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 36                                                                                  |
| Lane Group Flow (vph)             | 70                                                                                | 263                                                                               | 19                                                                                | 553                                                                               | 578                                                                               | 0                                                                                 | 59                                                                                  | 701                                                                                 | 432                                                                                 | 339                                                                                 | 894                                                                                 | 27                                                                                  |
| Heavy Vehicles (%)                | 3%                                                                                | 0%                                                                                | 0%                                                                                | 5%                                                                                | 1%                                                                                | 5%                                                                                | 2%                                                                                  | 5%                                                                                  | 5%                                                                                  | 3%                                                                                  | 3%                                                                                  | 4%                                                                                  |
| Turn Type                         | Perm                                                                              | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                |                                                                                   | pm+pt                                                                               | NA                                                                                  | Free                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   | 3                                                                                 | 8                                                                                 |                                                                                   | 5                                                                                   | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   |                                                                                   | 2                                                                                   |                                                                                     | Free                                                                                | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             | 24.3                                                                              | 24.3                                                                              | 24.3                                                                              | 17.0                                                                              | 47.3                                                                              |                                                                                   | 46.7                                                                                | 42.7                                                                                | 120.0                                                                               | 60.7                                                                                | 50.7                                                                                | 50.7                                                                                |
| Effective Green, g (s)            | 24.3                                                                              | 24.3                                                                              | 24.3                                                                              | 17.0                                                                              | 47.3                                                                              |                                                                                   | 46.7                                                                                | 42.7                                                                                | 120.0                                                                               | 60.7                                                                                | 50.7                                                                                | 50.7                                                                                |
| Actuated g/C Ratio                | 0.20                                                                              | 0.20                                                                              | 0.20                                                                              | 0.14                                                                              | 0.39                                                                              |                                                                                   | 0.39                                                                                | 0.36                                                                                | 1.00                                                                                | 0.51                                                                                | 0.42                                                                                | 0.42                                                                                |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)             | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               |                                                                                   | 3.0                                                                                 | 5.0                                                                                 |                                                                                     | 3.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |
| Lane Grp Cap (vph)                | 104                                                                               | 384                                                                               | 327                                                                               | 472                                                                               | 673                                                                               |                                                                                   | 218                                                                                 | 1223                                                                                | 1538                                                                                | 345                                                                                 | 1480                                                                                | 656                                                                                 |
| v/s Ratio Prot                    |                                                                                   | 0.14                                                                              |                                                                                   | c0.17                                                                             | c0.34                                                                             |                                                                                   | 0.01                                                                                | 0.20                                                                                |                                                                                     | c0.10                                                                               | 0.26                                                                                |                                                                                     |
| v/s Ratio Perm                    | 0.14                                                                              |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.10                                                                                |                                                                                     | 0.28                                                                                | c0.40                                                                               |                                                                                     | 0.02                                                                                |
| v/c Ratio                         | 0.67                                                                              | 0.68                                                                              | 0.06                                                                              | 1.17                                                                              | 0.86                                                                              |                                                                                   | 0.27                                                                                | 0.57                                                                                | 0.28                                                                                | 0.98                                                                                | 0.60                                                                                | 0.04                                                                                |
| Uniform Delay, d1                 | 44.2                                                                              | 44.3                                                                              | 38.6                                                                              | 51.5                                                                              | 33.3                                                                              |                                                                                   | 23.7                                                                                | 31.3                                                                                | 0.0                                                                                 | 24.5                                                                                | 26.9                                                                                | 20.4                                                                                |
| Progression Factor                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 0.79                                                                                | 0.83                                                                                | 1.00                                                                                |
| Incremental Delay, d2             | 15.8                                                                              | 5.0                                                                               | 0.1                                                                               | 97.8                                                                              | 10.6                                                                              |                                                                                   | 0.7                                                                                 | 2.0                                                                                 | 0.5                                                                                 | 40.2                                                                                | 1.6                                                                                 | 0.1                                                                                 |
| Delay (s)                         | 60.0                                                                              | 49.3                                                                              | 38.7                                                                              | 149.3                                                                             | 44.0                                                                              |                                                                                   | 24.3                                                                                | 33.2                                                                                | 0.5                                                                                 | 59.7                                                                                | 23.8                                                                                | 20.5                                                                                |
| Level of Service                  | E                                                                                 | D                                                                                 | D                                                                                 | F                                                                                 | D                                                                                 |                                                                                   | C                                                                                   | C                                                                                   | A                                                                                   | E                                                                                   | C                                                                                   | C                                                                                   |
| Approach Delay (s)                |                                                                                   | 48.7                                                                              |                                                                                   |                                                                                   | 93.9                                                                              |                                                                                   |                                                                                     | 20.9                                                                                |                                                                                     |                                                                                     | 33.1                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                     | C                                                                                   |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   | 48.5                                                                              |                                                                                   |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   | 1.04                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                     | 24.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   | 83.5%                                                                             |                                                                                   |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                     | E                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM Unsignalized Intersection Capacity Analysis

## 7: Pvt. Drwy/Bryant Rd & Thompson Mill Rd

Future Build AM  
11/16/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                     |  |                                                                                     |                                                                                     |  |                                                                                     |
| Traffic Volume (veh/h)            | 5                                                                                 | 213                                                                               | 1                                                                                 | 0                                                                                 | 621                                                                               | 30                                                                                | 0                                                                                   | 0                                                                                   | 0                                                                                   | 14                                                                                  | 0                                                                                   | 6                                                                                   |
| Future Volume (Veh/h)             | 5                                                                                 | 213                                                                               | 1                                                                                 | 0                                                                                 | 621                                                                               | 30                                                                                | 0                                                                                   | 0                                                                                   | 0                                                                                   | 14                                                                                  | 0                                                                                   | 6                                                                                   |
| Sign Control                      |                                                                                   | Free                                                                              |                                                                                   |                                                                                   | Free                                                                              |                                                                                   |                                                                                     | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Grade                             |                                                                                   | 0%                                                                                |                                                                                   |                                                                                   | 0%                                                                                |                                                                                   |                                                                                     | 0%                                                                                  |                                                                                     |                                                                                     | 0%                                                                                  |                                                                                     |
| Peak Hour Factor                  | 0.42                                                                              | 0.83                                                                              | 0.25                                                                              | 0.92                                                                              | 0.94                                                                              | 0.68                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.60                                                                                | 0.92                                                                                | 0.75                                                                                |
| Hourly flow rate (vph)            | 12                                                                                | 257                                                                               | 4                                                                                 | 0                                                                                 | 661                                                                               | 44                                                                                | 0                                                                                   | 0                                                                                   | 0                                                                                   | 23                                                                                  | 0                                                                                   | 8                                                                                   |
| Pedestrians                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane Width (ft)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Walking Speed (ft/s)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Percent Blockage                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Right turn flare (veh)            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median type                       |                                                                                   | None                                                                              |                                                                                   |                                                                                   | None                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median storage (veh)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Upstream signal (ft)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| pX, platoon unblocked             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC, conflicting volume            | 705                                                                               |                                                                                   |                                                                                   | 261                                                                               |                                                                                   |                                                                                   | 974                                                                                 | 988                                                                                 | 259                                                                                 | 966                                                                                 | 968                                                                                 | 683                                                                                 |
| vC1, stage 1 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC2, stage 2 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vCu, unblocked vol                | 705                                                                               |                                                                                   |                                                                                   | 261                                                                               |                                                                                   |                                                                                   | 974                                                                                 | 988                                                                                 | 259                                                                                 | 966                                                                                 | 968                                                                                 | 683                                                                                 |
| tC, single (s)                    | 4.1                                                                               |                                                                                   |                                                                                   | 4.1                                                                               |                                                                                   |                                                                                   | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 |
| tC, 2 stage (s)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| tF (s)                            | 2.2                                                                               |                                                                                   |                                                                                   | 2.2                                                                               |                                                                                   |                                                                                   | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 |
| p0 queue free %                   | 99                                                                                |                                                                                   |                                                                                   | 100                                                                               |                                                                                   |                                                                                   | 100                                                                                 | 100                                                                                 | 100                                                                                 | 90                                                                                  | 100                                                                                 | 98                                                                                  |
| cM capacity (veh/h)               | 902                                                                               |                                                                                   |                                                                                   | 1315                                                                              |                                                                                   |                                                                                   | 227                                                                                 | 246                                                                                 | 785                                                                                 | 234                                                                                 | 252                                                                                 | 453                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total                      | 273                                                                               | 705                                                                               | 0                                                                                 | 31                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left                       | 12                                                                                | 0                                                                                 | 0                                                                                 | 23                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right                      | 4                                                                                 | 44                                                                                | 0                                                                                 | 8                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| cSH                               | 902                                                                               | 1315                                                                              | 1700                                                                              | 267                                                                               |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume to Capacity                | 0.01                                                                              | 0.00                                                                              | 0.00                                                                              | 0.12                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Queue Length 95th (ft)            | 1                                                                                 | 0                                                                                 | 0                                                                                 | 10                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 0.5                                                                               | 0.0                                                                               | 0.0                                                                               | 20.2                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane LOS                          | A                                                                                 |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 0.5                                                                               | 0.0                                                                               | 0.0                                                                               | 20.2                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Average Delay                     |                                                                                   |                                                                                   | 0.8                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 44.5%                                                                             | ICU Level of Service                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM Unsignalized Intersection Capacity Analysis 8: N. Bogan Rd & Thompson Mill Rd

Future Build AM

11/16/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                    |  |                                                                                     |                                                                                     |  |                                                                                     |
| Sign Control                      |                                                                                   | Stop                                                                              |                                                                                   |                                                                                   | Stop                                                                              |                                                                                   |                                                                                    | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Traffic Volume (vph)              | 56                                                                                | 120                                                                               | 69                                                                                | 54                                                                                | 438                                                                               | 9                                                                                 | 119                                                                                | 69                                                                                  | 17                                                                                  | 8                                                                                   | 98                                                                                  | 127                                                                                 |
| Future Volume (vph)               | 56                                                                                | 120                                                                               | 69                                                                                | 54                                                                                | 438                                                                               | 9                                                                                 | 119                                                                                | 69                                                                                  | 17                                                                                  | 8                                                                                   | 98                                                                                  | 127                                                                                 |
| Peak Hour Factor                  | 0.74                                                                              | 0.80                                                                              | 0.75                                                                              | 0.85                                                                              | 0.95                                                                              | 0.45                                                                              | 0.72                                                                               | 0.87                                                                                | 0.80                                                                                | 0.50                                                                                | 0.93                                                                                | 0.78                                                                                |
| Hourly flow rate (vph)            | 76                                                                                | 150                                                                               | 92                                                                                | 64                                                                                | 461                                                                               | 20                                                                                | 165                                                                                | 79                                                                                  | 21                                                                                  | 16                                                                                  | 105                                                                                 | 163                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total (vph)                | 318                                                                               | 545                                                                               | 265                                                                               | 284                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left (vph)                 | 76                                                                                | 64                                                                                | 165                                                                               | 16                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right (vph)                | 92                                                                                | 20                                                                                | 21                                                                                | 163                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Hadj (s)                          | -0.12                                                                             | 0.00                                                                              | 0.08                                                                              | -0.33                                                                             |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Departure Headway (s)             | 7.4                                                                               | 7.0                                                                               | 7.9                                                                               | 7.5                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Degree Utilization, x             | 0.65                                                                              | 1.07                                                                              | 0.58                                                                              | 0.59                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Capacity (veh/h)                  | 458                                                                               | 506                                                                               | 431                                                                               | 449                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 23.1                                                                              | 84.7                                                                              | 21.2                                                                              | 20.6                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 23.1                                                                              | 84.7                                                                              | 21.2                                                                              | 20.6                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      | C                                                                                 | F                                                                                 | C                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Delay                             |                                                                                   |                                                                                   |                                                                                   | 46.0                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  |                                                                                   |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   |                                                                                   | 64.6%                                                                             | ICU Level of Service                                                              |                                                                                   | C                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

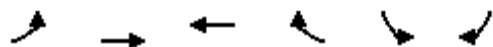
Intersection: 8: N. Bogan Rd & Thompson Mill Rd

| Movement              | EB   | WB   | NB  | SB  |
|-----------------------|------|------|-----|-----|
| Directions Served     | LTR  | LTR  | LTR | LTR |
| Maximum Queue (ft)    | 120  | 203  | 55  | 71  |
| Average Queue (ft)    | 72   | 115  | 44  | 57  |
| 95th Queue (ft)       | 121  | 200  | 62  | 75  |
| Link Distance (ft)    | 2178 | 1031 | 846 | 591 |
| Upstream Blk Time (%) |      |      |     |     |
| Queuing Penalty (veh) |      |      |     |     |
| Storage Bay Dist (ft) |      |      |     |     |
| Storage Blk Time (%)  |      |      |     |     |
| Queuing Penalty (veh) |      |      |     |     |

# HCM Unsignalized Intersection Capacity Analysis

## 9: Thompson Mill Rd & Site Drwy

Future Build AM  
11/16/2016



| Movement                          | EBL  | EBT  | WBT   | WBR  | SBL                  | SBR  |
|-----------------------------------|------|------|-------|------|----------------------|------|
| Lane Configurations               |      | ↑    | ↑     | ↗    | ↘                    |      |
| Traffic Volume (veh/h)            | 0    | 227  | 652   | 28   | 7                    | 0    |
| Future Volume (Veh/h)             | 0    | 227  | 652   | 28   | 7                    | 0    |
| Sign Control                      |      | Free | Free  |      | Stop                 |      |
| Grade                             |      | 0%   | 0%    |      | 0%                   |      |
| Peak Hour Factor                  | 0.92 | 0.83 | 0.94  | 0.92 | 0.92                 | 0.92 |
| Hourly flow rate (vph)            | 0    | 273  | 694   | 30   | 8                    | 0    |
| Pedestrians                       |      |      |       |      |                      |      |
| Lane Width (ft)                   |      |      |       |      |                      |      |
| Walking Speed (ft/s)              |      |      |       |      |                      |      |
| Percent Blockage                  |      |      |       |      |                      |      |
| Right turn flare (veh)            |      |      |       |      |                      |      |
| Median type                       |      | None | None  |      |                      |      |
| Median storage veh                |      |      |       |      |                      |      |
| Upstream signal (ft)              |      |      |       |      |                      |      |
| pX, platoon unblocked             |      |      |       |      |                      |      |
| vC, conflicting volume            | 694  |      |       |      | 967                  | 694  |
| vC1, stage 1 conf vol             |      |      |       |      |                      |      |
| vC2, stage 2 conf vol             |      |      |       |      |                      |      |
| vCu, unblocked vol                | 694  |      |       |      | 967                  | 694  |
| tC, single (s)                    | 4.1  |      |       |      | 6.4                  | 6.2  |
| tC, 2 stage (s)                   |      |      |       |      |                      |      |
| tF (s)                            | 2.2  |      |       |      | 3.5                  | 3.3  |
| p0 queue free %                   | 100  |      |       |      | 97                   | 100  |
| cM capacity (veh/h)               | 911  |      |       |      | 284                  | 446  |
| Direction, Lane #                 | EB 1 | WB 1 | WB 2  | SB 1 |                      |      |
| Volume Total                      | 273  | 694  | 30    | 8    |                      |      |
| Volume Left                       | 0    | 0    | 0     | 8    |                      |      |
| Volume Right                      | 0    | 0    | 30    | 0    |                      |      |
| cSH                               | 1700 | 1700 | 1700  | 284  |                      |      |
| Volume to Capacity                | 0.16 | 0.41 | 0.02  | 0.03 |                      |      |
| Queue Length 95th (ft)            | 0    | 0    | 0     | 2    |                      |      |
| Control Delay (s)                 | 0.0  | 0.0  | 0.0   | 18.0 |                      |      |
| Lane LOS                          |      |      |       | C    |                      |      |
| Approach Delay (s)                | 0.0  | 0.0  |       | 18.0 |                      |      |
| Approach LOS                      |      |      |       | C    |                      |      |
| Intersection Summary              |      |      |       |      |                      |      |
| Average Delay                     |      |      | 0.1   |      |                      |      |
| Intersection Capacity Utilization |      |      | 44.3% |      | ICU Level of Service | A    |
| Analysis Period (min)             |      |      | 15    |      |                      |      |

## Queues

Future Build PM

## 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)

11/16/2016



| Lane Group              | EBL   | EBT   | WBT   | WBR   | NBL   | NBT   | NBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     |       |       |       |       |       |       |       |
| Traffic Volume (vph)    | 573   | 1332  | 564   | 135   | 379   | 1     | 562   |
| Future Volume (vph)     | 573   | 1332  | 564   | 135   | 379   | 1     | 562   |
| Lane Group Flow (vph)   | 699   | 1497  | 581   | 173   | 225   | 230   | 618   |
| Turn Type               | Prot  | NA    | NA    | Perm  | Perm  | NA    | Perm  |
| Protected Phases        | 5     | 2     | 6     |       |       | 8     |       |
| Permitted Phases        |       |       |       | 6     | 8     |       | 8     |
| Detector Phase          | 5     | 2     | 6     | 6     | 8     | 8     | 8     |
| Switch Phase            |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 4.0   | 15.0  | 15.0  | 15.0  | 6.0   | 6.0   | 6.0   |
| Minimum Split (s)       | 11.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 52.0  | 77.0  | 25.0  | 25.0  | 43.0  | 43.0  | 43.0  |
| Total Split (%)         | 43.3% | 64.2% | 20.8% | 20.8% | 35.8% | 35.8% | 35.8% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lead  |       | Lag   | Lag   |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |
| Recall Mode             | None  | C-Min | C-Min | C-Min | None  | None  | None  |
| v/c Ratio               | 1.06  | 0.71  | 0.71  | 0.43  | 0.44  | 0.45  | 1.12  |
| Control Delay           | 74.2  | 12.5  | 53.5  | 10.2  | 36.5  | 36.7  | 108.2 |
| Queue Delay             | 0.0   | 2.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 74.2  | 14.8  | 53.5  | 10.2  | 36.5  | 36.7  | 108.2 |
| Queue Length 50th (ft)  | ~610  | 467   | 158   | 0     | 146   | 150   | ~504  |
| Queue Length 95th (ft)  | #702  | 300   | 201   | 38    | 207   | 54    | #733  |
| Internal Link Dist (ft) |       | 591   | 1139  |       |       | 825   |       |
| Turn Bay Length (ft)    |       |       |       | 840   |       |       | 510   |
| Base Capacity (vph)     | 658   | 2114  | 813   | 398   | 513   | 515   | 554   |
| Starvation Cap Reductn  | 0     | 463   | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 1.06  | 0.91  | 0.71  | 0.43  | 0.44  | 0.45  | 1.12  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 69 (58%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

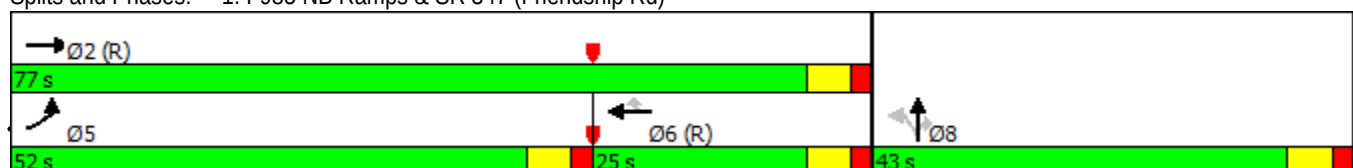
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)



# HCM Signalized Intersection Capacity Analysis

## 1: I-985 NB Ramps & SR 347 (Friendship Rd)

Future Build PM

11/16/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |  |                                                                                   |                                                                                   |  |  |  |  |  |                                                                                     |                                                                                     |                                                                                     |
| Traffic Volume (vph)              | 573                                                                               | 1332                                                                              | 0                                                                                 | 0                                                                                 | 564                                                                               | 135                                                                               | 379                                                                                | 1                                                                                   | 562                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Future Volume (vph)               | 573                                                                               | 1332                                                                              | 0                                                                                 | 0                                                                                 | 564                                                                               | 135                                                                               | 379                                                                                | 1                                                                                   | 562                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Util. Factor                 | 1.00                                                                              | 0.95                                                                              |                                                                                   |                                                                                   | 0.91                                                                              | 1.00                                                                              | 0.95                                                                               | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Frt                               | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              | 0.85                                                                              | 1.00                                                                               | 1.00                                                                                | 0.85                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.95                                                                               | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (prot)                 | 1719                                                                              | 3574                                                                              |                                                                                   |                                                                                   | 5136                                                                              | 1599                                                                              | 1665                                                                               | 1671                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Permitted                     | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.95                                                                               | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (perm)                 | 1719                                                                              | 3574                                                                              |                                                                                   |                                                                                   | 5136                                                                              | 1599                                                                              | 1665                                                                               | 1671                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Peak-hour factor, PHF             | 0.82                                                                              | 0.89                                                                              | 0.92                                                                              | 0.92                                                                              | 0.97                                                                              | 0.78                                                                              | 0.84                                                                               | 0.25                                                                                | 0.91                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Adj. Flow (vph)                   | 699                                                                               | 1497                                                                              | 0                                                                                 | 0                                                                                 | 581                                                                               | 173                                                                               | 451                                                                                | 4                                                                                   | 618                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 146                                                                               | 0                                                                                  | 0                                                                                   | 57                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 699                                                                               | 1497                                                                              | 0                                                                                 | 0                                                                                 | 581                                                                               | 27                                                                                | 225                                                                                | 230                                                                                 | 561                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Heavy Vehicles (%)                | 5%                                                                                | 1%                                                                                | 0%                                                                                | 0%                                                                                | 1%                                                                                | 1%                                                                                | 3%                                                                                 | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  |
| Turn Type                         | Prot                                                                              | NA                                                                                |                                                                                   |                                                                                   | NA                                                                                | Perm                                                                              | Perm                                                                               | NA                                                                                  | Perm                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Protected Phases                  | 5                                                                                 | 2                                                                                 |                                                                                   |                                                                                   | 6                                                                                 |                                                                                   |                                                                                    | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Permitted Phases                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 6                                                                                 | 8                                                                                  |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Actuated Green, G (s)             | 46.0                                                                              | 71.0                                                                              |                                                                                   |                                                                                   | 19.0                                                                              | 19.0                                                                              | 37.0                                                                               | 37.0                                                                                | 37.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Effective Green, g (s)            | 46.0                                                                              | 71.0                                                                              |                                                                                   |                                                                                   | 19.0                                                                              | 19.0                                                                              | 37.0                                                                               | 37.0                                                                                | 37.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Actuated g/C Ratio                | 0.38                                                                              | 0.59                                                                              |                                                                                   |                                                                                   | 0.16                                                                              | 0.16                                                                              | 0.31                                                                               | 0.31                                                                                | 0.31                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Vehicle Extension (s)             | 3.0                                                                               | 5.0                                                                               |                                                                                   |                                                                                   | 5.0                                                                               | 5.0                                                                               | 3.0                                                                                | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Grp Cap (vph)                | 658                                                                               | 2114                                                                              |                                                                                   |                                                                                   | 813                                                                               | 253                                                                               | 513                                                                                | 515                                                                                 | 497                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Prot                    | c0.41                                                                             | c0.42                                                                             |                                                                                   |                                                                                   | 0.11                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 0.02                                                                              | 0.14                                                                               | 0.14                                                                                | c0.35                                                                               |                                                                                     |                                                                                     |                                                                                     |
| v/c Ratio                         | 1.06                                                                              | 0.71                                                                              |                                                                                   |                                                                                   | 0.71                                                                              | 0.11                                                                              | 0.44                                                                               | 0.45                                                                                | 1.13                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Uniform Delay, d1                 | 37.0                                                                              | 17.2                                                                              |                                                                                   |                                                                                   | 47.9                                                                              | 43.2                                                                              | 33.2                                                                               | 33.3                                                                                | 41.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Progression Factor                | 0.65                                                                              | 0.62                                                                              |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Incremental Delay, d2             | 48.3                                                                              | 1.5                                                                               |                                                                                   |                                                                                   | 5.3                                                                               | 0.9                                                                               | 0.6                                                                                | 0.6                                                                                 | 80.9                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Delay (s)                         | 72.5                                                                              | 12.2                                                                              |                                                                                   |                                                                                   | 53.3                                                                              | 44.1                                                                              | 33.8                                                                               | 33.9                                                                                | 122.4                                                                               |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  | E                                                                                 | B                                                                                 |                                                                                   |                                                                                   | D                                                                                 | D                                                                                 | C                                                                                  | C                                                                                   | F                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                |                                                                                   | 31.4                                                                              |                                                                                   |                                                                                   | 51.2                                                                              |                                                                                   |                                                                                    | 84.9                                                                                |                                                                                     |                                                                                     | 0.0                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                    | F                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 49.4                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     | D                                                                                   |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 1.04                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     | 18.0                                                                                |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 81.6%                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     | D                                                                                   |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>c Critical Lane Group</b>      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



## Queues

Future Build PM

## 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)

11/16/2016



| Lane Group              | EBT   | EBR   | WBL   | WBT   | SBL   | SBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↑↑↑   | ↑     | ↵     | ↑↑    | ↵     | ↑     |
| Traffic Volume (vph)    | 1601  | 490   | 162   | 792   | 320   | 393   |
| Future Volume (vph)     | 1601  | 490   | 162   | 792   | 320   | 393   |
| Lane Group Flow (vph)   | 1685  | 605   | 198   | 870   | 421   | 468   |
| Turn Type               | NA    | Perm  | Prot  | NA    | Perm  | Perm  |
| Protected Phases        | 2     |       | 1     | 6     |       |       |
| Permitted Phases        |       | 2     |       |       | 4     | 4     |
| Detector Phase          | 2     | 2     | 1     | 6     | 4     | 4     |
| Switch Phase            |       |       |       |       |       |       |
| Minimum Initial (s)     | 15.0  | 15.0  | 4.0   | 15.0  | 6.0   | 6.0   |
| Minimum Split (s)       | 24.0  | 24.0  | 11.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 56.0  | 56.0  | 16.0  | 72.0  | 48.0  | 48.0  |
| Total Split (%)         | 46.7% | 46.7% | 13.3% | 60.0% | 40.0% | 40.0% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lag   | Lag   | Lead  |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |
| Recall Mode             | C-Min | C-Min | None  | C-Min | None  | None  |
| v/c Ratio               | 0.69  | 0.57  | 0.70  | 0.40  | 0.82  | 0.87  |
| Control Delay           | 17.6  | 1.3   | 45.0  | 21.1  | 52.6  | 44.8  |
| Queue Delay             | 0.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 17.7  | 1.3   | 45.0  | 21.1  | 52.6  | 44.8  |
| Queue Length 50th (ft)  | 191   | 0     | 63    | 355   | 301   | 252   |
| Queue Length 95th (ft)  | m258  | m0    | 97    | 440   | 310   | 320   |
| Internal Link Dist (ft) | 904   |       |       | 591   |       |       |
| Turn Bay Length (ft)    |       | 375   | 380   |       |       |       |
| Base Capacity (vph)     | 2455  | 1055  | 288   | 2174  | 631   | 631   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 72    | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.71  | 0.57  | 0.69  | 0.40  | 0.67  | 0.74  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

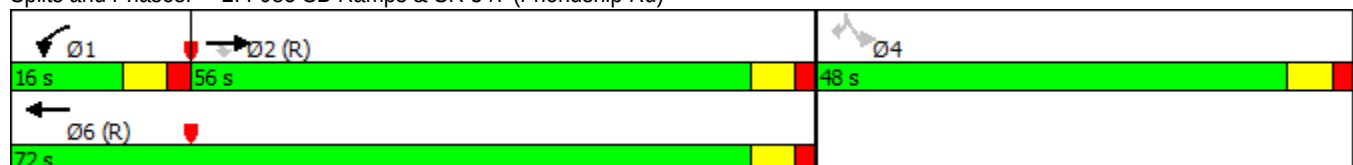
Offset: 7 (6%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)

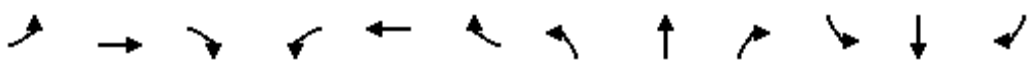


# HCM Signalized Intersection Capacity Analysis

## 2: I-985 SB Ramps & SR 347 (Friendship Rd)

Future Build PM

11/16/2016

|                                   |  |       |       |       |      |                           |      |      |      |      |      |       |
|-----------------------------------|------------------------------------------------------------------------------------|-------|-------|-------|------|---------------------------|------|------|------|------|------|-------|
| Movement                          | EBL                                                                                | EBT   | EBR   | WBL   | WBT  | WBR                       | NBL  | NBT  | NBR  | SBL  | SBT  | SBR   |
| Lane Configurations               |                                                                                    | ↑↑↑   | ↑     | ↑↑    | ↑↑   |                           |      |      |      | ↑    |      | ↑     |
| Traffic Volume (vph)              | 0                                                                                  | 1601  | 490   | 162   | 792  | 0                         | 0    | 0    | 0    | 320  | 0    | 393   |
| Future Volume (vph)               | 0                                                                                  | 1601  | 490   | 162   | 792  | 0                         | 0    | 0    | 0    | 320  | 0    | 393   |
| Ideal Flow (vphpl)                | 1900                                                                               | 1900  | 1900  | 1900  | 1900 | 1900                      | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  |
| Total Lost time (s)               |                                                                                    | 6.0   | 6.0   | 6.0   | 6.0  |                           |      |      |      | 6.0  |      | 6.0   |
| Lane Util. Factor                 |                                                                                    | 0.91  | 1.00  | 0.97  | 0.95 |                           |      |      |      | 1.00 |      | 1.00  |
| Frt                               |                                                                                    | 1.00  | 0.85  | 1.00  | 1.00 |                           |      |      |      | 1.00 |      | 0.85  |
| Flt Protected                     |                                                                                    | 1.00  | 1.00  | 0.95  | 1.00 |                           |      |      |      | 0.95 |      | 1.00  |
| Satd. Flow (prot)                 |                                                                                    | 5085  | 1538  | 3467  | 3539 |                           |      |      |      | 1805 |      | 1553  |
| Flt Permitted                     |                                                                                    | 1.00  | 1.00  | 0.95  | 1.00 |                           |      |      |      | 0.95 |      | 1.00  |
| Satd. Flow (perm)                 |                                                                                    | 5085  | 1538  | 3467  | 3539 |                           |      |      |      | 1805 |      | 1553  |
| Peak-hour factor, PHF             | 0.92                                                                               | 0.95  | 0.81  | 0.82  | 0.91 | 0.92                      | 0.92 | 0.92 | 0.92 | 0.76 | 0.92 | 0.84  |
| Adj. Flow (vph)                   | 0                                                                                  | 1685  | 605   | 198   | 870  | 0                         | 0    | 0    | 0    | 421  | 0    | 468   |
| RTOR Reduction (vph)              | 0                                                                                  | 0     | 313   | 0     | 0    | 0                         | 0    | 0    | 0    | 0    | 0    | 97    |
| Lane Group Flow (vph)             | 0                                                                                  | 1685  | 292   | 198   | 870  | 0                         | 0    | 0    | 0    | 421  | 0    | 371   |
| Heavy Vehicles (%)                | 0%                                                                                 | 2%    | 5%    | 1%    | 2%   | 0%                        | 0%   | 0%   | 0%   | 0%   | 0%   | 4%    |
| Turn Type                         |                                                                                    | NA    | Perm  | Prot  | NA   |                           |      |      |      | Perm |      | Perm  |
| Protected Phases                  |                                                                                    | 2     |       | 1     | 6    |                           |      |      |      |      |      |       |
| Permitted Phases                  |                                                                                    |       | 2     |       |      |                           |      |      |      | 4    |      | 4     |
| Actuated Green, G (s)             |                                                                                    | 57.9  | 57.9  | 9.8   | 73.7 |                           |      |      |      | 34.3 |      | 34.3  |
| Effective Green, g (s)            |                                                                                    | 57.9  | 57.9  | 9.8   | 73.7 |                           |      |      |      | 34.3 |      | 34.3  |
| Actuated g/C Ratio                |                                                                                    | 0.48  | 0.48  | 0.08  | 0.61 |                           |      |      |      | 0.29 |      | 0.29  |
| Clearance Time (s)                |                                                                                    | 6.0   | 6.0   | 6.0   | 6.0  |                           |      |      |      | 6.0  |      | 6.0   |
| Vehicle Extension (s)             |                                                                                    | 5.0   | 5.0   | 3.0   | 5.0  |                           |      |      |      | 3.0  |      | 3.0   |
| Lane Grp Cap (vph)                |                                                                                    | 2453  | 742   | 283   | 2173 |                           |      |      |      | 515  |      | 443   |
| v/s Ratio Prot                    |                                                                                    | c0.33 |       | c0.06 | 0.25 |                           |      |      |      |      |      |       |
| v/s Ratio Perm                    |                                                                                    |       | 0.19  |       |      |                           |      |      |      | 0.23 |      | c0.24 |
| v/c Ratio                         |                                                                                    | 0.69  | 0.39  | 0.70  | 0.40 |                           |      |      |      | 0.82 |      | 0.84  |
| Uniform Delay, d1                 |                                                                                    | 24.0  | 19.8  | 53.7  | 11.8 |                           |      |      |      | 39.9 |      | 40.2  |
| Progression Factor                |                                                                                    | 0.67  | 0.19  | 0.62  | 1.60 |                           |      |      |      | 1.00 |      | 1.00  |
| Incremental Delay, d2             |                                                                                    | 0.6   | 0.6   | 6.1   | 0.5  |                           |      |      |      | 9.7  |      | 12.9  |
| Delay (s)                         |                                                                                    | 16.7  | 4.4   | 39.3  | 19.5 |                           |      |      |      | 49.7 |      | 53.2  |
| Level of Service                  |                                                                                    | B     | A     | D     | B    |                           |      |      |      | D    |      | D     |
| Approach Delay (s)                |                                                                                    | 13.4  |       |       | 23.1 |                           |      | 0.0  |      |      | 51.5 |       |
| Approach LOS                      |                                                                                    | B     |       |       | C    |                           |      | A    |      |      | D    |       |
| <b>Intersection Summary</b>       |                                                                                    |       |       |       |      |                           |      |      |      |      |      |       |
| HCM 2000 Control Delay            |                                                                                    |       | 23.9  |       |      | HCM 2000 Level of Service |      |      |      | C    |      |       |
| HCM 2000 Volume to Capacity ratio |                                                                                    |       | 0.74  |       |      |                           |      |      |      |      |      |       |
| Actuated Cycle Length (s)         |                                                                                    |       | 120.0 |       |      | Sum of lost time (s)      |      |      |      | 18.0 |      |       |
| Intersection Capacity Utilization |                                                                                    |       | 81.6% |       |      | ICU Level of Service      |      |      |      | D    |      |       |
| Analysis Period (min)             |                                                                                    |       | 15    |       |      |                           |      |      |      |      |      |       |
| c Critical Lane Group             |                                                                                    |       |       |       |      |                           |      |      |      |      |      |       |

## Queues

Future Build PM

## 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)

11/16/2016



| Lane Group              | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     |       |       |       |       |       |       |       |       |       |       |       |       |
| Traffic Volume (vph)    | 193   | 871   | 82    | 386   | 612   | 237   | 129   | 414   | 574   | 173   | 184   | 103   |
| Future Volume (vph)     | 193   | 871   | 82    | 386   | 612   | 237   | 129   | 414   | 574   | 173   | 184   | 103   |
| Lane Group Flow (vph)   | 222   | 1075  | 98    | 434   | 703   | 279   | 139   | 518   | 683   | 184   | 222   | 110   |
| Turn Type               | pm+pt | NA    | Perm  | pm+pt | NA    | Perm  | pm+pt | NA    | Perm  | pm+pt | NA    | Perm  |
| Protected Phases        | 5     | 2     |       | 1     | 6     |       | 3     | 8     |       | 7     | 4     |       |
| Permitted Phases        | 2     |       | 2     | 6     |       | 6     | 8     |       | 8     | 4     |       | 4     |
| Detector Phase          | 5     | 2     | 2     | 1     | 6     | 6     | 3     | 8     | 8     | 7     | 4     | 4     |
| Switch Phase            |       |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 4.0   | 15.0  | 15.0  | 4.0   | 15.0  | 15.0  | 4.0   | 6.0   | 6.0   | 4.0   | 6.0   | 6.0   |
| Minimum Split (s)       | 11.0  | 37.0  | 37.0  | 11.0  | 37.0  | 37.0  | 11.0  | 42.0  | 42.0  | 11.0  | 42.0  | 42.0  |
| Total Split (s)         | 21.0  | 40.0  | 40.0  | 27.0  | 46.0  | 46.0  | 11.0  | 42.0  | 42.0  | 11.0  | 42.0  | 42.0  |
| Total Split (%)         | 17.5% | 33.3% | 33.3% | 22.5% | 38.3% | 38.3% | 9.2%  | 35.0% | 35.0% | 9.2%  | 35.0% | 35.0% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |       |       |       |       |       |
| Recall Mode             | None  | C-Min | C-Min | None  | C-Min | C-Min | None  | None  | None  | None  | None  | None  |
| v/c Ratio               | 0.61  | 1.05  | 0.18  | 1.19  | 0.56  | 0.39  | 0.38  | 0.95  | 1.03  | 1.37  | 0.41  | 0.19  |
| Control Delay           | 25.4  | 84.6  | 2.8   | 146.6 | 16.1  | 3.0   | 15.7  | 50.0  | 51.7  | 235.2 | 36.4  | 3.6   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 25.4  | 84.6  | 2.8   | 146.6 | 16.1  | 3.0   | 15.7  | 50.0  | 51.7  | 235.2 | 36.4  | 3.6   |
| Queue Length 50th (ft)  | 93    | ~477  | 0     | ~341  | 162   | 11    | 32    | 414   | ~389  | ~136  | 137   | 0     |
| Queue Length 95th (ft)  | 138   | #507  | 12    | #566  | 130   | 19    | m55   | #482  | #517  | #288  | 191   | 27    |
| Internal Link Dist (ft) |       | 1576  |       |       | 3513  |       |       | 1183  |       |       | 1183  |       |
| Turn Bay Length (ft)    | 250   |       | 370   | 300   |       | 310   |       |       | 500   | 300   |       | 215   |
| Base Capacity (vph)     | 394   | 1022  | 537   | 364   | 1262  | 709   | 367   | 548   | 662   | 134   | 537   | 574   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.56  | 1.05  | 0.18  | 1.19  | 0.56  | 0.39  | 0.38  | 0.95  | 1.03  | 1.37  | 0.41  | 0.19  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 63 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.

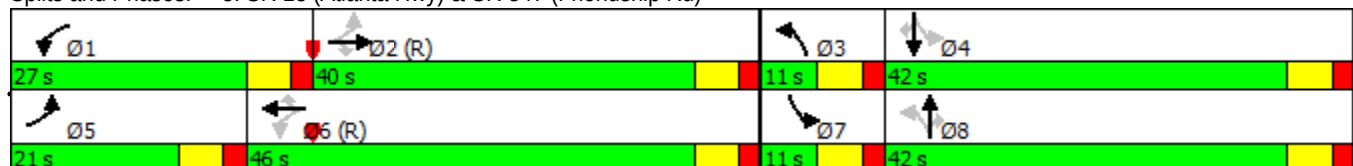
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)



# HCM Signalized Intersection Capacity Analysis

## 3: SR 13 (Atlanta Hwy) & SR 347 (Friendship Rd)

Future Build PM

11/16/2016

|                        |  |  |  |  |  |  |   |  |  |  |  |  |
|------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement               | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations    |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)   | 193                                                                               | 871                                                                               | 82                                                                                | 386                                                                               | 612                                                                               | 237                                                                               | 129                                                                                 | 414                                                                                 | 574                                                                                 | 173                                                                                 | 184                                                                                 | 103                                                                                 |
| Future Volume (vph)    | 193                                                                               | 871                                                                               | 82                                                                                | 386                                                                               | 612                                                                               | 237                                                                               | 129                                                                                 | 414                                                                                 | 574                                                                                 | 173                                                                                 | 184                                                                                 | 103                                                                                 |
| Ideal Flow (vphpl)     | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)    | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor      | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Frt                    | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected          | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)      | 1805                                                                              | 3610                                                                              | 1553                                                                              | 1736                                                                              | 3610                                                                              | 1568                                                                              | 1787                                                                                | 1827                                                                                | 1482                                                                                | 1752                                                                                | 1792                                                                                | 1599                                                                                |
| Flt Permitted          | 0.31                                                                              | 1.00                                                                              | 1.00                                                                              | 0.10                                                                              | 1.00                                                                              | 1.00                                                                              | 0.52                                                                                | 1.00                                                                                | 1.00                                                                                | 0.11                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)      | 597                                                                               | 3610                                                                              | 1553                                                                              | 183                                                                               | 3610                                                                              | 1568                                                                              | 977                                                                                 | 1827                                                                                | 1482                                                                                | 205                                                                                 | 1792                                                                                | 1599                                                                                |
| Peak-hour factor, PHF  | 0.87                                                                              | 0.81                                                                              | 0.84                                                                              | 0.89                                                                              | 0.87                                                                              | 0.85                                                                              | 0.93                                                                                | 0.80                                                                                | 0.84                                                                                | 0.94                                                                                | 0.83                                                                                | 0.94                                                                                |
| Adj. Flow (vph)        | 222                                                                               | 1075                                                                              | 98                                                                                | 434                                                                               | 703                                                                               | 279                                                                               | 139                                                                                 | 518                                                                                 | 683                                                                                 | 184                                                                                 | 222                                                                                 | 110                                                                                 |
| RTOR Reduction (vph)   | 0                                                                                 | 0                                                                                 | 70                                                                                | 0                                                                                 | 0                                                                                 | 161                                                                               | 0                                                                                   | 0                                                                                   | 218                                                                                 | 0                                                                                   | 0                                                                                   | 77                                                                                  |
| Lane Group Flow (vph)  | 222                                                                               | 1075                                                                              | 28                                                                                | 434                                                                               | 703                                                                               | 118                                                                               | 139                                                                                 | 518                                                                                 | 465                                                                                 | 184                                                                                 | 222                                                                                 | 33                                                                                  |
| Heavy Vehicles (%)     | 0%                                                                                | 0%                                                                                | 4%                                                                                | 4%                                                                                | 0%                                                                                | 3%                                                                                | 1%                                                                                  | 4%                                                                                  | 9%                                                                                  | 3%                                                                                  | 6%                                                                                  | 1%                                                                                  |
| Turn Type              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | pm+pt                                                                               | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases       | 5                                                                                 | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   | 3                                                                                   | 8                                                                                   |                                                                                     | 7                                                                                   | 4                                                                                   |                                                                                     |
| Permitted Phases       | 2                                                                                 |                                                                                   | 2                                                                                 | 6                                                                                 |                                                                                   | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   | 4                                                                                   |                                                                                     | 4                                                                                   |
| Actuated Green, G (s)  | 47.0                                                                              | 34.0                                                                              | 34.0                                                                              | 61.0                                                                              | 42.0                                                                              | 42.0                                                                              | 41.0                                                                                | 36.0                                                                                | 36.0                                                                                | 41.0                                                                                | 36.0                                                                                | 36.0                                                                                |
| Effective Green, g (s) | 47.0                                                                              | 34.0                                                                              | 34.0                                                                              | 61.0                                                                              | 42.0                                                                              | 42.0                                                                              | 41.0                                                                                | 36.0                                                                                | 36.0                                                                                | 41.0                                                                                | 36.0                                                                                | 36.0                                                                                |
| Actuated g/C Ratio     | 0.39                                                                              | 0.28                                                                              | 0.28                                                                              | 0.51                                                                              | 0.35                                                                              | 0.35                                                                              | 0.34                                                                                | 0.30                                                                                | 0.30                                                                                | 0.34                                                                                | 0.30                                                                                | 0.30                                                                                |
| Clearance Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)  | 3.0                                                                               | 5.0                                                                               | 5.0                                                                               | 3.0                                                                               | 5.0                                                                               | 5.0                                                                               | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 |
| Lane Grp Cap (vph)     | 364                                                                               | 1022                                                                              | 440                                                                               | 364                                                                               | 1263                                                                              | 548                                                                               | 367                                                                                 | 548                                                                                 | 444                                                                                 | 134                                                                                 | 537                                                                                 | 479                                                                                 |
| v/s Ratio Prot         | 0.07                                                                              | 0.30                                                                              |                                                                                   | c0.21                                                                             | 0.19                                                                              |                                                                                   | 0.02                                                                                | 0.28                                                                                |                                                                                     | c0.06                                                                               | 0.12                                                                                |                                                                                     |
| v/s Ratio Perm         | 0.17                                                                              |                                                                                   | 0.02                                                                              | c0.40                                                                             |                                                                                   | 0.08                                                                              | 0.11                                                                                |                                                                                     | 0.31                                                                                | c0.41                                                                               |                                                                                     | 0.02                                                                                |
| v/c Ratio              | 0.61                                                                              | 1.05                                                                              | 0.06                                                                              | 1.19                                                                              | 0.56                                                                              | 0.22                                                                              | 0.38                                                                                | 0.95                                                                                | 1.05                                                                                | 1.37                                                                                | 0.41                                                                                | 0.07                                                                                |
| Uniform Delay, d1      | 25.5                                                                              | 43.0                                                                              | 31.4                                                                              | 37.5                                                                              | 31.5                                                                              | 27.4                                                                              | 29.5                                                                                | 41.0                                                                                | 42.0                                                                                | 37.2                                                                                | 33.6                                                                                | 30.0                                                                                |
| Progression Factor     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.26                                                                              | 0.45                                                                              | 0.28                                                                              | 0.51                                                                                | 0.61                                                                                | 0.37                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Incremental Delay, d2  | 2.9                                                                               | 42.8                                                                              | 0.3                                                                               | 108.2                                                                             | 1.6                                                                               | 0.8                                                                               | 0.5                                                                                 | 21.7                                                                                | 51.3                                                                                | 207.8                                                                               | 0.5                                                                                 | 0.1                                                                                 |
| Delay (s)              | 28.4                                                                              | 85.8                                                                              | 31.7                                                                              | 155.5                                                                             | 15.7                                                                              | 8.6                                                                               | 15.5                                                                                | 46.6                                                                                | 66.9                                                                                | 245.0                                                                               | 34.1                                                                                | 30.1                                                                                |
| Level of Service       | C                                                                                 | F                                                                                 | C                                                                                 | F                                                                                 | B                                                                                 | A                                                                                 | B                                                                                   | D                                                                                   | E                                                                                   | F                                                                                   | C                                                                                   | C                                                                                   |
| Approach Delay (s)     |                                                                                   | 72.9                                                                              |                                                                                   |                                                                                   | 57.2                                                                              |                                                                                   |                                                                                     | 53.7                                                                                |                                                                                     |                                                                                     | 108.4                                                                               |                                                                                     |
| Approach LOS           |                                                                                   | E                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                     | D                                                                                   |                                                                                     |                                                                                     | F                                                                                   |                                                                                     |

### Intersection Summary

|                                   |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 66.5  | HCM 2000 Level of Service | E    |
| HCM 2000 Volume to Capacity ratio | 1.30  |                           |      |
| Actuated Cycle Length (s)         | 120.0 | Sum of lost time (s)      | 24.0 |
| Intersection Capacity Utilization | 96.8% | ICU Level of Service      | F    |
| Analysis Period (min)             | 15    |                           |      |
| c Critical Lane Group             |       |                           |      |

## Queues

Future Build PM

## 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) &amp; Relocated Thunder Rd/Roy Carlson Blvd 11/16/2016



| Lane Group              | EBT   | WBL   | WBT   | NBL   | NBT   | NBR   | SBL   | SBT   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↔     | ↔     | ↔     | ↔     | ↔     | ↔     | ↔     | ↔     |
| Traffic Volume (vph)    | 12    | 375   | 14    | 18    | 746   | 166   | 150   | 451   |
| Future Volume (vph)     | 12    | 375   | 14    | 18    | 746   | 166   | 150   | 451   |
| Lane Group Flow (vph)   | 68    | 408   | 468   | 20    | 848   | 180   | 163   | 564   |
| Turn Type               | NA    | Perm  | NA    | Perm  | NA    | Perm  | pm+pt | NA    |
| Protected Phases        | 4     |       | 8     |       | 2     |       | 1     | 6     |
| Permitted Phases        |       | 8     |       | 2     |       | 2     | 6     |       |
| Detector Phase          | 4     | 8     | 8     | 2     | 2     | 2     | 1     | 6     |
| Switch Phase            |       |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 6.0   | 6.0   | 6.0   | 15.0  | 15.0  | 15.0  | 5.0   | 15.0  |
| Minimum Split (s)       | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 11.0  | 24.0  |
| Total Split (s)         | 58.0  | 58.0  | 58.0  | 44.0  | 44.0  | 44.0  | 18.0  | 62.0  |
| Total Split (%)         | 48.3% | 48.3% | 48.3% | 36.7% | 36.7% | 36.7% | 15.0% | 51.7% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                |       |       |       | Lag   | Lag   | Lag   | Lead  |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |       |
| Recall Mode             | None  | None  | None  | C-Min | C-Min | C-Min | None  | C-Min |
| v/c Ratio               | 0.10  | 0.89  | 0.64  | 0.06  | 0.64  | 0.27  | 0.58  | 0.31  |
| Control Delay           | 7.5   | 56.5  | 14.7  | 14.4  | 21.1  | 3.9   | 18.4  | 12.0  |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 7.5   | 56.5  | 14.7  | 14.4  | 21.1  | 3.9   | 18.4  | 12.0  |
| Queue Length 50th (ft)  | 6     | 281   | 106   | 7     | 311   | 11    | 51    | 94    |
| Queue Length 95th (ft)  | 33    | #437  | 210   | m15   | 378   | 20    | m58   | m88   |
| Internal Link Dist (ft) | 491   |       | 1743  |       | 2367  |       |       | 498   |
| Turn Bay Length (ft)    |       |       |       | 375   |       | 375   | 200   |       |
| Base Capacity (vph)     | 764   | 519   | 786   | 311   | 1319  | 660   | 289   | 1831  |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.09  | 0.79  | 0.60  | 0.06  | 0.64  | 0.27  | 0.56  | 0.31  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 22 (18%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 75

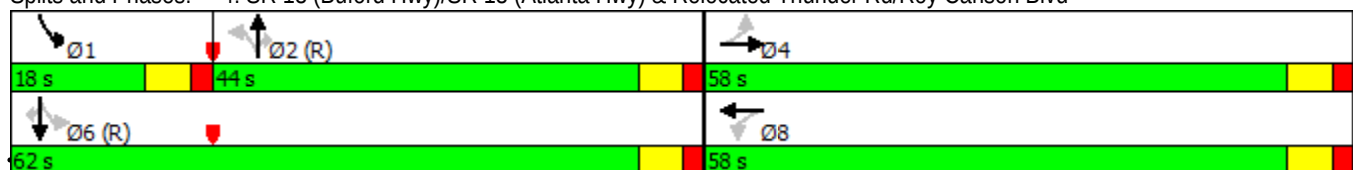
Control Type: Actuated-Coordinated

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) &amp; Relocated Thunder Rd/Roy Carlson Blvd



Baseline

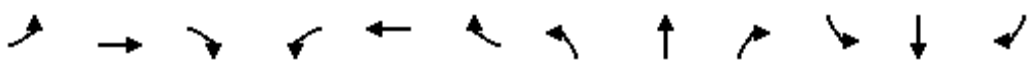
Synchro 9 Report

Page 7

# HCM Signalized Intersection Capacity Analysis

Future Build PM

4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) & Relocated Thunder Rd/Roy Carlson Blvd 11/16/2016

|                                   |  |      |       |       |      |                           |      |       |      |       |      |      |
|-----------------------------------|------------------------------------------------------------------------------------|------|-------|-------|------|---------------------------|------|-------|------|-------|------|------|
| Movement                          | EBL                                                                                | EBT  | EBR   | WBL   | WBT  | WBR                       | NBL  | NBT   | NBR  | SBL   | SBT  | SBR  |
| Lane Configurations               |                                                                                    | ↔    |       | ↔     | ↔    |                           | ↔    | ↔     | ↔    | ↔     | ↔    | ↔    |
| Traffic Volume (vph)              | 0                                                                                  | 12   | 51    | 375   | 14   | 417                       | 18   | 746   | 166  | 150   | 451  | 0    |
| Future Volume (vph)               | 0                                                                                  | 12   | 51    | 375   | 14   | 417                       | 18   | 746   | 166  | 150   | 451  | 0    |
| Ideal Flow (vphpl)                | 1900                                                                               | 1900 | 1900  | 1900  | 1900 | 1900                      | 1900 | 1900  | 1900 | 1900  | 1900 | 1900 |
| Total Lost time (s)               |                                                                                    | 6.0  |       | 6.0   | 6.0  |                           | 6.0  | 6.0   | 6.0  | 6.0   | 6.0  |      |
| Lane Util. Factor                 |                                                                                    | 1.00 |       | 1.00  | 1.00 |                           | 1.00 | 0.95  | 1.00 | 1.00  | 0.95 |      |
| Frt                               |                                                                                    | 0.89 |       | 1.00  | 0.85 |                           | 1.00 | 1.00  | 0.85 | 1.00  | 1.00 |      |
| Flt Protected                     |                                                                                    | 1.00 |       | 0.95  | 1.00 |                           | 0.95 | 1.00  | 1.00 | 0.95  | 1.00 |      |
| Satd. Flow (prot)                 |                                                                                    | 1693 |       | 1597  | 1443 |                           | 1805 | 3539  | 1468 | 1641  | 3539 |      |
| Flt Permitted                     |                                                                                    | 1.00 |       | 0.71  | 1.00 |                           | 0.44 | 1.00  | 1.00 | 0.17  | 1.00 |      |
| Satd. Flow (perm)                 |                                                                                    | 1693 |       | 1198  | 1443 |                           | 837  | 3539  | 1468 | 295   | 3539 |      |
| Peak-hour factor, PHF             | 0.92                                                                               | 0.92 | 0.92  | 0.92  | 0.92 | 0.92                      | 0.92 | 0.88  | 0.92 | 0.92  | 0.80 | 0.92 |
| Adj. Flow (vph)                   | 0                                                                                  | 13   | 55    | 408   | 15   | 453                       | 20   | 848   | 180  | 163   | 564  | 0    |
| RTOR Reduction (vph)              | 0                                                                                  | 34   | 0     | 0     | 175  | 0                         | 0    | 0     | 113  | 0     | 0    | 0    |
| Lane Group Flow (vph)             | 0                                                                                  | 34   | 0     | 408   | 293  | 0                         | 20   | 848   | 67   | 163   | 564  | 0    |
| Heavy Vehicles (%)                | 0%                                                                                 | 0%   | 0%    | 13%   | 0%   | 13%                       | 0%   | 2%    | 10%  | 10%   | 2%   | 0%   |
| Turn Type                         |                                                                                    | NA   |       | Perm  | NA   |                           | Perm | NA    | Perm | pm+pt | NA   | Perm |
| Protected Phases                  |                                                                                    | 4    |       |       | 8    |                           |      | 2     |      | 1     | 6    |      |
| Permitted Phases                  | 4                                                                                  |      |       | 8     |      |                           | 2    |       | 2    | 6     |      | 6    |
| Actuated Green, G (s)             |                                                                                    | 45.9 |       | 45.9  | 45.9 |                           | 44.8 | 44.8  | 44.8 | 62.1  | 62.1 |      |
| Effective Green, g (s)            |                                                                                    | 45.9 |       | 45.9  | 45.9 |                           | 44.8 | 44.8  | 44.8 | 62.1  | 62.1 |      |
| Actuated g/C Ratio                |                                                                                    | 0.38 |       | 0.38  | 0.38 |                           | 0.37 | 0.37  | 0.37 | 0.52  | 0.52 |      |
| Clearance Time (s)                |                                                                                    | 6.0  |       | 6.0   | 6.0  |                           | 6.0  | 6.0   | 6.0  | 6.0   | 6.0  |      |
| Vehicle Extension (s)             |                                                                                    | 3.0  |       | 3.0   | 3.0  |                           | 5.0  | 5.0   | 5.0  | 3.0   | 5.0  |      |
| Lane Grp Cap (vph)                |                                                                                    | 647  |       | 458   | 551  |                           | 312  | 1321  | 548  | 279   | 1831 |      |
| v/s Ratio Prot                    |                                                                                    | 0.02 |       |       | 0.20 |                           |      | c0.24 |      | c0.05 | 0.16 |      |
| v/s Ratio Perm                    |                                                                                    |      |       | c0.34 |      |                           | 0.02 |       | 0.05 | 0.25  |      |      |
| v/c Ratio                         |                                                                                    | 0.05 |       | 0.89  | 0.53 |                           | 0.06 | 0.64  | 0.12 | 0.58  | 0.31 |      |
| Uniform Delay, d1                 |                                                                                    | 23.3 |       | 34.7  | 28.7 |                           | 24.1 | 31.0  | 24.7 | 19.1  | 16.6 |      |
| Progression Factor                |                                                                                    | 1.00 |       | 1.00  | 1.00 |                           | 0.49 | 0.57  | 0.68 | 0.79  | 0.66 |      |
| Incremental Delay, d2             |                                                                                    | 0.0  |       | 19.0  | 1.0  |                           | 0.4  | 2.2   | 0.4  | 1.7   | 0.2  |      |
| Delay (s)                         |                                                                                    | 23.4 |       | 53.7  | 29.7 |                           | 12.2 | 19.9  | 17.2 | 16.8  | 11.2 |      |
| Level of Service                  |                                                                                    | C    |       | D     | C    |                           | B    | B     | B    | B     | B    |      |
| Approach Delay (s)                |                                                                                    | 23.4 |       |       | 40.9 |                           |      | 19.3  |      |       | 12.5 |      |
| Approach LOS                      |                                                                                    | C    |       |       | D    |                           |      | B     |      |       | B    |      |
| <b>Intersection Summary</b>       |                                                                                    |      |       |       |      |                           |      |       |      |       |      |      |
| HCM 2000 Control Delay            |                                                                                    |      | 24.5  |       |      | HCM 2000 Level of Service |      |       |      | C     |      |      |
| HCM 2000 Volume to Capacity ratio |                                                                                    |      | 0.75  |       |      |                           |      |       |      |       |      |      |
| Actuated Cycle Length (s)         |                                                                                    |      | 120.0 |       |      | Sum of lost time (s)      |      |       | 18.0 |       |      |      |
| Intersection Capacity Utilization |                                                                                    |      | 71.4% |       |      | ICU Level of Service      |      |       | C    |       |      |      |
| Analysis Period (min)             |                                                                                    |      | 15    |       |      |                           |      |       |      |       |      |      |
| c Critical Lane Group             |                                                                                    |      |       |       |      |                           |      |       |      |       |      |      |

## Queues

Future Build PM

## 5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd

11/16/2016

|                         |  |  |  |  |  |  |   |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 |
| Lane Configurations     |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 23                                                                                | 17                                                                                | 21                                                                                | 287                                                                               | 7                                                                                 | 122                                                                               | 6                                                                                   | 797                                                                                 | 384                                                                                 | 172                                                                                 | 745                                                                                 |
| Future Volume (vph)     | 23                                                                                | 17                                                                                | 21                                                                                | 287                                                                               | 7                                                                                 | 122                                                                               | 6                                                                                   | 797                                                                                 | 384                                                                                 | 172                                                                                 | 745                                                                                 |
| Lane Group Flow (vph)   | 0                                                                                 | 76                                                                                | 42                                                                                | 0                                                                                 | 331                                                                               | 153                                                                               | 12                                                                                  | 960                                                                                 | 404                                                                                 | 198                                                                                 | 920                                                                                 |
| Turn Type               | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                | Perm                                                                                | NA                                                                                  |
| Protected Phases        |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |
| Permitted Phases        | 4                                                                                 |                                                                                   | 4                                                                                 | 8                                                                                 |                                                                                   | 8                                                                                 | 2                                                                                   |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     |
| Detector Phase          | 4                                                                                 | 4                                                                                 | 4                                                                                 | 8                                                                                 | 8                                                                                 | 8                                                                                 | 2                                                                                   | 2                                                                                   | 2                                                                                   | 6                                                                                   | 6                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 15.0                                                                                | 15.0                                                                                | 15.0                                                                                | 15.0                                                                                | 15.0                                                                                |
| Minimum Split (s)       | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                                | 24.0                                                                                | 24.0                                                                                | 24.0                                                                                | 24.0                                                                                |
| Total Split (s)         | 44.0                                                                              | 44.0                                                                              | 44.0                                                                              | 44.0                                                                              | 44.0                                                                              | 44.0                                                                              | 76.0                                                                                | 76.0                                                                                | 76.0                                                                                | 76.0                                                                                | 76.0                                                                                |
| Total Split (%)         | 36.7%                                                                             | 36.7%                                                                             | 36.7%                                                                             | 36.7%                                                                             | 36.7%                                                                             | 36.7%                                                                             | 63.3%                                                                               | 63.3%                                                                               | 63.3%                                                                               | 63.3%                                                                               | 63.3%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    |                                                                                   | 0.0                                                                               | 0.0                                                                               |                                                                                   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Lost Time (s)     |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lead/Lag                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | C-Min                                                                               | C-Min                                                                               | C-Min                                                                               | C-Min                                                                               | C-Min                                                                               |
| v/c Ratio               |                                                                                   | 0.21                                                                              | 0.09                                                                              |                                                                                   | 0.90                                                                              | 0.28                                                                              | 0.04                                                                                | 0.44                                                                                | 0.35                                                                                | 0.68                                                                                | 0.44                                                                                |
| Control Delay           |                                                                                   | 33.0                                                                              | 9.1                                                                               |                                                                                   | 69.0                                                                              | 9.5                                                                               | 5.2                                                                                 | 5.8                                                                                 | 0.6                                                                                 | 23.1                                                                                | 7.7                                                                                 |
| Queue Delay             |                                                                                   | 0.0                                                                               | 0.0                                                                               |                                                                                   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             |                                                                                   | 33.0                                                                              | 9.1                                                                               |                                                                                   | 69.0                                                                              | 9.5                                                                               | 5.2                                                                                 | 5.8                                                                                 | 0.6                                                                                 | 23.1                                                                                | 7.7                                                                                 |
| Queue Length 50th (ft)  |                                                                                   | 43                                                                                | 0                                                                                 |                                                                                   | 239                                                                               | 16                                                                                | 2                                                                                   | 97                                                                                  | 0                                                                                   | 74                                                                                  | 153                                                                                 |
| Queue Length 95th (ft)  |                                                                                   | 34                                                                                | 4                                                                                 |                                                                                   | 138                                                                               | 49                                                                                | m2                                                                                  | 101                                                                                 | m0                                                                                  | m219                                                                                | 138                                                                                 |
| Internal Link Dist (ft) |                                                                                   | 275                                                                               |                                                                                   |                                                                                   | 4179                                                                              |                                                                                   |                                                                                     | 3868                                                                                |                                                                                     |                                                                                     | 2104                                                                                |
| Turn Bay Length (ft)    |                                                                                   |                                                                                   | 105                                                                               |                                                                                   |                                                                                   | 250                                                                               | 230                                                                                 |                                                                                     | 230                                                                                 | 200                                                                                 |                                                                                     |
| Base Capacity (vph)     |                                                                                   | 395                                                                               | 515                                                                               |                                                                                   | 409                                                                               | 596                                                                               | 309                                                                                 | 2180                                                                                | 1149                                                                                | 292                                                                                 | 2078                                                                                |
| Starvation Cap Reductn  |                                                                                   | 0                                                                                 | 0                                                                                 |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   |                                                                                   | 0                                                                                 | 0                                                                                 |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     |                                                                                   | 0                                                                                 | 0                                                                                 |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       |                                                                                   | 0.19                                                                              | 0.08                                                                              |                                                                                   | 0.81                                                                              | 0.26                                                                              | 0.04                                                                                | 0.44                                                                                | 0.35                                                                                | 0.68                                                                                | 0.44                                                                                |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 36 (30%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd

|                                                                                            |                                                                                          |
|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
|  Ø2 (R) |  Ø4 |
| 76 s                                                                                       | 44 s                                                                                     |
|  Ø6 (R) |  Ø8 |
| 76 s                                                                                       | 44 s                                                                                     |

# HCM Signalized Intersection Capacity Analysis

## 5: SR 13 (Buford Hwy) & Makita Co. Drwy/Thompson Mill Rd

Future Build PM

11/16/2016

|                                   |  |  |  |  |  |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)              | 23                                                                                | 17                                                                                | 21                                                                                | 287                                                                               | 7                                                                                 | 122                                                                               | 6                                                                                   | 797                                                                                 | 384                                                                                 | 172                                                                                 | 745                                                                                 | 0                                                                                   |
| Future Volume (vph)               | 23                                                                                | 17                                                                                | 21                                                                                | 287                                                                               | 7                                                                                 | 122                                                                               | 6                                                                                   | 797                                                                                 | 384                                                                                 | 172                                                                                 | 745                                                                                 | 0                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Lane Util. Factor                 |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                |                                                                                     |
| Frt                               |                                                                                   | 1.00                                                                              | 0.85                                                                              |                                                                                   | 1.00                                                                              | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Flt Protected                     |                                                                                   | 0.98                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                              | 1.00                                                                              | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (prot)                 |                                                                                   | 1860                                                                              | 1538                                                                              |                                                                                   | 1814                                                                              | 1615                                                                              | 1805                                                                                | 3539                                                                                | 1615                                                                                | 1805                                                                                | 3374                                                                                |                                                                                     |
| Flt Permitted                     |                                                                                   | 0.66                                                                              | 1.00                                                                              |                                                                                   | 0.68                                                                              | 1.00                                                                              | 0.26                                                                                | 1.00                                                                                | 1.00                                                                                | 0.25                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (perm)                 |                                                                                   | 1248                                                                              | 1538                                                                              |                                                                                   | 1295                                                                              | 1615                                                                              | 502                                                                                 | 3539                                                                                | 1615                                                                                | 475                                                                                 | 3374                                                                                |                                                                                     |
| Peak-hour factor, PHF             | 0.69                                                                              | 0.40                                                                              | 0.50                                                                              | 0.91                                                                              | 0.44                                                                              | 0.80                                                                              | 0.50                                                                                | 0.83                                                                                | 0.95                                                                                | 0.87                                                                                | 0.81                                                                                | 0.73                                                                                |
| Adj. Flow (vph)                   | 33                                                                                | 42                                                                                | 42                                                                                | 315                                                                               | 16                                                                                | 152                                                                               | 12                                                                                  | 960                                                                                 | 404                                                                                 | 198                                                                                 | 920                                                                                 | 0                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 30                                                                                | 0                                                                                 | 0                                                                                 | 89                                                                                | 0                                                                                   | 0                                                                                   | 155                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 0                                                                                 | 76                                                                                | 12                                                                                | 0                                                                                 | 331                                                                               | 64                                                                                | 12                                                                                  | 960                                                                                 | 249                                                                                 | 198                                                                                 | 920                                                                                 | 0                                                                                   |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 5%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                  | 2%                                                                                  | 0%                                                                                  | 0%                                                                                  | 7%                                                                                  | 0%                                                                                  |
| Turn Type                         | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                | Perm                                                                                | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   | 4                                                                                 | 8                                                                                 |                                                                                   | 8                                                                                 | 2                                                                                   |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 34.1                                                                              | 34.1                                                                              |                                                                                   | 34.1                                                                              | 34.1                                                                              | 73.9                                                                                | 73.9                                                                                | 73.9                                                                                | 73.9                                                                                | 73.9                                                                                |                                                                                     |
| Effective Green, g (s)            |                                                                                   | 34.1                                                                              | 34.1                                                                              |                                                                                   | 34.1                                                                              | 34.1                                                                              | 73.9                                                                                | 73.9                                                                                | 73.9                                                                                | 73.9                                                                                | 73.9                                                                                |                                                                                     |
| Actuated g/C Ratio                |                                                                                   | 0.28                                                                              | 0.28                                                                              |                                                                                   | 0.28                                                                              | 0.28                                                                              | 0.62                                                                                | 0.62                                                                                | 0.62                                                                                | 0.62                                                                                | 0.62                                                                                |                                                                                     |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Vehicle Extension (s)             |                                                                                   | 3.0                                                                               | 3.0                                                                               |                                                                                   | 3.0                                                                               | 3.0                                                                               | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |                                                                                     |
| Lane Grp Cap (vph)                |                                                                                   | 354                                                                               | 437                                                                               |                                                                                   | 367                                                                               | 458                                                                               | 309                                                                                 | 2179                                                                                | 994                                                                                 | 292                                                                                 | 2077                                                                                |                                                                                     |
| v/s Ratio Prot                    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     | 0.27                                                                                |                                                                                     |                                                                                     | 0.27                                                                                |                                                                                     |
| v/s Ratio Perm                    |                                                                                   | 0.06                                                                              | 0.01                                                                              |                                                                                   | 0.26                                                                              | 0.04                                                                              | 0.02                                                                                |                                                                                     | 0.15                                                                                | 0.42                                                                                |                                                                                     |                                                                                     |
| v/c Ratio                         |                                                                                   | 0.21                                                                              | 0.03                                                                              |                                                                                   | 0.90                                                                              | 0.14                                                                              | 0.04                                                                                | 0.44                                                                                | 0.25                                                                                | 0.68                                                                                | 0.44                                                                                |                                                                                     |
| Uniform Delay, d1                 |                                                                                   | 32.7                                                                              | 31.0                                                                              |                                                                                   | 41.3                                                                              | 32.0                                                                              | 9.1                                                                                 | 12.2                                                                                | 10.5                                                                                | 15.2                                                                                | 12.2                                                                                |                                                                                     |
| Progression Factor                |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.46                                                                                | 0.42                                                                                | 0.06                                                                                | 0.61                                                                                | 0.55                                                                                |                                                                                     |
| Incremental Delay, d2             |                                                                                   | 0.3                                                                               | 0.0                                                                               |                                                                                   | 24.4                                                                              | 0.1                                                                               | 0.1                                                                                 | 0.4                                                                                 | 0.4                                                                                 | 11.0                                                                                | 0.6                                                                                 |                                                                                     |
| Delay (s)                         |                                                                                   | 33.0                                                                              | 31.0                                                                              |                                                                                   | 65.7                                                                              | 32.2                                                                              | 4.3                                                                                 | 5.5                                                                                 | 1.0                                                                                 | 20.2                                                                                | 7.3                                                                                 |                                                                                     |
| Level of Service                  |                                                                                   | C                                                                                 | C                                                                                 |                                                                                   | E                                                                                 | C                                                                                 | A                                                                                   | A                                                                                   | A                                                                                   | C                                                                                   | A                                                                                   |                                                                                     |
| Approach Delay (s)                |                                                                                   | 32.3                                                                              |                                                                                   |                                                                                   | 55.1                                                                              |                                                                                   |                                                                                     | 4.2                                                                                 |                                                                                     |                                                                                     | 9.6                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                     | A                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   | 15.2                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   | 0.75                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   | 72.5%                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



## Queues

Future Build PM

## 6: SR 13 (Buford Hwy) &amp; S. Hill St/Hamilton Mill Rd

11/16/2016

|                         |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | NBL                                                                               | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations     |  |  |  |  |  |  |    |  |  |  |  |
| Traffic Volume (vph)    | 82                                                                                | 279                                                                               | 55                                                                                | 405                                                                               | 222                                                                               | 83                                                                                | 970                                                                                 | 770                                                                                 | 297                                                                                 | 786                                                                                 | 54                                                                                  |
| Future Volume (vph)     | 82                                                                                | 279                                                                               | 55                                                                                | 405                                                                               | 222                                                                               | 83                                                                                | 970                                                                                 | 770                                                                                 | 297                                                                                 | 786                                                                                 | 54                                                                                  |
| Lane Group Flow (vph)   | 93                                                                                | 291                                                                               | 68                                                                                | 460                                                                               | 516                                                                               | 122                                                                               | 1066                                                                                | 837                                                                                 | 349                                                                                 | 936                                                                                 | 61                                                                                  |
| Turn Type               | Perm                                                                              | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                | pm+pt                                                                             | NA                                                                                  | Free                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases        |                                                                                   | 4                                                                                 |                                                                                   | 3                                                                                 | 8                                                                                 | 5                                                                                 | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases        | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 2                                                                                 |                                                                                     | Free                                                                                | 6                                                                                   |                                                                                     | 6                                                                                   |
| Detector Phase          | 4                                                                                 | 4                                                                                 | 4                                                                                 | 3                                                                                 | 8                                                                                 | 5                                                                                 | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   | 6                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 4.0                                                                               | 6.0                                                                               | 4.0                                                                               | 15.0                                                                                |                                                                                     | 4.0                                                                                 | 15.0                                                                                | 15.0                                                                                |
| Minimum Split (s)       | 41.0                                                                              | 41.0                                                                              | 41.0                                                                              | 11.0                                                                              | 46.0                                                                              | 11.0                                                                              | 37.0                                                                                |                                                                                     | 11.0                                                                                | 40.0                                                                                | 40.0                                                                                |
| Total Split (s)         | 36.0                                                                              | 36.0                                                                              | 36.0                                                                              | 24.0                                                                              | 60.0                                                                              | 12.0                                                                              | 41.0                                                                                |                                                                                     | 19.0                                                                                | 48.0                                                                                | 48.0                                                                                |
| Total Split (%)         | 30.0%                                                                             | 30.0%                                                                             | 30.0%                                                                             | 20.0%                                                                             | 50.0%                                                                             | 10.0%                                                                             | 34.2%                                                                               |                                                                                     | 15.8%                                                                               | 40.0%                                                                               | 40.0%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                 |                                                                                     | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                 |                                                                                     | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 |                                                                                     | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Lost Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lead/Lag                | Lag                                                                               | Lag                                                                               | Lag                                                                               | Lead                                                                              |                                                                                   | Lead                                                                              | Lag                                                                                 |                                                                                     | Lead                                                                                | Lag                                                                                 | Lag                                                                                 |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | C-Min                                                                               |                                                                                     | None                                                                                | C-Min                                                                               | C-Min                                                                               |
| v/c Ratio               | 0.53                                                                              | 0.78                                                                              | 0.14                                                                              | 0.92                                                                              | 0.73                                                                              | 0.54                                                                              | 0.86                                                                                | 0.53                                                                                | 1.39                                                                                | 0.67                                                                                | 0.08                                                                                |
| Control Delay           | 53.5                                                                              | 60.6                                                                              | 0.7                                                                               | 75.2                                                                              | 33.3                                                                              | 29.4                                                                              | 45.7                                                                                | 1.3                                                                                 | 222.9                                                                               | 36.9                                                                                | 1.9                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 53.5                                                                              | 60.6                                                                              | 0.7                                                                               | 75.2                                                                              | 33.3                                                                              | 29.4                                                                              | 45.7                                                                                | 1.3                                                                                 | 222.9                                                                               | 36.9                                                                                | 1.9                                                                                 |
| Queue Length 50th (ft)  | 65                                                                                | 216                                                                               | 0                                                                                 | 183                                                                               | 300                                                                               | 49                                                                                | 403                                                                                 | 0                                                                                   | ~300                                                                                | 375                                                                                 | 1                                                                                   |
| Queue Length 95th (ft)  | 112                                                                               | 296                                                                               | 0                                                                                 | #270                                                                              | 366                                                                               | 69                                                                                | #596                                                                                | 0                                                                                   | m#462                                                                               | 418                                                                                 | m7                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 657                                                                               |                                                                                   |                                                                                   | 1618                                                                              |                                                                                   | 1320                                                                                |                                                                                     |                                                                                     | 3868                                                                                |                                                                                     |
| Turn Bay Length (ft)    | 180                                                                               |                                                                                   | 300                                                                               | 250                                                                               |                                                                                   | 240                                                                               |                                                                                     | 1000                                                                                | 400                                                                                 |                                                                                     | 280                                                                                 |
| Base Capacity (vph)     | 224                                                                               | 475                                                                               | 547                                                                               | 500                                                                               | 802                                                                               | 224                                                                               | 1238                                                                                | 1568                                                                                | 251                                                                                 | 1391                                                                                | 734                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.42                                                                              | 0.61                                                                              | 0.12                                                                              | 0.92                                                                              | 0.64                                                                              | 0.54                                                                              | 0.86                                                                                | 0.53                                                                                | 1.39                                                                                | 0.67                                                                                | 0.08                                                                                |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 17 (14%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.

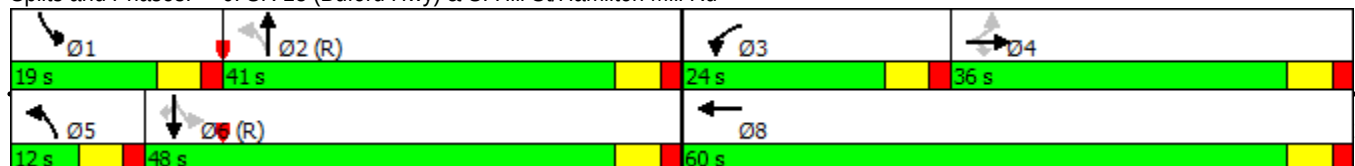
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: SR 13 (Buford Hwy) &amp; S. Hill St/Hamilton Mill Rd



# HCM Signalized Intersection Capacity Analysis

## 6: SR 13 (Buford Hwy) & S. Hill St/Hamilton Mill Rd

Future Build PM

11/16/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |  |  |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (vph)              | 82                                                                                | 279                                                                               | 55                                                                                | 405                                                                               | 222                                                                               | 201                                                                               | 83                                                                                 | 970                                                                                 | 770                                                                                 | 297                                                                                 | 786                                                                                 | 54                                                                                  |
| Future Volume (vph)               | 82                                                                                | 279                                                                               | 55                                                                                | 405                                                                               | 222                                                                               | 201                                                                               | 83                                                                                 | 970                                                                                 | 770                                                                                 | 297                                                                                 | 786                                                                                 | 54                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                | 6.0                                                                                 | 4.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.97                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                               | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |
| Frt                               | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 0.93                                                                              |                                                                                   | 1.00                                                                               | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                               | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)                 | 1805                                                                              | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1715                                                                              |                                                                                   | 1805                                                                               | 3574                                                                                | 1568                                                                                | 1752                                                                                | 3438                                                                                | 1615                                                                                |
| Flt Permitted                     | 0.47                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.20                                                                               | 1.00                                                                                | 1.00                                                                                | 0.08                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)                 | 899                                                                               | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1715                                                                              |                                                                                   | 386                                                                                | 3574                                                                                | 1568                                                                                | 155                                                                                 | 3438                                                                                | 1615                                                                                |
| Peak-hour factor, PHF             | 0.88                                                                              | 0.96                                                                              | 0.81                                                                              | 0.88                                                                              | 0.86                                                                              | 0.78                                                                              | 0.68                                                                               | 0.91                                                                                | 0.92                                                                                | 0.85                                                                                | 0.84                                                                                | 0.88                                                                                |
| Adj. Flow (vph)                   | 93                                                                                | 291                                                                               | 68                                                                                | 460                                                                               | 258                                                                               | 258                                                                               | 122                                                                                | 1066                                                                                | 837                                                                                 | 349                                                                                 | 936                                                                                 | 61                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 55                                                                                | 0                                                                                 | 33                                                                                | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 36                                                                                  |
| Lane Group Flow (vph)             | 93                                                                                | 291                                                                               | 13                                                                                | 460                                                                               | 483                                                                               | 0                                                                                 | 122                                                                                | 1066                                                                                | 837                                                                                 | 349                                                                                 | 936                                                                                 | 25                                                                                  |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 5%                                                                                | 1%                                                                                | 4%                                                                                | 0%                                                                                 | 1%                                                                                  | 3%                                                                                  | 3%                                                                                  | 5%                                                                                  | 0%                                                                                  |
| Turn Type                         | Perm                                                                              | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                |                                                                                   | pm+pt                                                                              | NA                                                                                  | Free                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   | 3                                                                                 | 8                                                                                 |                                                                                   | 5                                                                                  | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   |                                                                                   | 2                                                                                  |                                                                                     | Free                                                                                | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             | 23.4                                                                              | 23.4                                                                              | 23.4                                                                              | 18.0                                                                              | 47.4                                                                              |                                                                                   | 47.6                                                                               | 41.6                                                                                | 120.0                                                                               | 60.6                                                                                | 48.6                                                                                | 48.6                                                                                |
| Effective Green, g (s)            | 23.4                                                                              | 23.4                                                                              | 23.4                                                                              | 18.0                                                                              | 47.4                                                                              |                                                                                   | 47.6                                                                               | 41.6                                                                                | 120.0                                                                               | 60.6                                                                                | 48.6                                                                                | 48.6                                                                                |
| Actuated g/C Ratio                | 0.19                                                                              | 0.19                                                                              | 0.19                                                                              | 0.15                                                                              | 0.39                                                                              |                                                                                   | 0.40                                                                               | 0.35                                                                                | 1.00                                                                                | 0.51                                                                                | 0.41                                                                                | 0.41                                                                                |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)             | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               |                                                                                   | 3.0                                                                                | 5.0                                                                                 |                                                                                     | 3.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |
| Lane Grp Cap (vph)                | 175                                                                               | 370                                                                               | 314                                                                               | 500                                                                               | 677                                                                               |                                                                                   | 224                                                                                | 1238                                                                                | 1568                                                                                | 251                                                                                 | 1392                                                                                | 654                                                                                 |
| v/s Ratio Prot                    |                                                                                   | 0.15                                                                              |                                                                                   | c0.14                                                                             | c0.28                                                                             |                                                                                   | 0.03                                                                               | 0.30                                                                                |                                                                                     | c0.15                                                                               | 0.27                                                                                |                                                                                     |
| v/s Ratio Perm                    | 0.10                                                                              |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.19                                                                               |                                                                                     | 0.53                                                                                | c0.55                                                                               |                                                                                     | 0.02                                                                                |
| v/c Ratio                         | 0.53                                                                              | 0.79                                                                              | 0.04                                                                              | 0.92                                                                              | 0.71                                                                              |                                                                                   | 0.54                                                                               | 0.86                                                                                | 0.53                                                                                | 1.39                                                                                | 0.67                                                                                | 0.04                                                                                |
| Uniform Delay, d1                 | 43.4                                                                              | 45.9                                                                              | 39.2                                                                              | 50.3                                                                              | 30.6                                                                              |                                                                                   | 24.4                                                                               | 36.5                                                                                | 0.0                                                                                 | 35.9                                                                                | 29.2                                                                                | 21.6                                                                                |
| Progression Factor                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.13                                                                                | 1.00                                                                                |
| Incremental Delay, d2             | 3.1                                                                               | 10.5                                                                              | 0.1                                                                               | 22.3                                                                              | 3.6                                                                               |                                                                                   | 2.7                                                                                | 8.0                                                                                 | 1.3                                                                                 | 195.9                                                                               | 2.3                                                                                 | 0.1                                                                                 |
| Delay (s)                         | 46.5                                                                              | 56.5                                                                              | 39.3                                                                              | 72.6                                                                              | 34.1                                                                              |                                                                                   | 27.1                                                                               | 44.5                                                                                | 1.3                                                                                 | 226.2                                                                               | 35.3                                                                                | 21.7                                                                                |
| Level of Service                  | D                                                                                 | E                                                                                 | D                                                                                 | E                                                                                 | C                                                                                 |                                                                                   | C                                                                                  | D                                                                                   | A                                                                                   | F                                                                                   | D                                                                                   | C                                                                                   |
| Approach Delay (s)                |                                                                                   | 51.8                                                                              |                                                                                   |                                                                                   | 52.3                                                                              |                                                                                   |                                                                                    | 25.6                                                                                |                                                                                     |                                                                                     | 84.2                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                    | C                                                                                   |                                                                                     |                                                                                     | F                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 49.9                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                    |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 1.20                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                    |                                                                                     |                                                                                     | 24.0                                                                                |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 92.2%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                    |                                                                                     |                                                                                     | F                                                                                   |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM Unsignalized Intersection Capacity Analysis

## 7: Pvt. Drwy/Bryant Rd & Thompson Mill Rd

Future Build PM  
11/16/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                     |  |                                                                                     |                                                                                     |  |                                                                                     |
| Traffic Volume (veh/h)            | 5                                                                                 | 516                                                                               | 0                                                                                 | 0                                                                                 | 296                                                                               | 11                                                                                | 0                                                                                   | 0                                                                                   | 0                                                                                   | 32                                                                                  | 0                                                                                   | 8                                                                                   |
| Future Volume (Veh/h)             | 5                                                                                 | 516                                                                               | 0                                                                                 | 0                                                                                 | 296                                                                               | 11                                                                                | 0                                                                                   | 0                                                                                   | 0                                                                                   | 32                                                                                  | 0                                                                                   | 8                                                                                   |
| Sign Control                      |                                                                                   | Free                                                                              |                                                                                   |                                                                                   | Free                                                                              |                                                                                   |                                                                                     | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Grade                             |                                                                                   | 0%                                                                                |                                                                                   |                                                                                   | 0%                                                                                |                                                                                   |                                                                                     | 0%                                                                                  |                                                                                     |                                                                                     | 0%                                                                                  |                                                                                     |
| Peak Hour Factor                  | 0.31                                                                              | 0.80                                                                              | 0.25                                                                              | 0.92                                                                              | 0.96                                                                              | 0.58                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.61                                                                                | 0.92                                                                                | 0.67                                                                                |
| Hourly flow rate (vph)            | 16                                                                                | 645                                                                               | 0                                                                                 | 0                                                                                 | 308                                                                               | 19                                                                                | 0                                                                                   | 0                                                                                   | 0                                                                                   | 52                                                                                  | 0                                                                                   | 12                                                                                  |
| Pedestrians                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane Width (ft)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Walking Speed (ft/s)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Percent Blockage                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Right turn flare (veh)            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median type                       |                                                                                   | None                                                                              |                                                                                   |                                                                                   | None                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median storage (veh)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Upstream signal (ft)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| pX, platoon unblocked             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC, conflicting volume            | 327                                                                               |                                                                                   |                                                                                   | 645                                                                               |                                                                                   |                                                                                   | 1006                                                                                | 1004                                                                                | 645                                                                                 | 994                                                                                 | 994                                                                                 | 318                                                                                 |
| vC1, stage 1 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC2, stage 2 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vCu, unblocked vol                | 327                                                                               |                                                                                   |                                                                                   | 645                                                                               |                                                                                   |                                                                                   | 1006                                                                                | 1004                                                                                | 645                                                                                 | 994                                                                                 | 994                                                                                 | 318                                                                                 |
| tC, single (s)                    | 4.1                                                                               |                                                                                   |                                                                                   | 4.1                                                                               |                                                                                   |                                                                                   | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 |
| tC, 2 stage (s)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| tF (s)                            | 2.2                                                                               |                                                                                   |                                                                                   | 2.2                                                                               |                                                                                   |                                                                                   | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 |
| p0 queue free %                   | 99                                                                                |                                                                                   |                                                                                   | 100                                                                               |                                                                                   |                                                                                   | 100                                                                                 | 100                                                                                 | 100                                                                                 | 77                                                                                  | 100                                                                                 | 98                                                                                  |
| cM capacity (veh/h)               | 1244                                                                              |                                                                                   |                                                                                   | 950                                                                               |                                                                                   |                                                                                   | 216                                                                                 | 241                                                                                 | 476                                                                                 | 224                                                                                 | 244                                                                                 | 728                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total                      | 661                                                                               | 327                                                                               | 0                                                                                 | 64                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left                       | 16                                                                                | 0                                                                                 | 0                                                                                 | 52                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right                      | 0                                                                                 | 19                                                                                | 0                                                                                 | 12                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| cSH                               | 1244                                                                              | 950                                                                               | 1700                                                                              | 257                                                                               |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume to Capacity                | 0.01                                                                              | 0.00                                                                              | 0.00                                                                              | 0.25                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Queue Length 95th (ft)            | 1                                                                                 | 0                                                                                 | 0                                                                                 | 24                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 0.4                                                                               | 0.0                                                                               | 0.0                                                                               | 23.6                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane LOS                          | A                                                                                 |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 0.4                                                                               | 0.0                                                                               | 0.0                                                                               | 23.6                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Average Delay                     |                                                                                   |                                                                                   | 1.7                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 41.1%                                                                             |                                                                                   | ICU Level of Service                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM Unsignalized Intersection Capacity Analysis 8: N. Bogan Rd & Thompson Mill Rd

Future Build PM

11/16/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                    |  |                                                                                     |                                                                                     |  |                                                                                     |
| Sign Control                      |                                                                                   | Stop                                                                              |                                                                                   |                                                                                   | Stop                                                                              |                                                                                   |                                                                                    | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Traffic Volume (vph)              | 74                                                                                | 380                                                                               | 112                                                                               | 58                                                                                | 182                                                                               | 15                                                                                | 74                                                                                 | 150                                                                                 | 87                                                                                  | 15                                                                                  | 158                                                                                 | 50                                                                                  |
| Future Volume (vph)               | 74                                                                                | 380                                                                               | 112                                                                               | 58                                                                                | 182                                                                               | 15                                                                                | 74                                                                                 | 150                                                                                 | 87                                                                                  | 15                                                                                  | 158                                                                                 | 50                                                                                  |
| Peak Hour Factor                  | 0.83                                                                              | 0.90                                                                              | 0.79                                                                              | 0.92                                                                              | 0.86                                                                              | 0.88                                                                              | 0.92                                                                               | 0.81                                                                                | 0.77                                                                                | 0.70                                                                                | 0.75                                                                                | 0.80                                                                                |
| Hourly flow rate (vph)            | 89                                                                                | 422                                                                               | 142                                                                               | 63                                                                                | 212                                                                               | 17                                                                                | 80                                                                                 | 185                                                                                 | 113                                                                                 | 21                                                                                  | 211                                                                                 | 63                                                                                  |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total (vph)                | 653                                                                               | 292                                                                               | 378                                                                               | 295                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left (vph)                 | 89                                                                                | 63                                                                                | 80                                                                                | 21                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right (vph)                | 142                                                                               | 17                                                                                | 113                                                                               | 63                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Hadj (s)                          | -0.10                                                                             | 0.01                                                                              | -0.13                                                                             | -0.11                                                                             |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Departure Headway (s)             | 7.7                                                                               | 8.3                                                                               | 7.9                                                                               | 8.2                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Degree Utilization, x             | 1.40                                                                              | 0.68                                                                              | 0.83                                                                              | 0.68                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Capacity (veh/h)                  | 469                                                                               | 408                                                                               | 436                                                                               | 413                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 213.4                                                                             | 27.0                                                                              | 39.0                                                                              | 26.8                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 213.4                                                                             | 27.0                                                                              | 39.0                                                                              | 26.8                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      | F                                                                                 | D                                                                                 | E                                                                                 | D                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Delay                             |                                                                                   |                                                                                   |                                                                                   | 105.0                                                                             |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  |                                                                                   |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   |                                                                                   | 75.5%                                                                             | ICU Level of Service                                                              |                                                                                   | D                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

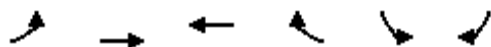
Intersection: 8: N. Bogan Rd & Thompson Mill Rd

| Movement              | EB   | WB   | NB  | SB  |
|-----------------------|------|------|-----|-----|
| Directions Served     | LTR  | LTR  | LTR | LTR |
| Maximum Queue (ft)    | 202  | 116  | 78  | 71  |
| Average Queue (ft)    | 120  | 50   | 70  | 51  |
| 95th Queue (ft)       | 201  | 107  | 85  | 73  |
| Link Distance (ft)    | 2178 | 1031 | 846 | 591 |
| Upstream Blk Time (%) |      |      |     |     |
| Queuing Penalty (veh) |      |      |     |     |
| Storage Bay Dist (ft) |      |      |     |     |
| Storage Blk Time (%)  |      |      |     |     |
| Queuing Penalty (veh) |      |      |     |     |

# HCM Unsignalized Intersection Capacity Analysis

## 9: Thompson Mill Rd & Site Drwy

Future Build PM  
11/16/2016



| Movement                          | EBL  | EBT  | WBT   | WBR  | SBL                  | SBR  |
|-----------------------------------|------|------|-------|------|----------------------|------|
| Lane Configurations               |      | ↑    | ↑     | ↗    | ↘                    |      |
| Traffic Volume (veh/h)            | 0    | 548  | 307   | 8    | 29                   | 0    |
| Future Volume (Veh/h)             | 0    | 548  | 307   | 8    | 29                   | 0    |
| Sign Control                      |      | Free | Free  |      | Stop                 |      |
| Grade                             |      | 0%   | 0%    |      | 0%                   |      |
| Peak Hour Factor                  | 0.92 | 0.80 | 0.96  | 0.92 | 0.92                 | 0.92 |
| Hourly flow rate (vph)            | 0    | 685  | 320   | 9    | 32                   | 0    |
| Pedestrians                       |      |      |       |      |                      |      |
| Lane Width (ft)                   |      |      |       |      |                      |      |
| Walking Speed (ft/s)              |      |      |       |      |                      |      |
| Percent Blockage                  |      |      |       |      |                      |      |
| Right turn flare (veh)            |      |      |       |      |                      |      |
| Median type                       |      | None | None  |      |                      |      |
| Median storage veh                |      |      |       |      |                      |      |
| Upstream signal (ft)              |      |      |       |      |                      |      |
| pX, platoon unblocked             |      |      |       |      |                      |      |
| vC, conflicting volume            | 320  |      |       |      | 1005                 | 320  |
| vC1, stage 1 conf vol             |      |      |       |      |                      |      |
| vC2, stage 2 conf vol             |      |      |       |      |                      |      |
| vCu, unblocked vol                | 320  |      |       |      | 1005                 | 320  |
| tC, single (s)                    | 4.1  |      |       |      | 6.4                  | 6.2  |
| tC, 2 stage (s)                   |      |      |       |      |                      |      |
| tF (s)                            | 2.2  |      |       |      | 3.5                  | 3.3  |
| p0 queue free %                   | 100  |      |       |      | 88                   | 100  |
| cM capacity (veh/h)               | 1240 |      |       |      | 268                  | 721  |
| Direction, Lane #                 | EB 1 | WB 1 | WB 2  | SB 1 |                      |      |
| Volume Total                      | 685  | 320  | 9     | 32   |                      |      |
| Volume Left                       | 0    | 0    | 0     | 32   |                      |      |
| Volume Right                      | 0    | 0    | 9     | 0    |                      |      |
| cSH                               | 1700 | 1700 | 1700  | 268  |                      |      |
| Volume to Capacity                | 0.40 | 0.19 | 0.01  | 0.12 |                      |      |
| Queue Length 95th (ft)            | 0    | 0    | 0     | 10   |                      |      |
| Control Delay (s)                 | 0.0  | 0.0  | 0.0   | 20.3 |                      |      |
| Lane LOS                          |      |      |       | C    |                      |      |
| Approach Delay (s)                | 0.0  | 0.0  |       | 20.3 |                      |      |
| Approach LOS                      |      |      |       | C    |                      |      |
| Intersection Summary              |      |      |       |      |                      |      |
| Average Delay                     |      |      | 0.6   |      |                      |      |
| Intersection Capacity Utilization |      |      | 38.8% |      | ICU Level of Service | A    |
| Analysis Period (min)             |      |      | 15    |      |                      |      |

## **Future “Build” Improved Intersection Analysis**

## Queues

## Future Build AM - Improved

## 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)

11/16/2016



| Lane Group              | EBL   | EBT   | WBT   | WBR   | NBL   | NBT   | NBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     |       |       |       |       |       |       |       |
| Traffic Volume (vph)    | 398   | 416   | 1296  | 328   | 392   | 4     | 87    |
| Future Volume (vph)     | 398   | 416   | 1296  | 328   | 392   | 4     | 87    |
| Lane Group Flow (vph)   | 468   | 443   | 1507  | 426   | 233   | 231   | 121   |
| Turn Type               | Prot  | NA    | NA    | Perm  | Perm  | NA    | Perm  |
| Protected Phases        | 5     | 2     | 6     |       |       | 8     |       |
| Permitted Phases        |       |       |       | 6     | 8     |       | 8     |
| Detector Phase          | 5     | 2     | 6     | 6     | 8     | 8     | 8     |
| Switch Phase            |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 4.0   | 15.0  | 15.0  | 15.0  | 6.0   | 6.0   | 6.0   |
| Minimum Split (s)       | 11.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 44.0  | 91.0  | 47.0  | 47.0  | 29.0  | 29.0  | 29.0  |
| Total Split (%)         | 36.7% | 75.8% | 39.2% | 39.2% | 24.2% | 24.2% | 24.2% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lead  |       | Lag   | Lag   |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |
| Recall Mode             | None  | C-Min | C-Min | C-Min | None  | None  | None  |
| v/c Ratio               | 0.91  | 0.17  | 0.76  | 0.49  | 0.84  | 0.82  | 0.32  |
| Control Delay           | 42.8  | 11.9  | 36.4  | 4.7   | 72.3  | 70.6  | 9.6   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 2.9   | 2.7   | 0.0   |
| Total Delay             | 42.8  | 11.9  | 36.4  | 4.7   | 75.2  | 73.4  | 9.6   |
| Queue Length 50th (ft)  | 385   | 158   | 392   | 0     | 181   | 178   | 0     |
| Queue Length 95th (ft)  | #471  | 213   | 430   | 24    | #277  | 137   | 24    |
| Internal Link Dist (ft) |       | 591   | 1139  |       |       | 825   |       |
| Turn Bay Length (ft)    | 100   |       |       | 840   |       |       | 510   |
| Base Capacity (vph)     | 560   | 2598  | 1978  | 877   | 310   | 312   | 407   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 18    | 0     | 26    | 27    | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.84  | 0.17  | 0.77  | 0.49  | 0.82  | 0.81  | 0.30  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 87 (73%), Referenced to phase 2:EBT and 6:WBT, Start of Green

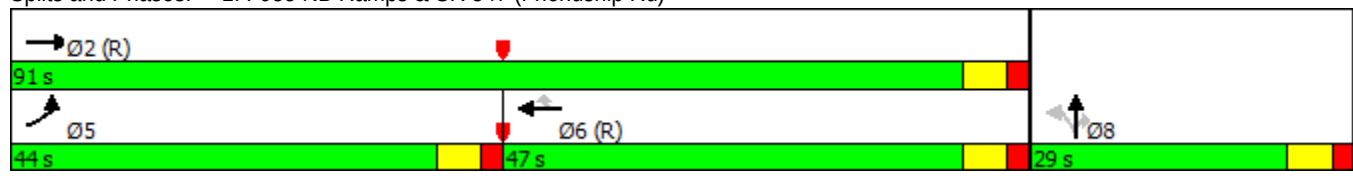
Natural Cycle: 90

Control Type: Actuated-Coordinated

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)



Baseline

Synchro 9 Report  
Page 1



# HCM Signalized Intersection Capacity Analysis

## 1: I-985 NB Ramps & SR 347 (Friendship Rd)

Future Build AM - Improved

11/16/2016

|                                   |  |                                                                                    |  |  |                                                                                                                                                                      |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                                                                                                                 | EBR                                                                               | WBL                                                                               | WBT                                                                                                                                                                                                                                                   | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |   |                                                                                   |                                                                                   |    |  |  |  |  |                                                                                     |                                                                                     |                                                                                     |
| Traffic Volume (vph)              | 398                                                                               | 416                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1296                                                                                                                                                                                                                                                  | 328                                                                               | 392                                                                                 | 4                                                                                   | 87                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Future Volume (vph)               | 398                                                                               | 416                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1296                                                                                                                                                                                                                                                  | 328                                                                               | 392                                                                                 | 4                                                                                   | 87                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                                                                                                                | 1900                                                                              | 1900                                                                              | 1900                                                                                                                                                                                                                                                  | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                                                                                                                 |                                                                                   |                                                                                   | 6.0                                                                                                                                                                                                                                                   | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Util. Factor                 | 1.00                                                                              | 0.95                                                                                                                                                                |                                                                                   |                                                                                   | 0.91                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Frt                               | 1.00                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (prot)                 | 1770                                                                              | 3574                                                                                                                                                                |                                                                                   |                                                                                   | 5136                                                                                                                                                                                                                                                  | 1599                                                                              | 1618                                                                                | 1628                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Permitted                     | 0.95                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (perm)                 | 1770                                                                              | 3574                                                                                                                                                                |                                                                                   |                                                                                   | 5136                                                                                                                                                                                                                                                  | 1599                                                                              | 1618                                                                                | 1628                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Peak-hour factor, PHF             | 0.85                                                                              | 0.94                                                                                                                                                                | 0.92                                                                              | 0.92                                                                              | 0.86                                                                                                                                                                                                                                                  | 0.77                                                                              | 0.86                                                                                | 0.50                                                                                | 0.72                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Adj. Flow (vph)                   | 468                                                                               | 443                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1507                                                                                                                                                                                                                                                  | 426                                                                               | 456                                                                                 | 8                                                                                   | 121                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                                                                                                                                                                                     | 262                                                                               | 0                                                                                   | 0                                                                                   | 100                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 468                                                                               | 443                                                                                                                                                                 | 0                                                                                 | 0                                                                                 | 1507                                                                                                                                                                                                                                                  | 164                                                                               | 233                                                                                 | 231                                                                                 | 21                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Heavy Vehicles (%)                | 2%                                                                                | 1%                                                                                                                                                                  | 0%                                                                                | 0%                                                                                | 1%                                                                                                                                                                                                                                                    | 1%                                                                                | 6%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  |
| Turn Type                         | Prot                                                                              | NA                                                                                                                                                                  |                                                                                   |                                                                                   | NA                                                                                                                                                                                                                                                    | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Protected Phases                  | 5                                                                                 | 2                                                                                                                                                                   |                                                                                   |                                                                                   | 6                                                                                                                                                                                                                                                     |                                                                                   |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Permitted Phases                  |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Actuated Green, G (s)             | 35.0                                                                              | 87.2                                                                                                                                                                |                                                                                   |                                                                                   | 46.2                                                                                                                                                                                                                                                  | 46.2                                                                              | 20.8                                                                                | 20.8                                                                                | 20.8                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Effective Green, g (s)            | 35.0                                                                              | 87.2                                                                                                                                                                |                                                                                   |                                                                                   | 46.2                                                                                                                                                                                                                                                  | 46.2                                                                              | 20.8                                                                                | 20.8                                                                                | 20.8                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Actuated g/C Ratio                | 0.29                                                                              | 0.73                                                                                                                                                                |                                                                                   |                                                                                   | 0.39                                                                                                                                                                                                                                                  | 0.39                                                                              | 0.17                                                                                | 0.17                                                                                | 0.17                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                                                                                                                 |                                                                                   |                                                                                   | 6.0                                                                                                                                                                                                                                                   | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Vehicle Extension (s)             | 3.0                                                                               | 5.0                                                                                                                                                                 |                                                                                   |                                                                                   | 5.0                                                                                                                                                                                                                                                   | 5.0                                                                               | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Grp Cap (vph)                | 516                                                                               | 2597                                                                                                                                                                |                                                                                   |                                                                                   | 1977                                                                                                                                                                                                                                                  | 615                                                                               | 280                                                                                 | 282                                                                                 | 279                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Prot                    | c0.26                                                                             | 0.12                                                                                                                                                                |                                                                                   |                                                                                   | c0.29                                                                                                                                                                                                                                                 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       | 0.10                                                                              | c0.14                                                                               | 0.14                                                                                | 0.01                                                                                |                                                                                     |                                                                                     |                                                                                     |
| v/c Ratio                         | 0.91                                                                              | 0.17                                                                                                                                                                |                                                                                   |                                                                                   | 0.76                                                                                                                                                                                                                                                  | 0.27                                                                              | 0.83                                                                                | 0.82                                                                                | 0.08                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Uniform Delay, d1                 | 40.9                                                                              | 5.1                                                                                                                                                                 |                                                                                   |                                                                                   | 32.1                                                                                                                                                                                                                                                  | 25.3                                                                              | 47.9                                                                                | 47.8                                                                                | 41.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Progression Factor                | 0.56                                                                              | 2.19                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Incremental Delay, d2             | 16.9                                                                              | 0.1                                                                                                                                                                 |                                                                                   |                                                                                   | 2.8                                                                                                                                                                                                                                                   | 1.1                                                                               | 18.6                                                                                | 16.7                                                                                | 0.1                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Delay (s)                         | 39.8                                                                              | 11.3                                                                                                                                                                |                                                                                   |                                                                                   | 35.0                                                                                                                                                                                                                                                  | 26.4                                                                              | 66.5                                                                                | 64.5                                                                                | 41.7                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  | D                                                                                 | B                                                                                                                                                                   |                                                                                   |                                                                                   | C                                                                                                                                                                                                                                                     | C                                                                                 | E                                                                                   | E                                                                                   | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                |                                                                                   | 26.0                                                                                                                                                                |                                                                                   |                                                                                   | 33.1                                                                                                                                                                                                                                                  |                                                                                   |                                                                                     | 60.6                                                                                |                                                                                     |                                                                                     | 0.0                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                                                                                                   |                                                                                   |                                                                                   | C                                                                                                                                                                                                                                                     |                                                                                   |                                                                                     | E                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                                                                                                     | 35.9                                                                              |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   | HCM 2000 Level of Service                                                           |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                                                                                                     | 0.83                                                                              |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                                                                                                     | 120.0                                                                             |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   | Sum of lost time (s)                                                                |                                                                                     | 18.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                                                                                                     | 77.7%                                                                             |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   | ICU Level of Service                                                                |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                                                                                                     | 15                                                                                |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

## 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)

Future Build AM - Improved

11/16/2016

|                         | →     | ↘     | ↙     | ←     | ↘     | ↙     |
|-------------------------|-------|-------|-------|-------|-------|-------|
| Lane Group              | EBT   | EBR   | WBL   | WBT   | SBL   | SBR   |
| Lane Configurations     | ↑↑↑   | ↑     | ↘↙    | ↑↑    | ↘     | ↙     |
| Traffic Volume (vph)    | 693   | 422   | 496   | 1221  | 118   | 548   |
| Future Volume (vph)     | 693   | 422   | 496   | 1221  | 118   | 548   |
| Lane Group Flow (vph)   | 806   | 469   | 570   | 1489  | 139   | 652   |
| Turn Type               | NA    | Perm  | Prot  | NA    | Perm  | Perm  |
| Protected Phases        | 2     |       | 1     | 6     |       |       |
| Permitted Phases        |       | 2     |       |       | 4     | 4     |
| Detector Phase          | 2     | 2     | 1     | 6     | 4     | 4     |
| Switch Phase            |       |       |       |       |       |       |
| Minimum Initial (s)     | 15.0  | 15.0  | 4.0   | 15.0  | 6.0   | 6.0   |
| Minimum Split (s)       | 24.0  | 24.0  | 11.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 33.0  | 33.0  | 29.0  | 62.0  | 58.0  | 58.0  |
| Total Split (%)         | 27.5% | 27.5% | 24.2% | 51.7% | 48.3% | 48.3% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lag   | Lag   | Lead  |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |
| Recall Mode             | C-Min | C-Min | None  | C-Min | None  | None  |
| v/c Ratio               | 0.63  | 0.63  | 0.88  | 0.87  | 0.19  | 0.95  |
| Control Delay           | 39.2  | 9.2   | 47.3  | 17.8  | 22.4  | 54.6  |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 1.6   | 0.0   | 0.0   |
| Total Delay             | 39.2  | 9.2   | 47.3  | 19.4  | 22.4  | 54.6  |
| Queue Length 50th (ft)  | 125   | 34    | 162   | 508   | 65    | 420   |
| Queue Length 95th (ft)  | 193   | 124   | #258  | 541   | 101   | #582  |
| Internal Link Dist (ft) | 904   |       |       | 591   |       |       |
| Turn Bay Length (ft)    |       | 375   | 380   |       |       |       |
| Base Capacity (vph)     | 1270  | 743   | 664   | 1703  | 782   | 712   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 93    | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.63  | 0.63  | 0.86  | 0.92  | 0.18  | 0.92  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 15 (13%), Referenced to phase 2:EBT and 6:WBT, Start of Green

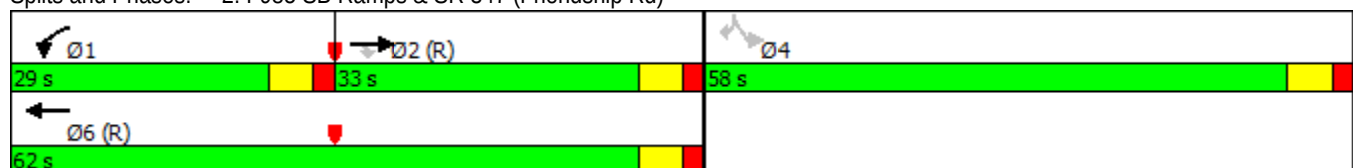
Natural Cycle: 80

Control Type: Actuated-Coordinated

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)

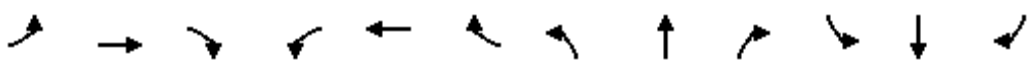


# HCM Signalized Intersection Capacity Analysis

## 2: I-985 SB Ramps & SR 347 (Friendship Rd)

Future Build AM - Improved

11/16/2016

|                                   |  |      |       |      |       |                           |      |      |      |      |      |       |
|-----------------------------------|------------------------------------------------------------------------------------|------|-------|------|-------|---------------------------|------|------|------|------|------|-------|
| Movement                          | EBL                                                                                | EBT  | EBR   | WBL  | WBT   | WBR                       | NBL  | NBT  | NBR  | SBL  | SBT  | SBR   |
| Lane Configurations               |                                                                                    | ↑↑↑  | ↑     | ↑↑   | ↑↑    |                           |      |      |      | ↑    |      | ↑     |
| Traffic Volume (vph)              | 0                                                                                  | 693  | 422   | 496  | 1221  | 0                         | 0    | 0    | 0    | 118  | 0    | 548   |
| Future Volume (vph)               | 0                                                                                  | 693  | 422   | 496  | 1221  | 0                         | 0    | 0    | 0    | 118  | 0    | 548   |
| Ideal Flow (vphpl)                | 1900                                                                               | 1900 | 1900  | 1900 | 1900  | 1900                      | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  |
| Total Lost time (s)               |                                                                                    | 6.0  | 6.0   | 6.0  | 6.0   |                           |      |      |      | 6.0  |      | 6.0   |
| Lane Util. Factor                 |                                                                                    | 0.91 | 1.00  | 0.97 | 0.95  |                           |      |      |      | 1.00 |      | 1.00  |
| Frt                               |                                                                                    | 1.00 | 0.85  | 1.00 | 1.00  |                           |      |      |      | 1.00 |      | 0.85  |
| Flt Protected                     |                                                                                    | 1.00 | 1.00  | 0.95 | 1.00  |                           |      |      |      | 0.95 |      | 1.00  |
| Satd. Flow (prot)                 |                                                                                    | 5085 | 1568  | 3467 | 3505  |                           |      |      |      | 1805 |      | 1538  |
| Flt Permitted                     |                                                                                    | 1.00 | 1.00  | 0.95 | 1.00  |                           |      |      |      | 0.95 |      | 1.00  |
| Satd. Flow (perm)                 |                                                                                    | 5085 | 1568  | 3467 | 3505  |                           |      |      |      | 1805 |      | 1538  |
| Peak-hour factor, PHF             | 0.92                                                                               | 0.86 | 0.90  | 0.87 | 0.82  | 0.92                      | 0.92 | 0.92 | 0.92 | 0.85 | 0.92 | 0.84  |
| Adj. Flow (vph)                   | 0                                                                                  | 806  | 469   | 570  | 1489  | 0                         | 0    | 0    | 0    | 139  | 0    | 652   |
| RTOR Reduction (vph)              | 0                                                                                  | 0    | 352   | 0    | 0     | 0                         | 0    | 0    | 0    | 0    | 0    | 48    |
| Lane Group Flow (vph)             | 0                                                                                  | 806  | 117   | 570  | 1489  | 0                         | 0    | 0    | 0    | 139  | 0    | 604   |
| Heavy Vehicles (%)                | 0%                                                                                 | 2%   | 3%    | 1%   | 3%    | 0%                        | 0%   | 0%   | 0%   | 0%   | 0%   | 5%    |
| Turn Type                         |                                                                                    | NA   | Perm  | Prot | NA    |                           |      |      |      | Perm |      | Perm  |
| Protected Phases                  |                                                                                    | 2    |       | 1    | 6     |                           |      |      |      |      |      |       |
| Permitted Phases                  |                                                                                    |      | 2     |      |       |                           |      |      |      | 4    |      | 4     |
| Actuated Green, G (s)             |                                                                                    | 30.0 | 30.0  | 22.3 | 58.3  |                           |      |      |      | 49.7 |      | 49.7  |
| Effective Green, g (s)            |                                                                                    | 30.0 | 30.0  | 22.3 | 58.3  |                           |      |      |      | 49.7 |      | 49.7  |
| Actuated g/C Ratio                |                                                                                    | 0.25 | 0.25  | 0.19 | 0.49  |                           |      |      |      | 0.41 |      | 0.41  |
| Clearance Time (s)                |                                                                                    | 6.0  | 6.0   | 6.0  | 6.0   |                           |      |      |      | 6.0  |      | 6.0   |
| Vehicle Extension (s)             |                                                                                    | 5.0  | 5.0   | 3.0  | 5.0   |                           |      |      |      | 3.0  |      | 3.0   |
| Lane Grp Cap (vph)                |                                                                                    | 1271 | 392   | 644  | 1702  |                           |      |      |      | 747  |      | 636   |
| v/s Ratio Prot                    |                                                                                    | 0.16 |       | 0.16 | c0.42 |                           |      |      |      |      |      |       |
| v/s Ratio Perm                    |                                                                                    |      | 0.07  |      |       |                           |      |      |      | 0.08 |      | c0.39 |
| v/c Ratio                         |                                                                                    | 0.63 | 0.30  | 0.89 | 0.87  |                           |      |      |      | 0.19 |      | 0.95  |
| Uniform Delay, d1                 |                                                                                    | 40.1 | 36.5  | 47.6 | 27.6  |                           |      |      |      | 22.3 |      | 33.9  |
| Progression Factor                |                                                                                    | 0.90 | 1.57  | 0.74 | 0.44  |                           |      |      |      | 1.00 |      | 1.00  |
| Incremental Delay, d2             |                                                                                    | 2.0  | 1.6   | 9.9  | 4.6   |                           |      |      |      | 0.1  |      | 23.6  |
| Delay (s)                         |                                                                                    | 38.2 | 59.1  | 45.0 | 16.8  |                           |      |      |      | 22.4 |      | 57.6  |
| Level of Service                  |                                                                                    | D    | E     | D    | B     |                           |      |      |      | C    |      | E     |
| Approach Delay (s)                |                                                                                    | 45.9 |       |      | 24.6  |                           |      | 0.0  |      |      | 51.4 |       |
| Approach LOS                      |                                                                                    | D    |       |      | C     |                           |      | A    |      |      | D    |       |
| <b>Intersection Summary</b>       |                                                                                    |      |       |      |       |                           |      |      |      |      |      |       |
| HCM 2000 Control Delay            |                                                                                    |      | 36.3  |      |       | HCM 2000 Level of Service |      |      |      | D    |      |       |
| HCM 2000 Volume to Capacity ratio |                                                                                    |      | 0.96  |      |       |                           |      |      |      |      |      |       |
| Actuated Cycle Length (s)         |                                                                                    |      | 120.0 |      |       | Sum of lost time (s)      |      |      |      | 18.0 |      |       |
| Intersection Capacity Utilization |                                                                                    |      | 77.7% |      |       | ICU Level of Service      |      |      |      | D    |      |       |
| Analysis Period (min)             |                                                                                    |      | 15    |      |       |                           |      |      |      |      |      |       |
| c Critical Lane Group             |                                                                                    |      |       |      |       |                           |      |      |      |      |      |       |

## Queues

Future Build AM - Improved

## 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)

11/16/2016

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations     |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 142                                                                               | 599                                                                               | 113                                                                               | 607                                                                               | 607                                                                               | 78                                                                                | 95                                                                                  | 153                                                                                 | 222                                                                                 | 244                                                                                 | 333                                                                                 | 129                                                                                 |
| Future Volume (vph)     | 142                                                                               | 599                                                                               | 113                                                                               | 607                                                                               | 607                                                                               | 78                                                                                | 95                                                                                  | 153                                                                                 | 222                                                                                 | 244                                                                                 | 333                                                                                 | 129                                                                                 |
| Lane Group Flow (vph)   | 165                                                                               | 689                                                                               | 149                                                                               | 660                                                                               | 723                                                                               | 110                                                                               | 122                                                                                 | 172                                                                                 | 258                                                                                 | 252                                                                                 | 387                                                                                 | 159                                                                                 |
| Turn Type               | pm+pt                                                                             | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                | Perm                                                                              | pm+pt                                                                               | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases        | 5                                                                                 | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   | 3                                                                                   | 8                                                                                   |                                                                                     | 7                                                                                   | 4                                                                                   |                                                                                     |
| Permitted Phases        | 2                                                                                 |                                                                                   | 2                                                                                 |                                                                                   |                                                                                   | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   | 4                                                                                   |                                                                                     | 4                                                                                   |
| Detector Phase          | 5                                                                                 | 2                                                                                 | 2                                                                                 | 1                                                                                 | 6                                                                                 | 6                                                                                 | 3                                                                                   | 8                                                                                   | 8                                                                                   | 7                                                                                   | 4                                                                                   | 4                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 4.0                                                                               | 15.0                                                                              | 15.0                                                                              | 4.0                                                                               | 15.0                                                                              | 15.0                                                                              | 4.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 4.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Minimum Split (s)       | 11.0                                                                              | 37.0                                                                              | 37.0                                                                              | 11.0                                                                              | 37.0                                                                              | 37.0                                                                              | 11.0                                                                                | 42.0                                                                                | 42.0                                                                                | 11.0                                                                                | 42.0                                                                                | 42.0                                                                                |
| Total Split (s)         | 18.0                                                                              | 37.0                                                                              | 37.0                                                                              | 30.0                                                                              | 49.0                                                                              | 49.0                                                                              | 11.0                                                                                | 42.0                                                                                | 42.0                                                                                | 11.0                                                                                | 42.0                                                                                | 42.0                                                                                |
| Total Split (%)         | 15.0%                                                                             | 30.8%                                                                             | 30.8%                                                                             | 25.0%                                                                             | 40.8%                                                                             | 40.8%                                                                             | 9.2%                                                                                | 35.0%                                                                               | 35.0%                                                                               | 9.2%                                                                                | 35.0%                                                                               | 35.0%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Lost Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lead/Lag                | Lead                                                                              | Lag                                                                               | Lag                                                                               | Lead                                                                              | Lag                                                                               | Lag                                                                               | Lead                                                                                | Lag                                                                                 | Lag                                                                                 | Lead                                                                                | Lag                                                                                 | Lag                                                                                 |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | C-Min                                                                             | C-Min                                                                             | None                                                                              | C-Min                                                                             | C-Min                                                                             | None                                                                                | None                                                                                | None                                                                                | None                                                                                | None                                                                                | None                                                                                |
| v/c Ratio               | 0.44                                                                              | 0.61                                                                              | 0.24                                                                              | 1.03                                                                              | 0.47                                                                              | 0.15                                                                              | 0.73                                                                                | 0.37                                                                                | 0.46                                                                                | 0.76                                                                                | 0.85                                                                                | 0.30                                                                                |
| Control Delay           | 19.9                                                                              | 39.2                                                                              | 2.9                                                                               | 85.5                                                                              | 15.9                                                                              | 0.4                                                                               | 46.7                                                                                | 29.6                                                                                | 13.2                                                                                | 50.0                                                                                | 59.9                                                                                | 3.8                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 19.9                                                                              | 39.2                                                                              | 2.9                                                                               | 85.5                                                                              | 15.9                                                                              | 0.4                                                                               | 46.7                                                                                | 29.6                                                                                | 13.2                                                                                | 50.0                                                                                | 59.9                                                                                | 3.8                                                                                 |
| Queue Length 50th (ft)  | 60                                                                                | 241                                                                               | 0                                                                                 | ~263                                                                              | 125                                                                               | 0                                                                                 | 79                                                                                  | 123                                                                                 | 107                                                                                 | 148                                                                                 | 284                                                                                 | 0                                                                                   |
| Queue Length 95th (ft)  | 103                                                                               | 314                                                                               | 3                                                                                 | m#347                                                                             | m202                                                                              | m1                                                                                | 44                                                                                  | 184                                                                                 | 170                                                                                 | 208                                                                                 | 357                                                                                 | 17                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 1576                                                                              |                                                                                   |                                                                                   | 3513                                                                              |                                                                                   |                                                                                     | 1183                                                                                |                                                                                     |                                                                                     | 1183                                                                                |                                                                                     |
| Turn Bay Length (ft)    | 250                                                                               |                                                                                   | 370                                                                               | 300                                                                               |                                                                                   | 310                                                                               |                                                                                     |                                                                                     | 500                                                                                 | 300                                                                                 |                                                                                     | 215                                                                                 |
| Base Capacity (vph)     | 398                                                                               | 1121                                                                              | 623                                                                               | 642                                                                               | 1533                                                                              | 731                                                                               | 166                                                                                 | 558                                                                                 | 629                                                                                 | 333                                                                                 | 553                                                                                 | 608                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.41                                                                              | 0.61                                                                              | 0.24                                                                              | 1.03                                                                              | 0.47                                                                              | 0.15                                                                              | 0.73                                                                                | 0.31                                                                                | 0.41                                                                                | 0.76                                                                                | 0.70                                                                                | 0.26                                                                                |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 77 (64%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.

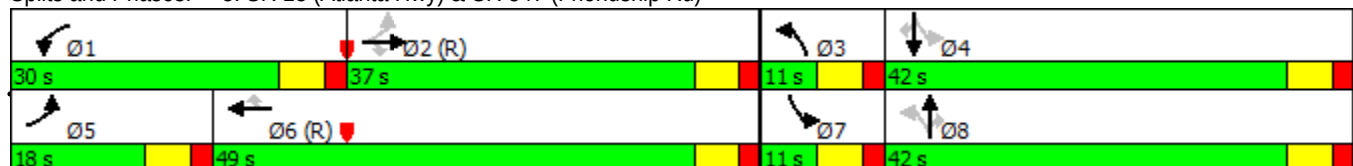
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)



# HCM Signalized Intersection Capacity Analysis

## 3: SR 13 (Atlanta Hwy) & SR 347 (Friendship Rd)

Future Build AM - Improved

11/16/2016

|                        |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement               | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations    |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)   | 142                                                                               | 599                                                                               | 113                                                                               | 607                                                                               | 607                                                                               | 78                                                                                | 95                                                                                 | 153                                                                                 | 222                                                                                 | 244                                                                                 | 333                                                                                 | 129                                                                                 |
| Future Volume (vph)    | 142                                                                               | 599                                                                               | 113                                                                               | 607                                                                               | 607                                                                               | 78                                                                                | 95                                                                                 | 153                                                                                 | 222                                                                                 | 244                                                                                 | 333                                                                                 | 129                                                                                 |
| Ideal Flow (vphpl)     | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)    | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor      | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 0.97                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Frt                    | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                               | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected          | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                               | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)      | 1787                                                                              | 3610                                                                              | 1583                                                                              | 3213                                                                              | 3610                                                                              | 1538                                                                              | 1787                                                                               | 1863                                                                                | 1495                                                                                | 1752                                                                                | 1845                                                                                | 1583                                                                                |
| Flt Permitted          | 0.38                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.20                                                                               | 1.00                                                                                | 1.00                                                                                | 0.57                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)      | 709                                                                               | 3610                                                                              | 1583                                                                              | 3213                                                                              | 3610                                                                              | 1538                                                                              | 370                                                                                | 1863                                                                                | 1495                                                                                | 1054                                                                                | 1845                                                                                | 1583                                                                                |
| Peak-hour factor, PHF  | 0.86                                                                              | 0.87                                                                              | 0.76                                                                              | 0.92                                                                              | 0.84                                                                              | 0.71                                                                              | 0.78                                                                               | 0.89                                                                                | 0.86                                                                                | 0.97                                                                                | 0.86                                                                                | 0.81                                                                                |
| Adj. Flow (vph)        | 165                                                                               | 689                                                                               | 149                                                                               | 660                                                                               | 723                                                                               | 110                                                                               | 122                                                                                | 172                                                                                 | 258                                                                                 | 252                                                                                 | 387                                                                                 | 159                                                                                 |
| RTOR Reduction (vph)   | 0                                                                                 | 0                                                                                 | 103                                                                               | 0                                                                                 | 0                                                                                 | 63                                                                                | 0                                                                                  | 0                                                                                   | 194                                                                                 | 0                                                                                   | 0                                                                                   | 120                                                                                 |
| Lane Group Flow (vph)  | 165                                                                               | 689                                                                               | 46                                                                                | 660                                                                               | 723                                                                               | 47                                                                                | 122                                                                                | 172                                                                                 | 64                                                                                  | 252                                                                                 | 387                                                                                 | 39                                                                                  |
| Heavy Vehicles (%)     | 1%                                                                                | 0%                                                                                | 2%                                                                                | 9%                                                                                | 0%                                                                                | 5%                                                                                | 1%                                                                                 | 2%                                                                                  | 8%                                                                                  | 3%                                                                                  | 3%                                                                                  | 2%                                                                                  |
| Turn Type              | pm+pt                                                                             | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                | Perm                                                                              | pm+pt                                                                              | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases       | 5                                                                                 | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   | 3                                                                                  | 8                                                                                   |                                                                                     | 7                                                                                   | 4                                                                                   |                                                                                     |
| Permitted Phases       | 2                                                                                 |                                                                                   | 2                                                                                 |                                                                                   |                                                                                   | 6                                                                                 | 8                                                                                  |                                                                                     | 8                                                                                   | 4                                                                                   |                                                                                     | 4                                                                                   |
| Actuated Green, G (s)  | 47.6                                                                              | 37.3                                                                              | 37.3                                                                              | 24.0                                                                              | 51.0                                                                              | 51.0                                                                              | 34.7                                                                               | 29.7                                                                                | 29.7                                                                                | 34.7                                                                                | 29.7                                                                                | 29.7                                                                                |
| Effective Green, g (s) | 47.6                                                                              | 37.3                                                                              | 37.3                                                                              | 24.0                                                                              | 51.0                                                                              | 51.0                                                                              | 34.7                                                                               | 29.7                                                                                | 29.7                                                                                | 34.7                                                                                | 29.7                                                                                | 29.7                                                                                |
| Actuated g/C Ratio     | 0.40                                                                              | 0.31                                                                              | 0.31                                                                              | 0.20                                                                              | 0.42                                                                              | 0.42                                                                              | 0.29                                                                               | 0.25                                                                                | 0.25                                                                                | 0.29                                                                                | 0.25                                                                                | 0.25                                                                                |
| Clearance Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)  | 3.0                                                                               | 5.0                                                                               | 5.0                                                                               | 3.0                                                                               | 5.0                                                                               | 5.0                                                                               | 3.0                                                                                | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 |
| Lane Grp Cap (vph)     | 373                                                                               | 1122                                                                              | 492                                                                               | 642                                                                               | 1534                                                                              | 653                                                                               | 166                                                                                | 461                                                                                 | 370                                                                                 | 333                                                                                 | 456                                                                                 | 391                                                                                 |
| v/s Ratio Prot         | 0.04                                                                              | c0.19                                                                             |                                                                                   | c0.21                                                                             | 0.20                                                                              |                                                                                   | 0.03                                                                               | 0.09                                                                                |                                                                                     | c0.03                                                                               | c0.21                                                                               |                                                                                     |
| v/s Ratio Perm         | 0.14                                                                              |                                                                                   | 0.03                                                                              |                                                                                   |                                                                                   | 0.03                                                                              | 0.18                                                                               |                                                                                     | 0.04                                                                                | 0.19                                                                                |                                                                                     | 0.02                                                                                |
| v/c Ratio              | 0.44                                                                              | 0.61                                                                              | 0.09                                                                              | 1.03                                                                              | 0.47                                                                              | 0.07                                                                              | 0.73                                                                               | 0.37                                                                                | 0.17                                                                                | 0.76                                                                                | 0.85                                                                                | 0.10                                                                                |
| Uniform Delay, d1      | 24.1                                                                              | 35.2                                                                              | 29.4                                                                              | 48.0                                                                              | 24.8                                                                              | 20.5                                                                              | 37.3                                                                               | 37.4                                                                                | 35.5                                                                                | 38.8                                                                                | 43.0                                                                                | 34.8                                                                                |
| Progression Factor     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.18                                                                              | 0.59                                                                              | 0.08                                                                              | 0.70                                                                               | 0.75                                                                                | 2.65                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Incremental Delay, d2  | 0.8                                                                               | 2.5                                                                               | 0.4                                                                               | 31.0                                                                              | 0.5                                                                               | 0.1                                                                               | 15.3                                                                               | 0.5                                                                                 | 0.2                                                                                 | 9.4                                                                                 | 13.7                                                                                | 0.1                                                                                 |
| Delay (s)              | 24.9                                                                              | 37.7                                                                              | 29.7                                                                              | 87.5                                                                              | 15.0                                                                              | 1.6                                                                               | 41.4                                                                               | 28.6                                                                                | 94.4                                                                                | 48.3                                                                                | 56.7                                                                                | 35.0                                                                                |
| Level of Service       | C                                                                                 | D                                                                                 | C                                                                                 | F                                                                                 | B                                                                                 | A                                                                                 | D                                                                                  | C                                                                                   | F                                                                                   | D                                                                                   | E                                                                                   | C                                                                                   |
| Approach Delay (s)     |                                                                                   | 34.4                                                                              |                                                                                   |                                                                                   | 46.0                                                                              |                                                                                   |                                                                                    | 62.2                                                                                |                                                                                     |                                                                                     | 49.7                                                                                |                                                                                     |
| Approach LOS           |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                    | E                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |

### Intersection Summary

|                                   |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 46.1  | HCM 2000 Level of Service | D    |
| HCM 2000 Volume to Capacity ratio | 0.80  |                           |      |
| Actuated Cycle Length (s)         | 120.0 | Sum of lost time (s)      | 24.0 |
| Intersection Capacity Utilization | 76.7% | ICU Level of Service      | D    |
| Analysis Period (min)             | 15    |                           |      |
| c Critical Lane Group             |       |                           |      |

## Queues

Future Build AM - Improved

## 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) &amp; Relocated Thunder Rd/Roy Carlson Blvd 11/16/2016



| Lane Group              | EBT   | WBL   | WBT   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↕     | ↶     | ↷     | ↶     | ↕     | ↷     | ↶     | ↕     | ↷     |
| Traffic Volume (vph)    | 13    | 75    | 8     | 41    | 377   | 295   | 310   | 727   | 2     |
| Future Volume (vph)     | 13    | 75    | 8     | 41    | 377   | 295   | 310   | 727   | 2     |
| Lane Group Flow (vph)   | 60    | 82    | 116   | 45    | 424   | 321   | 337   | 845   | 2     |
| Turn Type               | NA    | Perm  | NA    | Perm  | NA    | Perm  | pm+pt | NA    | Perm  |
| Protected Phases        | 4     |       | 8     |       | 2     |       | 1     | 6     |       |
| Permitted Phases        |       | 8     |       | 2     |       | 2     | 6     |       | 6     |
| Detector Phase          | 4     | 8     | 8     | 2     | 2     | 2     | 1     | 6     | 6     |
| Switch Phase            |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 6.0   | 6.0   | 6.0   | 15.0  | 15.0  | 15.0  | 5.0   | 15.0  | 15.0  |
| Minimum Split (s)       | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 11.0  | 24.0  | 24.0  |
| Total Split (s)         | 29.0  | 29.0  | 29.0  | 52.0  | 52.0  | 52.0  | 39.0  | 91.0  | 91.0  |
| Total Split (%)         | 24.2% | 24.2% | 24.2% | 43.3% | 43.3% | 43.3% | 32.5% | 75.8% | 75.8% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                |       |       |       | Lag   | Lag   | Lag   | Lead  |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |       |       |
| Recall Mode             | None  | None  | None  | C-Min | C-Min | C-Min | None  | C-Min | C-Min |
| v/c Ratio               | 0.26  | 0.59  | 0.45  | 0.13  | 0.21  | 0.34  | 0.47  | 0.30  | 0.00  |
| Control Delay           | 20.6  | 67.1  | 16.3  | 10.5  | 9.3   | 6.0   | 5.4   | 0.7   | 0.0   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 20.6  | 67.1  | 16.3  | 10.5  | 9.3   | 6.0   | 5.4   | 0.7   | 0.0   |
| Queue Length 50th (ft)  | 10    | 61    | 6     | 12    | 76    | 72    | 39    | 7     | 0     |
| Queue Length 95th (ft)  | 49    | 110   | 60    | 54    | 163   | 210   | m64   | m21   | m0    |
| Internal Link Dist (ft) | 491   |       | 1743  |       | 2367  |       |       | 498   |       |
| Turn Bay Length (ft)    |       | 150   |       | 375   |       | 375   | 200   |       | 200   |
| Base Capacity (vph)     | 363   | 242   | 366   | 353   | 1988  | 951   | 782   | 2823  | 1281  |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.17  | 0.34  | 0.32  | 0.13  | 0.21  | 0.34  | 0.43  | 0.30  | 0.00  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

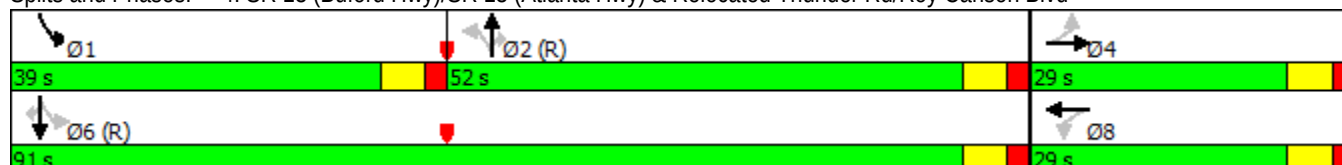
Offset: 27 (23%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) &amp; Relocated Thunder Rd/Roy Carlson Blvd



# HCM Signalized Intersection Capacity Analysis

Future Build AM - Improved

4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) & Relocated Thunder Rd/Roy Carlson Blvd 11/16/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (vph)              | 0                                                                                 | 13                                                                                | 42                                                                                | 75                                                                                | 8                                                                                 | 98                                                                                | 41                                                                                  | 377                                                                                 | 295                                                                                 | 310                                                                                 | 727                                                                                 | 2                                                                                   |
| Future Volume (vph)               | 0                                                                                 | 13                                                                                | 42                                                                                | 75                                                                                | 8                                                                                 | 98                                                                                | 41                                                                                  | 377                                                                                 | 295                                                                                 | 310                                                                                 | 727                                                                                 | 2                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor                 |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |
| Frt                               |                                                                                   | 0.90                                                                              |                                                                                   | 1.00                                                                              | 0.86                                                                              |                                                                                   | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected                     |                                                                                   | 1.00                                                                              |                                                                                   | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)                 |                                                                                   | 1703                                                                              |                                                                                   | 1671                                                                              | 1462                                                                              |                                                                                   | 1805                                                                                | 3574                                                                                | 1455                                                                                | 1504                                                                                | 3574                                                                                | 1615                                                                                |
| Flt Permitted                     |                                                                                   | 1.00                                                                              |                                                                                   | 0.72                                                                              | 1.00                                                                              |                                                                                   | 0.33                                                                                | 1.00                                                                                | 1.00                                                                                | 0.45                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)                 |                                                                                   | 1703                                                                              |                                                                                   | 1263                                                                              | 1462                                                                              |                                                                                   | 635                                                                                 | 3574                                                                                | 1455                                                                                | 716                                                                                 | 3574                                                                                | 1615                                                                                |
| Peak-hour factor, PHF             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.89                                                                                | 0.92                                                                                | 0.92                                                                                | 0.86                                                                                | 0.92                                                                                |
| Adj. Flow (vph)                   | 0                                                                                 | 14                                                                                | 46                                                                                | 82                                                                                | 9                                                                                 | 107                                                                               | 45                                                                                  | 424                                                                                 | 321                                                                                 | 337                                                                                 | 845                                                                                 | 2                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 41                                                                                | 0                                                                                 | 0                                                                                 | 95                                                                                | 0                                                                                 | 0                                                                                   | 0                                                                                   | 143                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 0                                                                                 | 19                                                                                | 0                                                                                 | 82                                                                                | 21                                                                                | 0                                                                                 | 45                                                                                  | 424                                                                                 | 178                                                                                 | 337                                                                                 | 845                                                                                 | 2                                                                                   |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 8%                                                                                | 0%                                                                                | 13%                                                                               | 0%                                                                                  | 1%                                                                                  | 11%                                                                                 | 20%                                                                                 | 1%                                                                                  | 0%                                                                                  |
| Turn Type                         |                                                                                   | NA                                                                                |                                                                                   | Perm                                                                              | NA                                                                                |                                                                                   | Perm                                                                                | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                   | 2                                                                                   |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 13.2                                                                              |                                                                                   | 13.2                                                                              | 13.2                                                                              |                                                                                   | 66.7                                                                                | 66.7                                                                                | 66.7                                                                                | 94.8                                                                                | 94.8                                                                                | 94.8                                                                                |
| Effective Green, g (s)            |                                                                                   | 13.2                                                                              |                                                                                   | 13.2                                                                              | 13.2                                                                              |                                                                                   | 66.7                                                                                | 66.7                                                                                | 66.7                                                                                | 94.8                                                                                | 94.8                                                                                | 94.8                                                                                |
| Actuated g/C Ratio                |                                                                                   | 0.11                                                                              |                                                                                   | 0.11                                                                              | 0.11                                                                              |                                                                                   | 0.56                                                                                | 0.56                                                                                | 0.56                                                                                | 0.79                                                                                | 0.79                                                                                | 0.79                                                                                |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)             |                                                                                   | 3.0                                                                               |                                                                                   | 3.0                                                                               | 3.0                                                                               |                                                                                   | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 3.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |
| Lane Grp Cap (vph)                |                                                                                   | 187                                                                               |                                                                                   | 138                                                                               | 160                                                                               |                                                                                   | 352                                                                                 | 1986                                                                                | 808                                                                                 | 710                                                                                 | 2823                                                                                | 1275                                                                                |
| v/s Ratio Prot                    |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                     | 0.12                                                                                |                                                                                     | c0.09                                                                               | 0.24                                                                                |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                   |                                                                                   | c0.06                                                                             |                                                                                   |                                                                                   | 0.07                                                                                |                                                                                     | 0.12                                                                                | c0.29                                                                               |                                                                                     | 0.00                                                                                |
| v/c Ratio                         |                                                                                   | 0.10                                                                              |                                                                                   | 0.59                                                                              | 0.13                                                                              |                                                                                   | 0.13                                                                                | 0.21                                                                                | 0.22                                                                                | 0.47                                                                                | 0.30                                                                                | 0.00                                                                                |
| Uniform Delay, d1                 |                                                                                   | 48.1                                                                              |                                                                                   | 50.8                                                                              | 48.2                                                                              |                                                                                   | 12.7                                                                                | 13.4                                                                                | 13.5                                                                                | 3.8                                                                                 | 3.5                                                                                 | 2.6                                                                                 |
| Progression Factor                |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.56                                                                                | 0.59                                                                                | 2.31                                                                                | 1.04                                                                                | 0.14                                                                                | 1.00                                                                                |
| Incremental Delay, d2             |                                                                                   | 0.2                                                                               |                                                                                   | 6.7                                                                               | 0.4                                                                               |                                                                                   | 0.7                                                                                 | 0.2                                                                                 | 0.6                                                                                 | 0.3                                                                                 | 0.1                                                                                 | 0.0                                                                                 |
| Delay (s)                         |                                                                                   | 48.3                                                                              |                                                                                   | 57.6                                                                              | 48.6                                                                              |                                                                                   | 7.9                                                                                 | 8.2                                                                                 | 31.8                                                                                | 4.3                                                                                 | 0.6                                                                                 | 2.6                                                                                 |
| Level of Service                  |                                                                                   | D                                                                                 |                                                                                   | E                                                                                 | D                                                                                 |                                                                                   | A                                                                                   | A                                                                                   | C                                                                                   | A                                                                                   | A                                                                                   | A                                                                                   |
| Approach Delay (s)                |                                                                                   | 48.3                                                                              |                                                                                   |                                                                                   | 52.3                                                                              |                                                                                   |                                                                                     | 17.7                                                                                |                                                                                     |                                                                                     | 1.7                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                     | B                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 13.1                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                     |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.51                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                     |                                                                                     | 18.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 58.4%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

## Future Build AM - Improved

## 5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd

11/16/2016

|                         | →     | ↘     | ↙     | ←     | ↖     | ↗     | ↑     | ↘     | ↙     | ↓     | ↖     |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Group              | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations     | ↖     | ↗     |       | ↖     | ↗     | ↗     | ↑↑    | ↗     | ↗     | ↑↑    | ↗     |
| Traffic Volume (vph)    | 1     | 6     | 416   | 26    | 236   | 22    | 691   | 185   | 120   | 687   | 40    |
| Future Volume (vph)     | 1     | 6     | 416   | 26    | 236   | 22    | 691   | 185   | 120   | 687   | 40    |
| Lane Group Flow (vph)   | 4     | 12    | 0     | 485   | 265   | 38    | 735   | 201   | 162   | 763   | 55    |
| Turn Type               | NA    | Perm  | Perm  | NA    | Perm  | Perm  | NA    | Perm  | Perm  | NA    | Perm  |
| Protected Phases        | 4     |       |       | 8     |       |       | 2     |       |       | 6     |       |
| Permitted Phases        |       | 4     | 8     |       | 8     | 2     |       | 2     | 6     |       | 6     |
| Detector Phase          | 4     | 4     | 8     | 8     | 8     | 2     | 2     | 2     | 6     | 6     | 6     |
| Switch Phase            |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 15.0  | 15.0  | 15.0  | 15.0  | 15.0  | 15.0  |
| Minimum Split (s)       | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 59.0  | 59.0  | 59.0  | 59.0  | 59.0  | 61.0  | 61.0  | 61.0  | 61.0  | 61.0  | 61.0  |
| Total Split (%)         | 49.2% | 49.2% | 49.2% | 49.2% | 49.2% | 50.8% | 50.8% | 50.8% | 50.8% | 50.8% | 50.8% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   |       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   |       | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                |       |       |       |       |       |       |       |       |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |       |       |       |       |
| Recall Mode             | None  | None  | None  | None  | None  | C-Min | C-Min | C-Min | C-Min | C-Min | C-Min |
| v/c Ratio               | 0.01  | 0.02  |       | 0.89  | 0.38  | 0.13  | 0.42  | 0.22  | 0.54  | 0.42  | 0.06  |
| Control Delay           | 19.0  | 2.5   |       | 53.4  | 13.2  | 13.1  | 14.1  | 1.0   | 15.2  | 7.5   | 1.4   |
| Queue Delay             | 0.0   | 0.0   |       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 19.0  | 2.5   |       | 53.4  | 13.2  | 13.1  | 14.1  | 1.0   | 15.2  | 7.5   | 1.4   |
| Queue Length 50th (ft)  | 2     | 0     |       | 336   | 66    | 8     | 161   | 3     | 52    | 112   | 3     |
| Queue Length 95th (ft)  | 3     | 0     |       | 300   | 122   | m13   | 110   | m8    | 75    | 151   | 5     |
| Internal Link Dist (ft) | 275   |       |       | 4179  |       |       | 3868  |       |       | 2104  |       |
| Turn Bay Length (ft)    |       | 105   |       |       | 250   | 230   |       | 230   | 200   |       | 185   |
| Base Capacity (vph)     | 839   | 624   |       | 620   | 786   | 291   | 1745  | 917   | 300   | 1796  | 854   |
| Starvation Cap Reductn  | 0     | 0     |       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     |       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     |       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.00  | 0.02  |       | 0.78  | 0.34  | 0.13  | 0.42  | 0.22  | 0.54  | 0.42  | 0.06  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

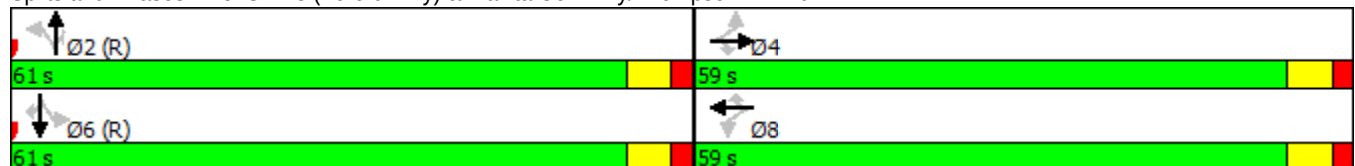
Offset: 56 (47%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd





# HCM Signalized Intersection Capacity Analysis

## 5: SR 13 (Buford Hwy) & Makita Co. Drwy/Thompson Mill Rd

Future Build AM - Improved

11/16/2016

|                                   |  |  |  |  |  |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)              | 0                                                                                 | 1                                                                                 | 6                                                                                 | 416                                                                               | 26                                                                                | 236                                                                               | 22                                                                                  | 691                                                                                 | 185                                                                                 | 120                                                                                 | 687                                                                                 | 40                                                                                  |
| Future Volume (vph)               | 0                                                                                 | 1                                                                                 | 6                                                                                 | 416                                                                               | 26                                                                                | 236                                                                               | 22                                                                                  | 691                                                                                 | 185                                                                                 | 120                                                                                 | 687                                                                                 | 40                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor                 |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |
| Frt                               |                                                                                   | 1.00                                                                              | 0.85                                                                              |                                                                                   | 1.00                                                                              | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected                     |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.96                                                                              | 1.00                                                                              | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)                 |                                                                                   | 1900                                                                              | 1380                                                                              |                                                                                   | 1816                                                                              | 1615                                                                              | 1805                                                                                | 3406                                                                                | 1599                                                                                | 1787                                                                                | 3505                                                                                | 1615                                                                                |
| Flt Permitted                     |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.74                                                                              | 1.00                                                                              | 0.30                                                                                | 1.00                                                                                | 1.00                                                                                | 0.31                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)                 |                                                                                   | 1900                                                                              | 1380                                                                              |                                                                                   | 1406                                                                              | 1615                                                                              | 568                                                                                 | 3406                                                                                | 1599                                                                                | 587                                                                                 | 3505                                                                                | 1615                                                                                |
| Peak-hour factor, PHF             | 0.54                                                                              | 0.25                                                                              | 0.50                                                                              | 0.93                                                                              | 0.69                                                                              | 0.89                                                                              | 0.58                                                                                | 0.94                                                                                | 0.92                                                                                | 0.74                                                                                | 0.90                                                                                | 0.73                                                                                |
| Adj. Flow (vph)                   | 0                                                                                 | 4                                                                                 | 12                                                                                | 447                                                                               | 38                                                                                | 265                                                                               | 38                                                                                  | 735                                                                                 | 201                                                                                 | 162                                                                                 | 763                                                                                 | 55                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 7                                                                                 | 0                                                                                 | 0                                                                                 | 80                                                                                | 0                                                                                   | 0                                                                                   | 98                                                                                  | 0                                                                                   | 0                                                                                   | 27                                                                                  |
| Lane Group Flow (vph)             | 0                                                                                 | 4                                                                                 | 5                                                                                 | 0                                                                                 | 485                                                                               | 185                                                                               | 38                                                                                  | 735                                                                                 | 103                                                                                 | 162                                                                                 | 763                                                                                 | 28                                                                                  |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 17%                                                                               | 0%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                  | 6%                                                                                  | 1%                                                                                  | 1%                                                                                  | 3%                                                                                  | 0%                                                                                  |
| Turn Type                         |                                                                                   | NA                                                                                | Perm                                                                              | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                | Perm                                                                                | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   | 4                                                                                 | 8                                                                                 |                                                                                   | 8                                                                                 | 2                                                                                   |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 46.5                                                                              | 46.5                                                                              |                                                                                   | 46.5                                                                              | 46.5                                                                              | 61.5                                                                                | 61.5                                                                                | 61.5                                                                                | 61.5                                                                                | 61.5                                                                                | 61.5                                                                                |
| Effective Green, g (s)            |                                                                                   | 46.5                                                                              | 46.5                                                                              |                                                                                   | 46.5                                                                              | 46.5                                                                              | 61.5                                                                                | 61.5                                                                                | 61.5                                                                                | 61.5                                                                                | 61.5                                                                                | 61.5                                                                                |
| Actuated g/C Ratio                |                                                                                   | 0.39                                                                              | 0.39                                                                              |                                                                                   | 0.39                                                                              | 0.39                                                                              | 0.51                                                                                | 0.51                                                                                | 0.51                                                                                | 0.51                                                                                | 0.51                                                                                | 0.51                                                                                |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)             |                                                                                   | 3.0                                                                               | 3.0                                                                               |                                                                                   | 3.0                                                                               | 3.0                                                                               | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |
| Lane Grp Cap (vph)                |                                                                                   | 736                                                                               | 534                                                                               |                                                                                   | 544                                                                               | 625                                                                               | 291                                                                                 | 1745                                                                                | 819                                                                                 | 300                                                                                 | 1796                                                                                | 827                                                                                 |
| v/s Ratio Prot                    |                                                                                   | 0.00                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     | 0.22                                                                                |                                                                                     |                                                                                     | 0.22                                                                                |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                   | 0.00                                                                              |                                                                                   | c0.34                                                                             | 0.11                                                                              | 0.07                                                                                |                                                                                     | 0.06                                                                                | c0.28                                                                               |                                                                                     | 0.02                                                                                |
| v/c Ratio                         |                                                                                   | 0.01                                                                              | 0.01                                                                              |                                                                                   | 0.89                                                                              | 0.30                                                                              | 0.13                                                                                | 0.42                                                                                | 0.13                                                                                | 0.54                                                                                | 0.42                                                                                | 0.03                                                                                |
| Uniform Delay, d1                 |                                                                                   | 22.6                                                                              | 22.6                                                                              |                                                                                   | 34.4                                                                              | 25.4                                                                              | 15.3                                                                                | 18.2                                                                                | 15.2                                                                                | 19.7                                                                                | 18.2                                                                                | 14.5                                                                                |
| Progression Factor                |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.67                                                                                | 0.70                                                                                | 0.21                                                                                | 0.36                                                                                | 0.35                                                                                | 0.27                                                                                |
| Incremental Delay, d2             |                                                                                   | 0.0                                                                               | 0.0                                                                               |                                                                                   | 16.7                                                                              | 0.3                                                                               | 0.7                                                                                 | 0.6                                                                                 | 0.3                                                                                 | 6.6                                                                                 | 0.7                                                                                 | 0.1                                                                                 |
| Delay (s)                         |                                                                                   | 22.6                                                                              | 22.6                                                                              |                                                                                   | 51.1                                                                              | 25.7                                                                              | 10.9                                                                                | 13.2                                                                                | 3.5                                                                                 | 13.8                                                                                | 7.1                                                                                 | 3.9                                                                                 |
| Level of Service                  |                                                                                   | C                                                                                 | C                                                                                 |                                                                                   | D                                                                                 | C                                                                                 | B                                                                                   | B                                                                                   | A                                                                                   | B                                                                                   | A                                                                                   | A                                                                                   |
| Approach Delay (s)                |                                                                                   | 22.6                                                                              |                                                                                   |                                                                                   | 42.1                                                                              |                                                                                   |                                                                                     | 11.1                                                                                |                                                                                     |                                                                                     | 8.0                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                     | B                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 18.6                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.69                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 77.7%                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

Future Build AM - Improved

6: SR 13 (Buford Hwy) &amp; S. Hill St/Hamilton Mill Rd

11/16/2016

|                         |  |  |  |                                                                                    |                                                                                    |  |                                                                                       |  |  |                                                                                      |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                                                                                                                 | WBT                                                                                                                                                                 | NBL                                                                               | NBT                                                                                                                                                                     | NBR                                                                                 | SBL                                                                                 | SBT                                                                                                                                                                     | SBR                                                                                 |                                                                                     |
| Lane Configurations     |  |  |  |   |   |  |   |  |  |   |  |                                                                                     |
| Traffic Volume (vph)    | 38                                                                                | 166                                                                               | 68                                                                                | 509                                                                                                                                                                 | 250                                                                                                                                                                 | 44                                                                                | 645                                                                                                                                                                     | 320                                                                                 | 241                                                                                 | 831                                                                                                                                                                     | 57                                                                                  |                                                                                     |
| Future Volume (vph)     | 38                                                                                | 166                                                                               | 68                                                                                | 509                                                                                                                                                                 | 250                                                                                                                                                                 | 44                                                                                | 645                                                                                                                                                                     | 320                                                                                 | 241                                                                                 | 831                                                                                                                                                                     | 57                                                                                  |                                                                                     |
| Lane Group Flow (vph)   | 70                                                                                | 263                                                                               | 96                                                                                | 553                                                                                                                                                                 | 613                                                                                                                                                                 | 59                                                                                | 701                                                                                                                                                                     | 432                                                                                 | 339                                                                                 | 894                                                                                                                                                                     | 63                                                                                  |                                                                                     |
| Turn Type               | Perm                                                                              | NA                                                                                | Perm                                                                              | Prot                                                                                                                                                                | NA                                                                                                                                                                  | pm+pt                                                                             | NA                                                                                                                                                                      | Free                                                                                | pm+pt                                                                               | NA                                                                                                                                                                      | Perm                                                                                |                                                                                     |
| Protected Phases        |                                                                                   | 4                                                                                 |                                                                                   | 3                                                                                                                                                                   | 8                                                                                                                                                                   | 5                                                                                 | 2                                                                                                                                                                       |                                                                                     | 1                                                                                   | 6                                                                                                                                                                       |                                                                                     |                                                                                     |
| Permitted Phases        | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                                                                                                     |                                                                                                                                                                     | 2                                                                                 |                                                                                                                                                                         | Free                                                                                | 6                                                                                   |                                                                                                                                                                         | 6                                                                                   |                                                                                     |
| Detector Phase          | 4                                                                                 | 4                                                                                 | 4                                                                                 | 3                                                                                                                                                                   | 8                                                                                                                                                                   | 5                                                                                 | 2                                                                                                                                                                       |                                                                                     | 1                                                                                   | 6                                                                                                                                                                       | 6                                                                                   |                                                                                     |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                                                                                                     |                                                                                                                                                                     |                                                                                   |                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 4.0                                                                                                                                                                 | 6.0                                                                                                                                                                 | 4.0                                                                               | 15.0                                                                                                                                                                    |                                                                                     | 4.0                                                                                 | 15.0                                                                                                                                                                    | 15.0                                                                                |                                                                                     |
| Minimum Split (s)       | 41.0                                                                              | 41.0                                                                              | 41.0                                                                              | 11.0                                                                                                                                                                | 46.0                                                                                                                                                                | 11.0                                                                              | 37.0                                                                                                                                                                    |                                                                                     | 11.0                                                                                | 40.0                                                                                                                                                                    | 40.0                                                                                |                                                                                     |
| Total Split (s)         | 41.0                                                                              | 41.0                                                                              | 41.0                                                                              | 23.0                                                                                                                                                                | 64.0                                                                                                                                                                | 11.0                                                                              | 38.0                                                                                                                                                                    |                                                                                     | 18.0                                                                                | 45.0                                                                                                                                                                    | 45.0                                                                                |                                                                                     |
| Total Split (%)         | 34.2%                                                                             | 34.2%                                                                             | 34.2%                                                                             | 19.2%                                                                                                                                                               | 53.3%                                                                                                                                                               | 9.2%                                                                              | 31.7%                                                                                                                                                                   |                                                                                     | 15.0%                                                                               | 37.5%                                                                                                                                                                   | 37.5%                                                                               |                                                                                     |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                                                                                                 | 4.0                                                                                                                                                                 | 4.0                                                                               | 4.0                                                                                                                                                                     |                                                                                     | 4.0                                                                                 | 4.0                                                                                                                                                                     | 4.0                                                                                 |                                                                                     |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                                                                                                 | 2.0                                                                                                                                                                 | 2.0                                                                               | 2.0                                                                                                                                                                     |                                                                                     | 2.0                                                                                 | 2.0                                                                                                                                                                     | 2.0                                                                                 |                                                                                     |
| Lost Time Adjust (s)    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                                                                                                 | 0.0                                                                                                                                                                 | 0.0                                                                               | 0.0                                                                                                                                                                     |                                                                                     | 0.0                                                                                 | 0.0                                                                                                                                                                     | 0.0                                                                                 |                                                                                     |
| Total Lost Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                                                                                                 | 6.0                                                                                                                                                                 | 6.0                                                                               | 6.0                                                                                                                                                                     |                                                                                     | 6.0                                                                                 | 6.0                                                                                                                                                                     | 6.0                                                                                 |                                                                                     |
| Lead/Lag                | Lag                                                                               | Lag                                                                               | Lag                                                                               | Lead                                                                                                                                                                |                                                                                                                                                                     | Lead                                                                              | Lag                                                                                                                                                                     |                                                                                     | Lead                                                                                | Lag                                                                                                                                                                     | Lag                                                                                 |                                                                                     |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                                                                                                     |                                                                                                                                                                     |                                                                                   |                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | None                                                                              | None                                                                              | None                                                                                                                                                                | None                                                                                                                                                                | None                                                                              | C-Min                                                                                                                                                                   |                                                                                     | None                                                                                | C-Min                                                                                                                                                                   | C-Min                                                                               |                                                                                     |
| v/c Ratio               | 0.67                                                                              | 0.68                                                                              | 0.20                                                                              | 1.17                                                                                                                                                                | 0.87                                                                                                                                                                | 0.25                                                                              | 0.57                                                                                                                                                                    | 0.28                                                                                | 0.98                                                                                | 0.59                                                                                                                                                                    | 0.08                                                                                |                                                                                     |
| Control Delay           | 71.9                                                                              | 52.5                                                                              | 0.9                                                                               | 142.8                                                                                                                                                               | 43.1                                                                                                                                                                | 21.4                                                                              | 35.1                                                                                                                                                                    | 0.5                                                                                 | 61.6                                                                                | 23.2                                                                                                                                                                    | 0.5                                                                                 |                                                                                     |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                                                                                                 | 0.0                                                                                                                                                                 | 0.0                                                                               | 0.0                                                                                                                                                                     | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                                                                                                     | 0.0                                                                                 |                                                                                     |
| Total Delay             | 71.9                                                                              | 52.5                                                                              | 0.9                                                                               | 142.8                                                                                                                                                               | 43.1                                                                                                                                                                | 21.4                                                                              | 35.1                                                                                                                                                                    | 0.5                                                                                 | 61.6                                                                                | 23.2                                                                                                                                                                    | 0.5                                                                                 |                                                                                     |
| Queue Length 50th (ft)  | 51                                                                                | 193                                                                               | 0                                                                                 | ~263                                                                                                                                                                | 406                                                                                                                                                                 | 22                                                                                | 225                                                                                                                                                                     | 0                                                                                   | 111                                                                                 | 263                                                                                                                                                                     | 1                                                                                   |                                                                                     |
| Queue Length 95th (ft)  | 51                                                                                | 164                                                                               | 0                                                                                 | #376                                                                                                                                                                | 396                                                                                                                                                                 | 45                                                                                | 335                                                                                                                                                                     | 0                                                                                   | #230                                                                                | 364                                                                                                                                                                     | m4                                                                                  |                                                                                     |
| Internal Link Dist (ft) |                                                                                   | 657                                                                               |                                                                                   |                                                                                                                                                                     | 1618                                                                                                                                                                |                                                                                   | 1320                                                                                                                                                                    |                                                                                     |                                                                                     | 3868                                                                                                                                                                    |                                                                                     |                                                                                     |
| Turn Bay Length (ft)    | 180                                                                               |                                                                                   | 300                                                                               | 250                                                                                                                                                                 |                                                                                                                                                                     | 240                                                                               |                                                                                                                                                                         | 1000                                                                                | 400                                                                                 |                                                                                                                                                                         | 280                                                                                 |                                                                                     |
| Base Capacity (vph)     | 150                                                                               | 554                                                                               | 606                                                                               | 472                                                                                                                                                                 | 854                                                                                                                                                                 | 232                                                                               | 1223                                                                                                                                                                    | 1538                                                                                | 346                                                                                 | 1516                                                                                                                                                                    | 749                                                                                 |                                                                                     |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                                                                                                   | 0                                                                                                                                                                   | 0                                                                                 | 0                                                                                                                                                                       | 0                                                                                   | 0                                                                                   | 0                                                                                                                                                                       | 0                                                                                   |                                                                                     |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                                                                                                   | 0                                                                                                                                                                   | 0                                                                                 | 0                                                                                                                                                                       | 0                                                                                   | 0                                                                                   | 0                                                                                                                                                                       | 0                                                                                   |                                                                                     |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                                                                                                   | 0                                                                                                                                                                   | 0                                                                                 | 0                                                                                                                                                                       | 0                                                                                   | 0                                                                                   | 0                                                                                                                                                                       | 0                                                                                   |                                                                                     |
| Reduced v/c Ratio       | 0.47                                                                              | 0.47                                                                              | 0.16                                                                              | 1.17                                                                                                                                                                | 0.72                                                                                                                                                                | 0.25                                                                              | 0.57                                                                                                                                                                    | 0.28                                                                                | 0.98                                                                                | 0.59                                                                                                                                                                    | 0.08                                                                                |                                                                                     |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 8 (7%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 125

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.

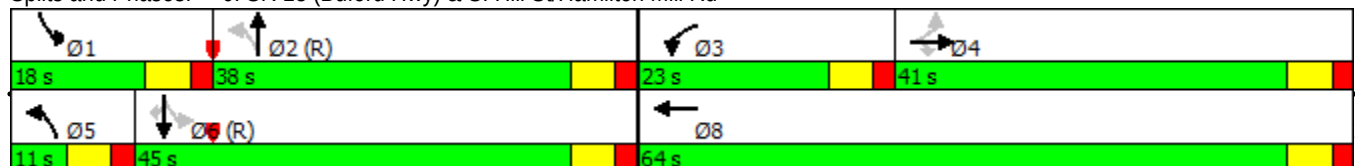
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: SR 13 (Buford Hwy) &amp; S. Hill St/Hamilton Mill Rd



# HCM Signalized Intersection Capacity Analysis

## 6: SR 13 (Buford Hwy) & S. Hill St/Hamilton Mill Rd

Future Build AM - Improved

11/16/2016

|                        |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement               | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations    |  |  |  |  |  |                                                                                   |   |  |  |  |  |  |
| Traffic Volume (vph)   | 38                                                                                | 166                                                                               | 68                                                                                | 509                                                                               | 250                                                                               | 231                                                                               | 44                                                                                  | 645                                                                                 | 320                                                                                 | 241                                                                                 | 831                                                                                 | 57                                                                                  |
| Future Volume (vph)    | 38                                                                                | 166                                                                               | 68                                                                                | 509                                                                               | 250                                                                               | 231                                                                               | 44                                                                                  | 645                                                                                 | 320                                                                                 | 241                                                                                 | 831                                                                                 | 57                                                                                  |
| Ideal Flow (vphpl)     | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)    | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 | 4.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor      | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.97                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |
| Frt                    | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 0.93                                                                              |                                                                                   | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected          | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)      | 1752                                                                              | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1708                                                                              |                                                                                   | 1770                                                                                | 3438                                                                                | 1538                                                                                | 1752                                                                                | 3505                                                                                | 1553                                                                                |
| Flt Permitted          | 0.28                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.24                                                                                | 1.00                                                                                | 1.00                                                                                | 0.23                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)      | 517                                                                               | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1708                                                                              |                                                                                   | 447                                                                                 | 3438                                                                                | 1538                                                                                | 420                                                                                 | 3505                                                                                | 1553                                                                                |
| Peak-hour factor, PHF  | 0.54                                                                              | 0.63                                                                              | 0.71                                                                              | 0.92                                                                              | 0.81                                                                              | 0.76                                                                              | 0.75                                                                                | 0.92                                                                                | 0.74                                                                                | 0.71                                                                                | 0.93                                                                                | 0.91                                                                                |
| Adj. Flow (vph)        | 70                                                                                | 263                                                                               | 96                                                                                | 553                                                                               | 309                                                                               | 304                                                                               | 59                                                                                  | 701                                                                                 | 432                                                                                 | 339                                                                                 | 894                                                                                 | 63                                                                                  |
| RTOR Reduction (vph)   | 0                                                                                 | 0                                                                                 | 77                                                                                | 0                                                                                 | 35                                                                                | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 36                                                                                  |
| Lane Group Flow (vph)  | 70                                                                                | 263                                                                               | 19                                                                                | 553                                                                               | 578                                                                               | 0                                                                                 | 59                                                                                  | 701                                                                                 | 432                                                                                 | 339                                                                                 | 894                                                                                 | 27                                                                                  |
| Heavy Vehicles (%)     | 3%                                                                                | 0%                                                                                | 0%                                                                                | 5%                                                                                | 1%                                                                                | 5%                                                                                | 2%                                                                                  | 5%                                                                                  | 5%                                                                                  | 3%                                                                                  | 3%                                                                                  | 4%                                                                                  |
| Turn Type              | Perm                                                                              | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                |                                                                                   | pm+pt                                                                               | NA                                                                                  | Free                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases       |                                                                                   | 4                                                                                 |                                                                                   | 3                                                                                 | 8                                                                                 |                                                                                   | 5                                                                                   | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases       | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   |                                                                                   | 2                                                                                   |                                                                                     | Free                                                                                | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)  | 24.3                                                                              | 24.3                                                                              | 24.3                                                                              | 17.0                                                                              | 47.3                                                                              |                                                                                   | 46.7                                                                                | 42.7                                                                                | 120.0                                                                               | 60.7                                                                                | 50.7                                                                                | 50.7                                                                                |
| Effective Green, g (s) | 24.3                                                                              | 24.3                                                                              | 24.3                                                                              | 17.0                                                                              | 47.3                                                                              |                                                                                   | 46.7                                                                                | 42.7                                                                                | 120.0                                                                               | 60.7                                                                                | 50.7                                                                                | 50.7                                                                                |
| Actuated g/C Ratio     | 0.20                                                                              | 0.20                                                                              | 0.20                                                                              | 0.14                                                                              | 0.39                                                                              |                                                                                   | 0.39                                                                                | 0.36                                                                                | 1.00                                                                                | 0.51                                                                                | 0.42                                                                                | 0.42                                                                                |
| Clearance Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)  | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               |                                                                                   | 3.0                                                                                 | 5.0                                                                                 |                                                                                     | 3.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |
| Lane Grp Cap (vph)     | 104                                                                               | 384                                                                               | 327                                                                               | 472                                                                               | 673                                                                               |                                                                                   | 218                                                                                 | 1223                                                                                | 1538                                                                                | 345                                                                                 | 1480                                                                                | 656                                                                                 |
| v/s Ratio Prot         |                                                                                   | 0.14                                                                              |                                                                                   | c0.17                                                                             | c0.34                                                                             |                                                                                   | 0.01                                                                                | 0.20                                                                                |                                                                                     | c0.10                                                                               | 0.26                                                                                |                                                                                     |
| v/s Ratio Perm         | 0.14                                                                              |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.10                                                                                |                                                                                     | 0.28                                                                                | c0.40                                                                               |                                                                                     | 0.02                                                                                |
| v/c Ratio              | 0.67                                                                              | 0.68                                                                              | 0.06                                                                              | 1.17                                                                              | 0.86                                                                              |                                                                                   | 0.27                                                                                | 0.57                                                                                | 0.28                                                                                | 0.98                                                                                | 0.60                                                                                | 0.04                                                                                |
| Uniform Delay, d1      | 44.2                                                                              | 44.3                                                                              | 38.6                                                                              | 51.5                                                                              | 33.3                                                                              |                                                                                   | 23.7                                                                                | 31.3                                                                                | 0.0                                                                                 | 24.5                                                                                | 26.9                                                                                | 20.4                                                                                |
| Progression Factor     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 0.77                                                                                | 0.76                                                                                | 1.00                                                                                |
| Incremental Delay, d2  | 15.8                                                                              | 5.0                                                                               | 0.1                                                                               | 97.8                                                                              | 10.6                                                                              |                                                                                   | 0.7                                                                                 | 2.0                                                                                 | 0.5                                                                                 | 40.2                                                                                | 1.6                                                                                 | 0.1                                                                                 |
| Delay (s)              | 60.0                                                                              | 49.3                                                                              | 38.7                                                                              | 149.3                                                                             | 44.0                                                                              |                                                                                   | 24.3                                                                                | 33.2                                                                                | 0.5                                                                                 | 59.1                                                                                | 22.1                                                                                | 20.5                                                                                |
| Level of Service       | E                                                                                 | D                                                                                 | D                                                                                 | F                                                                                 | D                                                                                 |                                                                                   | C                                                                                   | C                                                                                   | A                                                                                   | E                                                                                   | C                                                                                   | C                                                                                   |
| Approach Delay (s)     |                                                                                   | 48.7                                                                              |                                                                                   |                                                                                   | 93.9                                                                              |                                                                                   |                                                                                     | 20.9                                                                                |                                                                                     |                                                                                     | 31.7                                                                                |                                                                                     |
| Approach LOS           |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | F                                                                                 |                                                                                   |                                                                                     | C                                                                                   |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |

### Intersection Summary

|                                   |       |                           |      |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay            | 48.1  | HCM 2000 Level of Service | D    |
| HCM 2000 Volume to Capacity ratio | 1.04  |                           |      |
| Actuated Cycle Length (s)         | 120.0 | Sum of lost time (s)      | 24.0 |
| Intersection Capacity Utilization | 83.5% | ICU Level of Service      | E    |
| Analysis Period (min)             | 15    |                           |      |
| c Critical Lane Group             |       |                           |      |

# HCM Unsignalized Intersection Capacity Analysis

## 7: Pvt. Drwy/Bryant Rd & Thompson Mill Rd

Future Build AM - Improved

11/16/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                    |  |                                                                                     |                                                                                     |  |                                                                                     |
| Traffic Volume (veh/h)            | 5                                                                                 | 213                                                                               | 1                                                                                 | 0                                                                                 | 621                                                                               | 30                                                                                | 0                                                                                  | 0                                                                                   | 0                                                                                   | 14                                                                                  | 0                                                                                   | 6                                                                                   |
| Future Volume (Veh/h)             | 5                                                                                 | 213                                                                               | 1                                                                                 | 0                                                                                 | 621                                                                               | 30                                                                                | 0                                                                                  | 0                                                                                   | 0                                                                                   | 14                                                                                  | 0                                                                                   | 6                                                                                   |
| Sign Control                      |                                                                                   | Free                                                                              |                                                                                   |                                                                                   | Free                                                                              |                                                                                   |                                                                                    | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Grade                             |                                                                                   | 0%                                                                                |                                                                                   |                                                                                   | 0%                                                                                |                                                                                   |                                                                                    | 0%                                                                                  |                                                                                     |                                                                                     | 0%                                                                                  |                                                                                     |
| Peak Hour Factor                  | 0.42                                                                              | 0.83                                                                              | 0.25                                                                              | 0.92                                                                              | 0.94                                                                              | 0.68                                                                              | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.60                                                                                | 0.92                                                                                | 0.75                                                                                |
| Hourly flow rate (vph)            | 12                                                                                | 257                                                                               | 4                                                                                 | 0                                                                                 | 661                                                                               | 44                                                                                | 0                                                                                  | 0                                                                                   | 0                                                                                   | 23                                                                                  | 0                                                                                   | 8                                                                                   |
| Pedestrians                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane Width (ft)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Walking Speed (ft/s)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Percent Blockage                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Right turn flare (veh)            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median type                       | None                                                                              |                                                                                   |                                                                                   |                                                                                   | None                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median storage (veh)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Upstream signal (ft)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| pX, platoon unblocked             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC, conflicting volume            | 705                                                                               |                                                                                   |                                                                                   | 261                                                                               |                                                                                   |                                                                                   | 974                                                                                | 988                                                                                 | 259                                                                                 | 966                                                                                 | 968                                                                                 | 683                                                                                 |
| vC1, stage 1 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC2, stage 2 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vCu, unblocked vol                | 705                                                                               |                                                                                   |                                                                                   | 261                                                                               |                                                                                   |                                                                                   | 974                                                                                | 988                                                                                 | 259                                                                                 | 966                                                                                 | 968                                                                                 | 683                                                                                 |
| tC, single (s)                    | 4.1                                                                               |                                                                                   |                                                                                   | 4.1                                                                               |                                                                                   |                                                                                   | 7.1                                                                                | 6.5                                                                                 | 6.2                                                                                 | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 |
| tC, 2 stage (s)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| tF (s)                            | 2.2                                                                               |                                                                                   |                                                                                   | 2.2                                                                               |                                                                                   |                                                                                   | 3.5                                                                                | 4.0                                                                                 | 3.3                                                                                 | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 |
| p0 queue free %                   | 99                                                                                |                                                                                   |                                                                                   | 100                                                                               |                                                                                   |                                                                                   | 100                                                                                | 100                                                                                 | 100                                                                                 | 90                                                                                  | 100                                                                                 | 98                                                                                  |
| cM capacity (veh/h)               | 902                                                                               |                                                                                   |                                                                                   | 1315                                                                              |                                                                                   |                                                                                   | 227                                                                                | 246                                                                                 | 785                                                                                 | 234                                                                                 | 252                                                                                 | 453                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total                      | 273                                                                               | 705                                                                               | 0                                                                                 | 31                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left                       | 12                                                                                | 0                                                                                 | 0                                                                                 | 23                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right                      | 4                                                                                 | 44                                                                                | 0                                                                                 | 8                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| cSH                               | 902                                                                               | 1315                                                                              | 1700                                                                              | 267                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume to Capacity                | 0.01                                                                              | 0.00                                                                              | 0.00                                                                              | 0.12                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Queue Length 95th (ft)            | 1                                                                                 | 0                                                                                 | 0                                                                                 | 10                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 0.5                                                                               | 0.0                                                                               | 0.0                                                                               | 20.2                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane LOS                          | A                                                                                 |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 0.5                                                                               | 0.0                                                                               | 0.0                                                                               | 20.2                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Average Delay                     |                                                                                   |                                                                                   | 0.8                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 44.5%                                                                             | ICU Level of Service                                                              |                                                                                   |                                                                                   |                                                                                    | A                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

HCM Unsignalized Intersection Capacity Analysis  
8: N. Bogan Rd & Thompson Mill Rd

Future Build AM - Improved

11/16/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |  |                                                                                   |  |                                                                                   |                                                                                    |  |  |                                                                                     |  |  |
| Sign Control                      |                                                                                   | Stop                                                                              |                                                                                   |                                                                                   | Stop                                                                              |                                                                                   |                                                                                    | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Traffic Volume (vph)              | 56                                                                                | 120                                                                               | 69                                                                                | 54                                                                                | 438                                                                               | 9                                                                                 | 119                                                                                | 69                                                                                  | 17                                                                                  | 8                                                                                   | 98                                                                                  | 127                                                                                 |
| Future Volume (vph)               | 56                                                                                | 120                                                                               | 69                                                                                | 54                                                                                | 438                                                                               | 9                                                                                 | 119                                                                                | 69                                                                                  | 17                                                                                  | 8                                                                                   | 98                                                                                  | 127                                                                                 |
| Peak Hour Factor                  | 0.74                                                                              | 0.80                                                                              | 0.75                                                                              | 0.85                                                                              | 0.95                                                                              | 0.45                                                                              | 0.72                                                                               | 0.87                                                                                | 0.80                                                                                | 0.50                                                                                | 0.93                                                                                | 0.78                                                                                |
| Hourly flow rate (vph)            | 76                                                                                | 150                                                                               | 92                                                                                | 64                                                                                | 461                                                                               | 20                                                                                | 165                                                                                | 79                                                                                  | 21                                                                                  | 16                                                                                  | 105                                                                                 | 163                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | EB 2                                                                              | WB 1                                                                              | NB 1                                                                              | NB 2                                                                              | SB 1                                                                              | SB 2                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total (vph)                | 226                                                                               | 92                                                                                | 545                                                                               | 244                                                                               | 21                                                                                | 121                                                                               | 163                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left (vph)                 | 76                                                                                | 0                                                                                 | 64                                                                                | 165                                                                               | 0                                                                                 | 16                                                                                | 0                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right (vph)                | 0                                                                                 | 92                                                                                | 20                                                                                | 0                                                                                 | 21                                                                                | 0                                                                                 | 163                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Hadj (s)                          | 0.08                                                                              | -0.60                                                                             | 0.00                                                                              | 0.14                                                                              | -0.60                                                                             | 0.03                                                                              | -0.60                                                                              |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Departure Headway (s)             | 6.3                                                                               | 3.2                                                                               | 5.6                                                                               | 6.6                                                                               | 3.2                                                                               | 6.9                                                                               | 3.2                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Degree Utilization, x             | 0.39                                                                              | 0.08                                                                              | 0.85                                                                              | 0.45                                                                              | 0.02                                                                              | 0.23                                                                              | 0.14                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Capacity (veh/h)                  | 534                                                                               | 1121                                                                              | 629                                                                               | 504                                                                               | 1121                                                                              | 466                                                                               | 1121                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 13.3                                                                              | 6.5                                                                               | 32.3                                                                              | 14.9                                                                              | 6.3                                                                               | 11.9                                                                              | 6.7                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 11.3                                                                              |                                                                                   | 32.3                                                                              | 14.2                                                                              |                                                                                   | 8.9                                                                               |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      | B                                                                                 |                                                                                   | D                                                                                 | B                                                                                 |                                                                                   | A                                                                                 |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Delay                             |                                                                                   |                                                                                   | 19.5                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 56.8%                                                                             | ICU Level of Service                                                              |                                                                                   |                                                                                   |                                                                                    | B                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

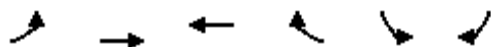
Intersection: 8: N. Bogan Rd & Thompson Mill Rd

| Movement              | EB   | WB   | NB  | SB  | SB |
|-----------------------|------|------|-----|-----|----|
| Directions Served     | LT   | LTR  | LT  | LT  | R  |
| Maximum Queue (ft)    | 54   | 143  | 31  | 55  | 54 |
| Average Queue (ft)    | 39   | 93   | 31  | 38  | 17 |
| 95th Queue (ft)       | 59   | 143  | 31  | 58  | 54 |
| Link Distance (ft)    | 2179 | 1026 | 850 | 591 |    |
| Upstream Blk Time (%) |      |      |     |     |    |
| Queuing Penalty (veh) |      |      |     |     |    |
| Storage Bay Dist (ft) |      |      |     | 100 |    |
| Storage Blk Time (%)  |      |      |     |     |    |
| Queuing Penalty (veh) |      |      |     |     |    |

# HCM Unsignalized Intersection Capacity Analysis

## 9: Thompson Mill Rd & Site Drwy

Future Build AM - Improved  
11/16/2016



| Movement                          | EBL  | EBT  | WBT   | WBR  | SBL                  | SBR  |
|-----------------------------------|------|------|-------|------|----------------------|------|
| Lane Configurations               |      | ↑    | ↑     | ↗    | ↘                    |      |
| Traffic Volume (veh/h)            | 0    | 227  | 652   | 28   | 7                    | 0    |
| Future Volume (Veh/h)             | 0    | 227  | 652   | 28   | 7                    | 0    |
| Sign Control                      |      | Free | Free  |      | Stop                 |      |
| Grade                             |      | 0%   | 0%    |      | 0%                   |      |
| Peak Hour Factor                  | 0.92 | 0.83 | 0.94  | 0.92 | 0.92                 | 0.92 |
| Hourly flow rate (vph)            | 0    | 273  | 694   | 30   | 8                    | 0    |
| Pedestrians                       |      |      |       |      |                      |      |
| Lane Width (ft)                   |      |      |       |      |                      |      |
| Walking Speed (ft/s)              |      |      |       |      |                      |      |
| Percent Blockage                  |      |      |       |      |                      |      |
| Right turn flare (veh)            |      |      |       |      |                      |      |
| Median type                       |      | None | None  |      |                      |      |
| Median storage veh                |      |      |       |      |                      |      |
| Upstream signal (ft)              |      |      |       |      |                      |      |
| pX, platoon unblocked             |      |      |       |      |                      |      |
| vC, conflicting volume            | 694  |      |       |      | 967                  | 694  |
| vC1, stage 1 conf vol             |      |      |       |      |                      |      |
| vC2, stage 2 conf vol             |      |      |       |      |                      |      |
| vCu, unblocked vol                | 694  |      |       |      | 967                  | 694  |
| tC, single (s)                    | 4.1  |      |       |      | 6.4                  | 6.2  |
| tC, 2 stage (s)                   |      |      |       |      |                      |      |
| tF (s)                            | 2.2  |      |       |      | 3.5                  | 3.3  |
| p0 queue free %                   | 100  |      |       |      | 97                   | 100  |
| cM capacity (veh/h)               | 911  |      |       |      | 284                  | 446  |
| Direction, Lane #                 | EB 1 | WB 1 | WB 2  | SB 1 |                      |      |
| Volume Total                      | 273  | 694  | 30    | 8    |                      |      |
| Volume Left                       | 0    | 0    | 0     | 8    |                      |      |
| Volume Right                      | 0    | 0    | 30    | 0    |                      |      |
| cSH                               | 1700 | 1700 | 1700  | 284  |                      |      |
| Volume to Capacity                | 0.16 | 0.41 | 0.02  | 0.03 |                      |      |
| Queue Length 95th (ft)            | 0    | 0    | 0     | 2    |                      |      |
| Control Delay (s)                 | 0.0  | 0.0  | 0.0   | 18.0 |                      |      |
| Lane LOS                          |      |      |       | C    |                      |      |
| Approach Delay (s)                | 0.0  | 0.0  |       | 18.0 |                      |      |
| Approach LOS                      |      |      |       | C    |                      |      |
| Intersection Summary              |      |      |       |      |                      |      |
| Average Delay                     |      |      | 0.1   |      |                      |      |
| Intersection Capacity Utilization |      |      | 44.3% |      | ICU Level of Service | A    |
| Analysis Period (min)             |      |      | 15    |      |                      |      |

## Queues

Future Build PM - Improved

## 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)

11/16/2016



| Lane Group              | EBL   | EBT   | WBT   | WBR   | NBL   | NBT   | NBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↰     | ↗↗    | ↰↰↰   | ↗     | ↰     | ↗     | ↗     |
| Traffic Volume (vph)    | 573   | 1332  | 564   | 135   | 379   | 1     | 562   |
| Future Volume (vph)     | 573   | 1332  | 564   | 135   | 379   | 1     | 562   |
| Lane Group Flow (vph)   | 699   | 1497  | 581   | 173   | 225   | 230   | 618   |
| Turn Type               | Prot  | NA    | NA    | Perm  | Perm  | NA    | Perm  |
| Protected Phases        | 5     | 2     | 6     |       |       | 8     |       |
| Permitted Phases        |       |       |       | 6     | 8     |       | 8     |
| Detector Phase          | 5     | 2     | 6     | 6     | 8     | 8     | 8     |
| Switch Phase            |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 4.0   | 15.0  | 15.0  | 15.0  | 6.0   | 6.0   | 6.0   |
| Minimum Split (s)       | 11.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 52.0  | 77.0  | 25.0  | 25.0  | 43.0  | 43.0  | 43.0  |
| Total Split (%)         | 43.3% | 64.2% | 20.8% | 20.8% | 35.8% | 35.8% | 35.8% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lead  |       | Lag   | Lag   |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |
| Recall Mode             | None  | C-Min | C-Min | C-Min | None  | None  | None  |
| v/c Ratio               | 1.06  | 0.71  | 0.71  | 0.43  | 0.44  | 0.45  | 1.12  |
| Control Delay           | 73.6  | 11.4  | 53.5  | 10.2  | 36.5  | 36.7  | 108.2 |
| Queue Delay             | 0.0   | 1.8   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 73.6  | 13.1  | 53.5  | 10.2  | 36.5  | 36.7  | 108.2 |
| Queue Length 50th (ft)  | ~589  | 344   | 158   | 0     | 146   | 150   | ~504  |
| Queue Length 95th (ft)  | #699  | 103   | 201   | 38    | 207   | 54    | #733  |
| Internal Link Dist (ft) |       | 591   | 1139  |       |       | 825   |       |
| Turn Bay Length (ft)    | 100   |       |       | 840   |       |       | 510   |
| Base Capacity (vph)     | 658   | 2114  | 813   | 398   | 513   | 515   | 554   |
| Starvation Cap Reductn  | 0     | 425   | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 1.06  | 0.89  | 0.71  | 0.43  | 0.44  | 0.45  | 1.12  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 59 (49%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

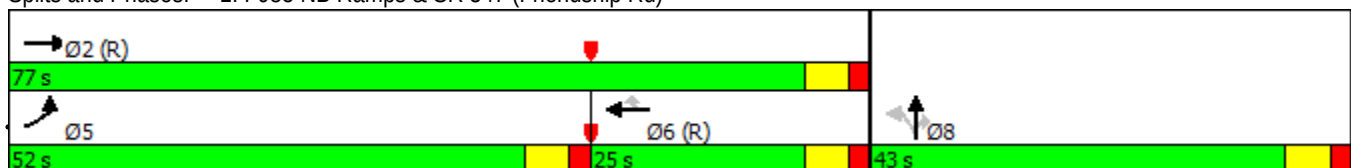
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: I-985 NB Ramps &amp; SR 347 (Friendship Rd)





# HCM Signalized Intersection Capacity Analysis

## 1: I-985 NB Ramps & SR 347 (Friendship Rd)

Future Build PM - Improved

11/16/2016

|                                   |  |                                                                                    |  |  |                                                                                                                                                                      |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                                                                                                                 | EBR                                                                               | WBL                                                                               | WBT                                                                                                                                                                                                                                                   | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |   |                                                                                   |                                                                                   |    |  |  |  |  |                                                                                     |                                                                                     |                                                                                     |
| Traffic Volume (vph)              | 573                                                                               | 1332                                                                                                                                                                | 0                                                                                 | 0                                                                                 | 564                                                                                                                                                                                                                                                   | 135                                                                               | 379                                                                                 | 1                                                                                   | 562                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Future Volume (vph)               | 573                                                                               | 1332                                                                                                                                                                | 0                                                                                 | 0                                                                                 | 564                                                                                                                                                                                                                                                   | 135                                                                               | 379                                                                                 | 1                                                                                   | 562                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                                                                                                                | 1900                                                                              | 1900                                                                              | 1900                                                                                                                                                                                                                                                  | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                                                                                                                 |                                                                                   |                                                                                   | 6.0                                                                                                                                                                                                                                                   | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Util. Factor                 | 1.00                                                                              | 0.95                                                                                                                                                                |                                                                                   |                                                                                   | 0.91                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Frt                               | 1.00                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (prot)                 | 1719                                                                              | 3574                                                                                                                                                                |                                                                                   |                                                                                   | 5136                                                                                                                                                                                                                                                  | 1599                                                                              | 1665                                                                                | 1671                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Flt Permitted                     | 0.95                                                                              | 1.00                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 0.95                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Satd. Flow (perm)                 | 1719                                                                              | 3574                                                                                                                                                                |                                                                                   |                                                                                   | 5136                                                                                                                                                                                                                                                  | 1599                                                                              | 1665                                                                                | 1671                                                                                | 1615                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Peak-hour factor, PHF             | 0.82                                                                              | 0.89                                                                                                                                                                | 0.92                                                                              | 0.92                                                                              | 0.97                                                                                                                                                                                                                                                  | 0.78                                                                              | 0.84                                                                                | 0.25                                                                                | 0.91                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Adj. Flow (vph)                   | 699                                                                               | 1497                                                                                                                                                                | 0                                                                                 | 0                                                                                 | 581                                                                                                                                                                                                                                                   | 173                                                                               | 451                                                                                 | 4                                                                                   | 618                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                                                                                                                                                                                     | 146                                                                               | 0                                                                                   | 0                                                                                   | 57                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 699                                                                               | 1497                                                                                                                                                                | 0                                                                                 | 0                                                                                 | 581                                                                                                                                                                                                                                                   | 27                                                                                | 225                                                                                 | 230                                                                                 | 561                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Heavy Vehicles (%)                | 5%                                                                                | 1%                                                                                                                                                                  | 0%                                                                                | 0%                                                                                | 1%                                                                                                                                                                                                                                                    | 1%                                                                                | 3%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  |
| Turn Type                         | Prot                                                                              | NA                                                                                                                                                                  |                                                                                   |                                                                                   | NA                                                                                                                                                                                                                                                    | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Protected Phases                  | 5                                                                                 | 2                                                                                                                                                                   |                                                                                   |                                                                                   | 6                                                                                                                                                                                                                                                     |                                                                                   |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Permitted Phases                  |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Actuated Green, G (s)             | 46.0                                                                              | 71.0                                                                                                                                                                |                                                                                   |                                                                                   | 19.0                                                                                                                                                                                                                                                  | 19.0                                                                              | 37.0                                                                                | 37.0                                                                                | 37.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Effective Green, g (s)            | 46.0                                                                              | 71.0                                                                                                                                                                |                                                                                   |                                                                                   | 19.0                                                                                                                                                                                                                                                  | 19.0                                                                              | 37.0                                                                                | 37.0                                                                                | 37.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Actuated g/C Ratio                | 0.38                                                                              | 0.59                                                                                                                                                                |                                                                                   |                                                                                   | 0.16                                                                                                                                                                                                                                                  | 0.16                                                                              | 0.31                                                                                | 0.31                                                                                | 0.31                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                                                                                                                 |                                                                                   |                                                                                   | 6.0                                                                                                                                                                                                                                                   | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Vehicle Extension (s)             | 3.0                                                                               | 5.0                                                                                                                                                                 |                                                                                   |                                                                                   | 5.0                                                                                                                                                                                                                                                   | 5.0                                                                               | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Lane Grp Cap (vph)                | 658                                                                               | 2114                                                                                                                                                                |                                                                                   |                                                                                   | 813                                                                                                                                                                                                                                                   | 253                                                                               | 513                                                                                 | 515                                                                                 | 497                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Prot                    | c0.41                                                                             | c0.42                                                                                                                                                               |                                                                                   |                                                                                   | 0.11                                                                                                                                                                                                                                                  |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       | 0.02                                                                              | 0.14                                                                                | 0.14                                                                                | c0.35                                                                               |                                                                                     |                                                                                     |                                                                                     |
| v/c Ratio                         | 1.06                                                                              | 0.71                                                                                                                                                                |                                                                                   |                                                                                   | 0.71                                                                                                                                                                                                                                                  | 0.11                                                                              | 0.44                                                                                | 0.45                                                                                | 1.13                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Uniform Delay, d1                 | 37.0                                                                              | 17.2                                                                                                                                                                |                                                                                   |                                                                                   | 47.9                                                                                                                                                                                                                                                  | 43.2                                                                              | 33.2                                                                                | 33.3                                                                                | 41.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Progression Factor                | 0.63                                                                              | 0.56                                                                                                                                                                |                                                                                   |                                                                                   | 1.00                                                                                                                                                                                                                                                  | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Incremental Delay, d2             | 48.3                                                                              | 1.5                                                                                                                                                                 |                                                                                   |                                                                                   | 5.3                                                                                                                                                                                                                                                   | 0.9                                                                               | 0.6                                                                                 | 0.6                                                                                 | 80.9                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Delay (s)                         | 71.7                                                                              | 11.2                                                                                                                                                                |                                                                                   |                                                                                   | 53.3                                                                                                                                                                                                                                                  | 44.1                                                                              | 33.8                                                                                | 33.9                                                                                | 122.4                                                                               |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  | E                                                                                 | B                                                                                                                                                                   |                                                                                   |                                                                                   | D                                                                                                                                                                                                                                                     | D                                                                                 | C                                                                                   | C                                                                                   | F                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                |                                                                                   | 30.4                                                                                                                                                                |                                                                                   |                                                                                   | 51.2                                                                                                                                                                                                                                                  |                                                                                   |                                                                                     | 84.9                                                                                |                                                                                     |                                                                                     | 0.0                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                                                                                                   |                                                                                   |                                                                                   | D                                                                                                                                                                                                                                                     |                                                                                   |                                                                                     | F                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                                                                                                     | 48.8                                                                              |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     | D                                                                                   |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                                                                                                     | 1.04                                                                              |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                                                                                                     | 120.0                                                                             |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     | 18.0                                                                                |
| Intersection Capacity Utilization |                                                                                   |                                                                                                                                                                     | 81.6%                                                                             |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     | D                                                                                   |
| Analysis Period (min)             |                                                                                   |                                                                                                                                                                     | 15                                                                                |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>c Critical Lane Group</b>      |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                                                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

Future Build PM - Improved

## 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)

11/16/2016



| Lane Group              | EBT   | EBR   | WBL   | WBT   | SBL   | SBR   |
|-------------------------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↑↑↑   | ↑     | ↑↑    | ↑↑    | ↑     | ↑     |
| Traffic Volume (vph)    | 1601  | 490   | 162   | 792   | 320   | 393   |
| Future Volume (vph)     | 1601  | 490   | 162   | 792   | 320   | 393   |
| Lane Group Flow (vph)   | 1685  | 605   | 198   | 870   | 421   | 468   |
| Turn Type               | NA    | Perm  | Prot  | NA    | Perm  | Perm  |
| Protected Phases        | 2     |       | 1     | 6     |       |       |
| Permitted Phases        |       | 2     |       |       | 4     | 4     |
| Detector Phase          | 2     | 2     | 1     | 6     | 4     | 4     |
| Switch Phase            |       |       |       |       |       |       |
| Minimum Initial (s)     | 15.0  | 15.0  | 4.0   | 15.0  | 6.0   | 6.0   |
| Minimum Split (s)       | 24.0  | 24.0  | 11.0  | 24.0  | 24.0  | 24.0  |
| Total Split (s)         | 56.0  | 56.0  | 16.0  | 72.0  | 48.0  | 48.0  |
| Total Split (%)         | 46.7% | 46.7% | 13.3% | 60.0% | 40.0% | 40.0% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                | Lag   | Lag   | Lead  |       |       |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |
| Recall Mode             | C-Min | C-Min | None  | C-Min | None  | None  |
| v/c Ratio               | 0.69  | 0.57  | 0.70  | 0.40  | 0.82  | 0.87  |
| Control Delay           | 17.9  | 1.5   | 42.3  | 23.0  | 52.6  | 44.8  |
| Queue Delay             | 0.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 17.9  | 1.5   | 42.3  | 23.0  | 52.6  | 44.8  |
| Queue Length 50th (ft)  | 215   | 1     | 60    | 358   | 301   | 252   |
| Queue Length 95th (ft)  | m230  | m1    | 97    | 443   | 310   | 320   |
| Internal Link Dist (ft) | 904   |       |       | 591   |       |       |
| Turn Bay Length (ft)    |       | 375   | 380   |       |       |       |
| Base Capacity (vph)     | 2455  | 1055  | 288   | 2174  | 631   | 631   |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 59    | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.70  | 0.57  | 0.69  | 0.40  | 0.67  | 0.74  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

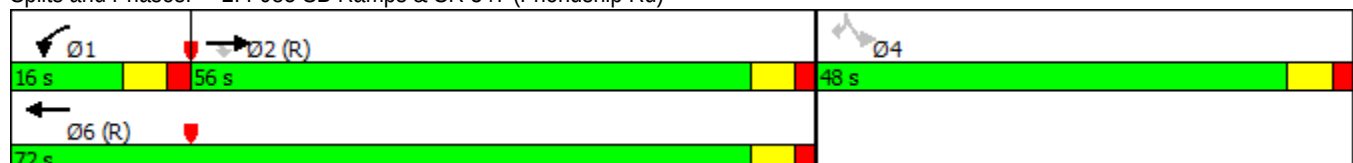
Offset: 119 (99%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: I-985 SB Ramps &amp; SR 347 (Friendship Rd)



# HCM Signalized Intersection Capacity Analysis

## 2: I-985 SB Ramps & SR 347 (Friendship Rd)

Future Build PM - Improved

11/16/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   | ↑↑↑                                                                               | ↗                                                                                 | ↗↗                                                                                | ↑↑                                                                                |                                                                                   |                                                                                    |                                                                                     |                                                                                     | ↗                                                                                   |                                                                                     | ↗                                                                                   |
| Traffic Volume (vph)              | 0                                                                                 | 1601                                                                              | 490                                                                               | 162                                                                               | 792                                                                               | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 320                                                                                 | 0                                                                                   | 393                                                                                 |
| Future Volume (vph)               | 0                                                                                 | 1601                                                                              | 490                                                                               | 162                                                                               | 792                                                                               | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 320                                                                                 | 0                                                                                   | 393                                                                                 |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 6.0                                                                                 |                                                                                     | 6.0                                                                                 |
| Lane Util. Factor                 |                                                                                   | 0.91                                                                              | 1.00                                                                              | 0.97                                                                              | 0.95                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Frt                               |                                                                                   | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     | 0.85                                                                                |
| Flt Protected                     |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.95                                                                                |                                                                                     | 1.00                                                                                |
| Satd. Flow (prot)                 |                                                                                   | 5085                                                                              | 1538                                                                              | 3467                                                                              | 3539                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 1805                                                                                |                                                                                     | 1553                                                                                |
| Flt Permitted                     |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.95                                                                                |                                                                                     | 1.00                                                                                |
| Satd. Flow (perm)                 |                                                                                   | 5085                                                                              | 1538                                                                              | 3467                                                                              | 3539                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 1805                                                                                |                                                                                     | 1553                                                                                |
| Peak-hour factor, PHF             | 0.92                                                                              | 0.95                                                                              | 0.81                                                                              | 0.82                                                                              | 0.91                                                                              | 0.92                                                                              | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.76                                                                                | 0.92                                                                                | 0.84                                                                                |
| Adj. Flow (vph)                   | 0                                                                                 | 1685                                                                              | 605                                                                               | 198                                                                               | 870                                                                               | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 421                                                                                 | 0                                                                                   | 468                                                                                 |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 313                                                                               | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 97                                                                                  |
| Lane Group Flow (vph)             | 0                                                                                 | 1685                                                                              | 292                                                                               | 198                                                                               | 870                                                                               | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 421                                                                                 | 0                                                                                   | 371                                                                                 |
| Heavy Vehicles (%)                | 0%                                                                                | 2%                                                                                | 5%                                                                                | 1%                                                                                | 2%                                                                                | 0%                                                                                | 0%                                                                                 | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 0%                                                                                  | 4%                                                                                  |
| Turn Type                         |                                                                                   | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                |                                                                                   |                                                                                    |                                                                                     |                                                                                     | Perm                                                                                |                                                                                     | Perm                                                                                |
| Protected Phases                  |                                                                                   | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Permitted Phases                  |                                                                                   |                                                                                   | 2                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 4                                                                                   |                                                                                     | 4                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 57.9                                                                              | 57.9                                                                              | 9.8                                                                               | 73.7                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 34.3                                                                                |                                                                                     | 34.3                                                                                |
| Effective Green, g (s)            |                                                                                   | 57.9                                                                              | 57.9                                                                              | 9.8                                                                               | 73.7                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 34.3                                                                                |                                                                                     | 34.3                                                                                |
| Actuated g/C Ratio                |                                                                                   | 0.48                                                                              | 0.48                                                                              | 0.08                                                                              | 0.61                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.29                                                                                |                                                                                     | 0.29                                                                                |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 6.0                                                                                 |                                                                                     | 6.0                                                                                 |
| Vehicle Extension (s)             |                                                                                   | 5.0                                                                               | 5.0                                                                               | 3.0                                                                               | 5.0                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 3.0                                                                                 |                                                                                     | 3.0                                                                                 |
| Lane Grp Cap (vph)                |                                                                                   | 2453                                                                              | 742                                                                               | 283                                                                               | 2173                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 515                                                                                 |                                                                                     | 443                                                                                 |
| v/s Ratio Prot                    |                                                                                   | c0.33                                                                             |                                                                                   | c0.06                                                                             | 0.25                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                   | 0.19                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.23                                                                                |                                                                                     | c0.24                                                                               |
| v/c Ratio                         |                                                                                   | 0.69                                                                              | 0.39                                                                              | 0.70                                                                              | 0.40                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.82                                                                                |                                                                                     | 0.84                                                                                |
| Uniform Delay, d1                 |                                                                                   | 24.0                                                                              | 19.8                                                                              | 53.7                                                                              | 11.8                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 39.9                                                                                |                                                                                     | 40.2                                                                                |
| Progression Factor                |                                                                                   | 0.67                                                                              | 0.19                                                                              | 0.57                                                                              | 1.75                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Incremental Delay, d2             |                                                                                   | 0.8                                                                               | 0.8                                                                               | 6.1                                                                               | 0.5                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 9.7                                                                                 |                                                                                     | 12.9                                                                                |
| Delay (s)                         |                                                                                   | 17.0                                                                              | 4.5                                                                               | 36.5                                                                              | 21.2                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 49.7                                                                                |                                                                                     | 53.2                                                                                |
| Level of Service                  |                                                                                   | B                                                                                 | A                                                                                 | D                                                                                 | C                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     | D                                                                                   |                                                                                     | D                                                                                   |
| Approach Delay (s)                |                                                                                   | 13.7                                                                              |                                                                                   |                                                                                   | 24.0                                                                              |                                                                                   |                                                                                    | 0.0                                                                                 |                                                                                     |                                                                                     | 51.5                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | B                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                    | A                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 24.2                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                    |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.74                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                    |                                                                                     |                                                                                     | 18.0                                                                                |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 81.6%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                    |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

Future Build PM - Improved

## 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)

11/16/2016

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations     |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 193                                                                               | 871                                                                               | 82                                                                                | 386                                                                               | 612                                                                               | 237                                                                               | 129                                                                                | 414                                                                                 | 574                                                                                 | 173                                                                                 | 184                                                                                 | 103                                                                                 |
| Future Volume (vph)     | 193                                                                               | 871                                                                               | 82                                                                                | 386                                                                               | 612                                                                               | 237                                                                               | 129                                                                                | 414                                                                                 | 574                                                                                 | 173                                                                                 | 184                                                                                 | 103                                                                                 |
| Lane Group Flow (vph)   | 222                                                                               | 1075                                                                              | 98                                                                                | 434                                                                               | 703                                                                               | 279                                                                               | 139                                                                                | 518                                                                                 | 683                                                                                 | 184                                                                                 | 222                                                                                 | 110                                                                                 |
| Turn Type               | pm+pt                                                                             | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                | Perm                                                                              | pm+pt                                                                              | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases        | 5                                                                                 | 2                                                                                 |                                                                                   | 1                                                                                 | 6                                                                                 |                                                                                   | 3                                                                                  | 8                                                                                   |                                                                                     | 7                                                                                   | 4                                                                                   |                                                                                     |
| Permitted Phases        | 2                                                                                 |                                                                                   | 2                                                                                 |                                                                                   |                                                                                   | 6                                                                                 | 8                                                                                  |                                                                                     | 8                                                                                   | 4                                                                                   |                                                                                     | 4                                                                                   |
| Detector Phase          | 5                                                                                 | 2                                                                                 | 2                                                                                 | 1                                                                                 | 6                                                                                 | 6                                                                                 | 3                                                                                  | 8                                                                                   | 8                                                                                   | 7                                                                                   | 4                                                                                   | 4                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 4.0                                                                               | 15.0                                                                              | 15.0                                                                              | 4.0                                                                               | 15.0                                                                              | 15.0                                                                              | 4.0                                                                                | 6.0                                                                                 | 6.0                                                                                 | 4.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Minimum Split (s)       | 11.0                                                                              | 37.0                                                                              | 37.0                                                                              | 11.0                                                                              | 37.0                                                                              | 37.0                                                                              | 11.0                                                                               | 42.0                                                                                | 42.0                                                                                | 11.0                                                                                | 42.0                                                                                | 42.0                                                                                |
| Total Split (s)         | 22.0                                                                              | 42.0                                                                              | 42.0                                                                              | 22.0                                                                              | 42.0                                                                              | 42.0                                                                              | 14.0                                                                               | 43.0                                                                                | 43.0                                                                                | 13.0                                                                                | 42.0                                                                                | 42.0                                                                                |
| Total Split (%)         | 18.3%                                                                             | 35.0%                                                                             | 35.0%                                                                             | 18.3%                                                                             | 35.0%                                                                             | 35.0%                                                                             | 11.7%                                                                              | 35.8%                                                                               | 35.8%                                                                               | 10.8%                                                                               | 35.0%                                                                               | 35.0%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Lost Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lead/Lag                | Lead                                                                              | Lag                                                                               | Lag                                                                               | Lead                                                                              | Lag                                                                               | Lag                                                                               | Lead                                                                               | Lead                                                                                | Lead                                                                                | Lag                                                                                 | Lag                                                                                 | Lag                                                                                 |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | C-Min                                                                             | C-Min                                                                             | None                                                                              | C-Min                                                                             | C-Min                                                                             | None                                                                               | None                                                                                | None                                                                                | None                                                                                | None                                                                                | None                                                                                |
| v/c Ratio               | 0.64                                                                              | 0.99                                                                              | 0.16                                                                              | 0.97                                                                              | 0.61                                                                              | 0.40                                                                              | 0.49                                                                               | 0.92                                                                                | 1.01                                                                                | 0.86                                                                                | 0.41                                                                                | 0.19                                                                                |
| Control Delay           | 27.9                                                                              | 67.8                                                                              | 0.6                                                                               | 84.2                                                                              | 27.6                                                                              | 4.9                                                                               | 21.3                                                                               | 44.5                                                                                | 45.2                                                                                | 79.5                                                                                | 36.4                                                                                | 3.6                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 27.9                                                                              | 67.8                                                                              | 0.6                                                                               | 84.2                                                                              | 27.6                                                                              | 4.9                                                                               | 21.3                                                                               | 44.5                                                                                | 45.2                                                                                | 79.5                                                                                | 36.4                                                                                | 3.6                                                                                 |
| Queue Length 50th (ft)  | 98                                                                                | 436                                                                               | 0                                                                                 | 145                                                                               | 297                                                                               | 44                                                                                | 34                                                                                 | 410                                                                                 | ~388                                                                                | 111                                                                                 | 137                                                                                 | 0                                                                                   |
| Queue Length 95th (ft)  | 146                                                                               | #482                                                                              | 0                                                                                 | #267                                                                              | 297                                                                               | 26                                                                                | m57                                                                                | #388                                                                                | #151                                                                                | #232                                                                                | 191                                                                                 | 27                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 1576                                                                              |                                                                                   |                                                                                   | 3513                                                                              |                                                                                   |                                                                                    | 1183                                                                                |                                                                                     |                                                                                     | 1183                                                                                |                                                                                     |
| Turn Bay Length (ft)    | 250                                                                               |                                                                                   | 370                                                                               | 300                                                                               |                                                                                   | 310                                                                               |                                                                                    |                                                                                     | 500                                                                                 | 300                                                                                 |                                                                                     | 215                                                                                 |
| Base Capacity (vph)     | 382                                                                               | 1083                                                                              | 599                                                                               | 448                                                                               | 1154                                                                              | 691                                                                               | 285                                                                                | 563                                                                                 | 676                                                                                 | 214                                                                                 | 537                                                                                 | 574                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.58                                                                              | 0.99                                                                              | 0.16                                                                              | 0.97                                                                              | 0.61                                                                              | 0.40                                                                              | 0.49                                                                               | 0.92                                                                                | 1.01                                                                                | 0.86                                                                                | 0.41                                                                                | 0.19                                                                                |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 63 (53%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.

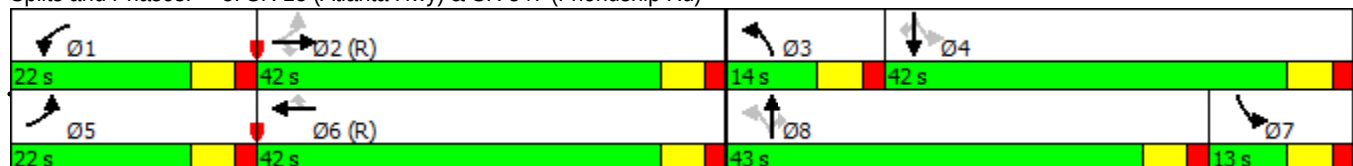
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 3: SR 13 (Atlanta Hwy) &amp; SR 347 (Friendship Rd)



# HCM Signalized Intersection Capacity Analysis

## 3: SR 13 (Atlanta Hwy) & SR 347 (Friendship Rd)

Future Build PM - Improved

11/16/2016

|                                   |  |                                                                                    |  |                                                                                    |                                                                                    |  |   |  |  |  |                                                                                      |  |
|-----------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                                                                                                                 | EBR                                                                               | WBL                                                                                                                                                                 | WBT                                                                                                                                                                 | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                                                                                                     | SBR                                                                                 |
| Lane Configurations               |  |   |  |   |   |  |  |  |  |  |   |  |
| Traffic Volume (vph)              | 193                                                                               | 871                                                                                                                                                                 | 82                                                                                | 386                                                                                                                                                                 | 612                                                                                                                                                                 | 237                                                                               | 129                                                                                 | 414                                                                                 | 574                                                                                 | 173                                                                                 | 184                                                                                                                                                                     | 103                                                                                 |
| Future Volume (vph)               | 193                                                                               | 871                                                                                                                                                                 | 82                                                                                | 386                                                                                                                                                                 | 612                                                                                                                                                                 | 237                                                                               | 129                                                                                 | 414                                                                                 | 574                                                                                 | 173                                                                                 | 184                                                                                                                                                                     | 103                                                                                 |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                                                                                                                | 1900                                                                              | 1900                                                                                                                                                                | 1900                                                                                                                                                                | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                                                                                                    | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                                                                                                                 | 6.0                                                                               | 6.0                                                                                                                                                                 | 6.0                                                                                                                                                                 | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                                                                                                     | 6.0                                                                                 |
| Lane Util. Factor                 | 1.00                                                                              | 0.95                                                                                                                                                                | 1.00                                                                              | 0.97                                                                                                                                                                | 0.95                                                                                                                                                                | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                                                                                                    | 1.00                                                                                |
| Frt                               | 1.00                                                                              | 1.00                                                                                                                                                                | 0.85                                                                              | 1.00                                                                                                                                                                | 1.00                                                                                                                                                                | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                                                                                                    | 0.85                                                                                |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                                                                                                                | 1.00                                                                              | 0.95                                                                                                                                                                | 1.00                                                                                                                                                                | 1.00                                                                              | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                                                                                                    | 1.00                                                                                |
| Satd. Flow (prot)                 | 1805                                                                              | 3610                                                                                                                                                                | 1553                                                                              | 3367                                                                                                                                                                | 3610                                                                                                                                                                | 1568                                                                              | 1787                                                                                | 1827                                                                                | 1482                                                                                | 1752                                                                                | 1792                                                                                                                                                                    | 1599                                                                                |
| Flt Permitted                     | 0.25                                                                              | 1.00                                                                                                                                                                | 1.00                                                                              | 0.95                                                                                                                                                                | 1.00                                                                                                                                                                | 1.00                                                                              | 0.37                                                                                | 1.00                                                                                | 1.00                                                                                | 0.25                                                                                | 1.00                                                                                                                                                                    | 1.00                                                                                |
| Satd. Flow (perm)                 | 472                                                                               | 3610                                                                                                                                                                | 1553                                                                              | 3367                                                                                                                                                                | 3610                                                                                                                                                                | 1568                                                                              | 691                                                                                 | 1827                                                                                | 1482                                                                                | 465                                                                                 | 1792                                                                                                                                                                    | 1599                                                                                |
| Peak-hour factor, PHF             | 0.87                                                                              | 0.81                                                                                                                                                                | 0.84                                                                              | 0.89                                                                                                                                                                | 0.87                                                                                                                                                                | 0.85                                                                              | 0.93                                                                                | 0.80                                                                                | 0.84                                                                                | 0.94                                                                                | 0.83                                                                                                                                                                    | 0.94                                                                                |
| Adj. Flow (vph)                   | 222                                                                               | 1075                                                                                                                                                                | 98                                                                                | 434                                                                                                                                                                 | 703                                                                                                                                                                 | 279                                                                               | 139                                                                                 | 518                                                                                 | 683                                                                                 | 184                                                                                 | 222                                                                                                                                                                     | 110                                                                                 |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                                                                                                   | 69                                                                                | 0                                                                                                                                                                   | 0                                                                                                                                                                   | 190                                                                               | 0                                                                                   | 0                                                                                   | 220                                                                                 | 0                                                                                   | 0                                                                                                                                                                       | 77                                                                                  |
| Lane Group Flow (vph)             | 222                                                                               | 1075                                                                                                                                                                | 29                                                                                | 434                                                                                                                                                                 | 703                                                                                                                                                                 | 89                                                                                | 139                                                                                 | 518                                                                                 | 463                                                                                 | 184                                                                                 | 222                                                                                                                                                                     | 33                                                                                  |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                                                                                                  | 4%                                                                                | 4%                                                                                                                                                                  | 0%                                                                                                                                                                  | 3%                                                                                | 1%                                                                                  | 4%                                                                                  | 9%                                                                                  | 3%                                                                                  | 6%                                                                                                                                                                      | 1%                                                                                  |
| Turn Type                         | pm+pt                                                                             | NA                                                                                                                                                                  | Perm                                                                              | Prot                                                                                                                                                                | NA                                                                                                                                                                  | Perm                                                                              | pm+pt                                                                               | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                                                                                                      | Perm                                                                                |
| Protected Phases                  | 5                                                                                 | 2                                                                                                                                                                   |                                                                                   | 1                                                                                                                                                                   | 6                                                                                                                                                                   |                                                                                   | 3                                                                                   | 8                                                                                   |                                                                                     | 7                                                                                   | 4                                                                                                                                                                       |                                                                                     |
| Permitted Phases                  | 2                                                                                 |                                                                                                                                                                     | 2                                                                                 |                                                                                                                                                                     |                                                                                                                                                                     | 6                                                                                 | 8                                                                                   |                                                                                     | 8                                                                                   | 4                                                                                   |                                                                                                                                                                         | 4                                                                                   |
| Actuated Green, G (s)             | 49.6                                                                              | 36.0                                                                                                                                                                | 36.0                                                                              | 16.0                                                                                                                                                                | 38.4                                                                                                                                                                | 38.4                                                                              | 37.0                                                                                | 37.0                                                                                | 37.0                                                                                | 36.0                                                                                | 36.0                                                                                                                                                                    | 36.0                                                                                |
| Effective Green, g (s)            | 49.6                                                                              | 36.0                                                                                                                                                                | 36.0                                                                              | 16.0                                                                                                                                                                | 38.4                                                                                                                                                                | 38.4                                                                              | 37.0                                                                                | 37.0                                                                                | 37.0                                                                                | 36.0                                                                                | 36.0                                                                                                                                                                    | 36.0                                                                                |
| Actuated g/C Ratio                | 0.41                                                                              | 0.30                                                                                                                                                                | 0.30                                                                              | 0.13                                                                                                                                                                | 0.32                                                                                                                                                                | 0.32                                                                              | 0.31                                                                                | 0.31                                                                                | 0.31                                                                                | 0.30                                                                                | 0.30                                                                                                                                                                    | 0.30                                                                                |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                                                                                                                 | 6.0                                                                               | 6.0                                                                                                                                                                 | 6.0                                                                                                                                                                 | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                                                                                                     | 6.0                                                                                 |
| Vehicle Extension (s)             | 3.0                                                                               | 5.0                                                                                                                                                                 | 5.0                                                                               | 3.0                                                                                                                                                                 | 5.0                                                                                                                                                                 | 5.0                                                                               | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                 | 3.0                                                                                                                                                                     | 3.0                                                                                 |
| Lane Grp Cap (vph)                | 346                                                                               | 1083                                                                                                                                                                | 465                                                                               | 448                                                                                                                                                                 | 1155                                                                                                                                                                | 501                                                                               | 286                                                                                 | 563                                                                                 | 456                                                                                 | 214                                                                                 | 537                                                                                                                                                                     | 479                                                                                 |
| v/s Ratio Prot                    | 0.07                                                                              | c0.30                                                                                                                                                               |                                                                                   | c0.13                                                                                                                                                               | 0.19                                                                                                                                                                |                                                                                   | 0.03                                                                                | 0.28                                                                                |                                                                                     | c0.05                                                                               | 0.12                                                                                                                                                                    |                                                                                     |
| v/s Ratio Perm                    | 0.19                                                                              |                                                                                                                                                                     | 0.02                                                                              |                                                                                                                                                                     |                                                                                                                                                                     | 0.06                                                                              | 0.12                                                                                |                                                                                     | c0.31                                                                               | 0.21                                                                                |                                                                                                                                                                         | 0.02                                                                                |
| v/c Ratio                         | 0.64                                                                              | 0.99                                                                                                                                                                | 0.06                                                                              | 0.97                                                                                                                                                                | 0.61                                                                                                                                                                | 0.18                                                                              | 0.49                                                                                | 0.92                                                                                | 1.02                                                                                | 0.86                                                                                | 0.41                                                                                                                                                                    | 0.07                                                                                |
| Uniform Delay, d1                 | 24.5                                                                              | 41.9                                                                                                                                                                | 30.0                                                                              | 51.8                                                                                                                                                                | 34.5                                                                                                                                                                | 29.4                                                                              | 31.8                                                                                | 40.1                                                                                | 41.5                                                                                | 46.8                                                                                | 33.6                                                                                                                                                                    | 30.0                                                                                |
| Progression Factor                | 1.00                                                                              | 1.00                                                                                                                                                                | 1.00                                                                              | 0.98                                                                                                                                                                | 0.72                                                                                                                                                                | 0.88                                                                              | 0.52                                                                                | 0.59                                                                                | 0.39                                                                                | 1.00                                                                                | 1.00                                                                                                                                                                    | 1.00                                                                                |
| Incremental Delay, d2             | 4.0                                                                               | 25.6                                                                                                                                                                | 0.3                                                                               | 31.7                                                                                                                                                                | 2.1                                                                                                                                                                 | 0.7                                                                               | 1.0                                                                                 | 17.3                                                                                | 41.5                                                                                | 27.3                                                                                | 0.5                                                                                                                                                                     | 0.1                                                                                 |
| Delay (s)                         | 28.5                                                                              | 67.5                                                                                                                                                                | 30.2                                                                              | 82.6                                                                                                                                                                | 27.0                                                                                                                                                                | 26.7                                                                              | 17.6                                                                                | 40.9                                                                                | 57.6                                                                                | 74.1                                                                                | 34.1                                                                                                                                                                    | 30.1                                                                                |
| Level of Service                  | C                                                                                 | E                                                                                                                                                                   | C                                                                                 | F                                                                                                                                                                   | C                                                                                                                                                                   | C                                                                                 | B                                                                                   | D                                                                                   | E                                                                                   | E                                                                                   | C                                                                                                                                                                       | C                                                                                   |
| Approach Delay (s)                |                                                                                   | 58.7                                                                                                                                                                |                                                                                   |                                                                                                                                                                     | 44.0                                                                                                                                                                |                                                                                   |                                                                                     | 47.0                                                                                |                                                                                     |                                                                                     | 47.5                                                                                                                                                                    |                                                                                     |
| Approach LOS                      |                                                                                   | E                                                                                                                                                                   |                                                                                   |                                                                                                                                                                     | D                                                                                                                                                                   |                                                                                   |                                                                                     | D                                                                                   |                                                                                     |                                                                                     | D                                                                                                                                                                       |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                                                                                                     |                                                                                                                                                                     |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                                                                                                     | 49.6                                                                              | HCM 2000 Level of Service                                                                                                                                           |                                                                                                                                                                     |                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                                                                                                         |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                                                                                                     | 0.99                                                                              |                                                                                                                                                                     |                                                                                                                                                                     |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                                                                                                     | 120.0                                                                             | Sum of lost time (s)                                                                                                                                                |                                                                                                                                                                     |                                                                                   |                                                                                     |                                                                                     | 24.0                                                                                |                                                                                     |                                                                                                                                                                         |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                                                                                                     | 86.5%                                                                             | ICU Level of Service                                                                                                                                                |                                                                                                                                                                     |                                                                                   |                                                                                     |                                                                                     | E                                                                                   |                                                                                     |                                                                                                                                                                         |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                                                                                                     | 15                                                                                |                                                                                                                                                                     |                                                                                                                                                                     |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                                                                                                     |                                                                                                                                                                     |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |

## Queues

Future Build PM - Improved

## 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) &amp; Relocated Thunder Rd/Roy Carlson Blvd 11/16/2016



| Lane Group              | EBT   | WBL   | WBT   | NBL   | NBT   | NBR   | SBL   | SBT   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Configurations     | ↕     | ↗     | ↘     | ↖     | ↕     | ↗     | ↖     | ↕     |
| Traffic Volume (vph)    | 12    | 375   | 14    | 18    | 746   | 166   | 150   | 451   |
| Future Volume (vph)     | 12    | 375   | 14    | 18    | 746   | 166   | 150   | 451   |
| Lane Group Flow (vph)   | 68    | 408   | 468   | 20    | 848   | 180   | 163   | 564   |
| Turn Type               | NA    | Perm  | NA    | Perm  | NA    | Perm  | pm+pt | NA    |
| Protected Phases        | 4     |       | 8     |       | 2     |       | 1     | 6     |
| Permitted Phases        |       | 8     |       | 2     |       | 2     | 6     |       |
| Detector Phase          | 4     | 8     | 8     | 2     | 2     | 2     | 1     | 6     |
| Switch Phase            |       |       |       |       |       |       |       |       |
| Minimum Initial (s)     | 6.0   | 6.0   | 6.0   | 15.0  | 15.0  | 15.0  | 5.0   | 15.0  |
| Minimum Split (s)       | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 24.0  | 11.0  | 24.0  |
| Total Split (s)         | 58.0  | 58.0  | 58.0  | 44.0  | 44.0  | 44.0  | 18.0  | 62.0  |
| Total Split (%)         | 48.3% | 48.3% | 48.3% | 36.7% | 36.7% | 36.7% | 15.0% | 51.7% |
| Yellow Time (s)         | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| All-Red Time (s)        | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   | 6.0   |
| Lead/Lag                |       |       |       | Lag   | Lag   | Lag   | Lead  |       |
| Lead-Lag Optimize?      |       |       |       |       |       |       |       |       |
| Recall Mode             | None  | None  | None  | C-Min | C-Min | C-Min | None  | C-Min |
| v/c Ratio               | 0.10  | 0.89  | 0.64  | 0.06  | 0.64  | 0.27  | 0.58  | 0.31  |
| Control Delay           | 7.5   | 56.5  | 14.7  | 15.5  | 24.0  | 4.8   | 28.9  | 6.8   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 7.5   | 56.5  | 14.7  | 15.5  | 24.0  | 4.8   | 28.9  | 6.8   |
| Queue Length 50th (ft)  | 6     | 281   | 106   | 8     | 341   | 20    | 47    | 81    |
| Queue Length 95th (ft)  | 33    | #437  | 210   | m18   | 396   | 38    | m83   | m90   |
| Internal Link Dist (ft) | 491   |       | 1743  |       | 2367  |       |       | 498   |
| Turn Bay Length (ft)    |       | 150   |       | 375   |       | 375   | 200   |       |
| Base Capacity (vph)     | 764   | 519   | 786   | 311   | 1319  | 660   | 289   | 1831  |
| Starvation Cap Reductn  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Spillback Cap Reductn   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Storage Cap Reductn     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Reduced v/c Ratio       | 0.09  | 0.79  | 0.60  | 0.06  | 0.64  | 0.27  | 0.56  | 0.31  |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 14 (12%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 75

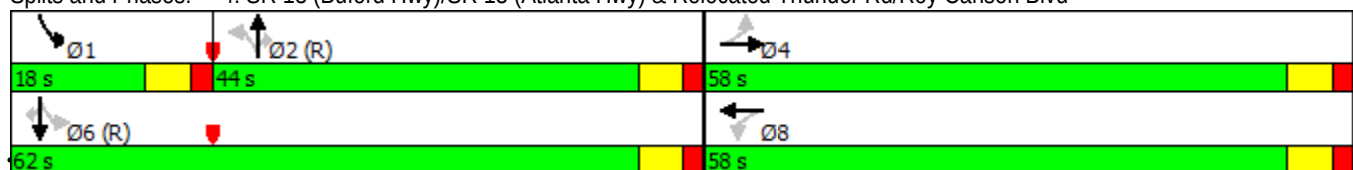
Control Type: Actuated-Coordinated

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) &amp; Relocated Thunder Rd/Roy Carlson Blvd



Baseline

Synchro 9 Report

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# HCM Signalized Intersection Capacity Analysis

Future Build PM - Improved

4: SR 13 (Buford Hwy)/SR 13 (Atlanta Hwy) & Relocated Thunder Rd/Roy Carlson Blvd 11/16/2016

|                                   |  |  |  |  |  |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (vph)              | 0                                                                                 | 12                                                                                | 51                                                                                | 375                                                                               | 14                                                                                | 417                                                                               | 18                                                                                  | 746                                                                                 | 166                                                                                 | 150                                                                                 | 451                                                                                 | 0                                                                                   |
| Future Volume (vph)               | 0                                                                                 | 12                                                                                | 51                                                                                | 375                                                                               | 14                                                                                | 417                                                                               | 18                                                                                  | 746                                                                                 | 166                                                                                 | 150                                                                                 | 451                                                                                 | 0                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Lane Util. Factor                 |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                |                                                                                     |
| Frt                               |                                                                                   | 0.89                                                                              |                                                                                   | 1.00                                                                              | 0.85                                                                              |                                                                                   | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Flt Protected                     |                                                                                   | 1.00                                                                              |                                                                                   | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (prot)                 |                                                                                   | 1693                                                                              |                                                                                   | 1597                                                                              | 1443                                                                              |                                                                                   | 1805                                                                                | 3539                                                                                | 1468                                                                                | 1641                                                                                | 3539                                                                                |                                                                                     |
| Flt Permitted                     |                                                                                   | 1.00                                                                              |                                                                                   | 0.71                                                                              | 1.00                                                                              |                                                                                   | 0.44                                                                                | 1.00                                                                                | 1.00                                                                                | 0.17                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (perm)                 |                                                                                   | 1693                                                                              |                                                                                   | 1198                                                                              | 1443                                                                              |                                                                                   | 837                                                                                 | 3539                                                                                | 1468                                                                                | 295                                                                                 | 3539                                                                                |                                                                                     |
| Peak-hour factor, PHF             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.88                                                                                | 0.92                                                                                | 0.92                                                                                | 0.80                                                                                | 0.92                                                                                |
| Adj. Flow (vph)                   | 0                                                                                 | 13                                                                                | 55                                                                                | 408                                                                               | 15                                                                                | 453                                                                               | 20                                                                                  | 848                                                                                 | 180                                                                                 | 163                                                                                 | 564                                                                                 | 0                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 34                                                                                | 0                                                                                 | 0                                                                                 | 175                                                                               | 0                                                                                 | 0                                                                                   | 0                                                                                   | 113                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 0                                                                                 | 34                                                                                | 0                                                                                 | 408                                                                               | 293                                                                               | 0                                                                                 | 20                                                                                  | 848                                                                                 | 67                                                                                  | 163                                                                                 | 564                                                                                 | 0                                                                                   |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 13%                                                                               | 0%                                                                                | 13%                                                                               | 0%                                                                                  | 2%                                                                                  | 10%                                                                                 | 10%                                                                                 | 2%                                                                                  | 0%                                                                                  |
| Turn Type                         |                                                                                   | NA                                                                                |                                                                                   | Perm                                                                              | NA                                                                                |                                                                                   | Perm                                                                                | NA                                                                                  | Perm                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                   | 2                                                                                   |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 45.9                                                                              |                                                                                   | 45.9                                                                              | 45.9                                                                              |                                                                                   | 44.8                                                                                | 44.8                                                                                | 44.8                                                                                | 62.1                                                                                | 62.1                                                                                |                                                                                     |
| Effective Green, g (s)            |                                                                                   | 45.9                                                                              |                                                                                   | 45.9                                                                              | 45.9                                                                              |                                                                                   | 44.8                                                                                | 44.8                                                                                | 44.8                                                                                | 62.1                                                                                | 62.1                                                                                |                                                                                     |
| Actuated g/C Ratio                |                                                                                   | 0.38                                                                              |                                                                                   | 0.38                                                                              | 0.38                                                                              |                                                                                   | 0.37                                                                                | 0.37                                                                                | 0.37                                                                                | 0.52                                                                                | 0.52                                                                                |                                                                                     |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Vehicle Extension (s)             |                                                                                   | 3.0                                                                               |                                                                                   | 3.0                                                                               | 3.0                                                                               |                                                                                   | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 3.0                                                                                 | 5.0                                                                                 |                                                                                     |
| Lane Grp Cap (vph)                |                                                                                   | 647                                                                               |                                                                                   | 458                                                                               | 551                                                                               |                                                                                   | 312                                                                                 | 1321                                                                                | 548                                                                                 | 279                                                                                 | 1831                                                                                |                                                                                     |
| v/s Ratio Prot                    |                                                                                   | 0.02                                                                              |                                                                                   |                                                                                   | 0.20                                                                              |                                                                                   |                                                                                     | c0.24                                                                               |                                                                                     | c0.05                                                                               | 0.16                                                                                |                                                                                     |
| v/s Ratio Perm                    |                                                                                   |                                                                                   |                                                                                   | c0.34                                                                             |                                                                                   |                                                                                   | 0.02                                                                                |                                                                                     | 0.05                                                                                | 0.25                                                                                |                                                                                     |                                                                                     |
| v/c Ratio                         |                                                                                   | 0.05                                                                              |                                                                                   | 0.89                                                                              | 0.53                                                                              |                                                                                   | 0.06                                                                                | 0.64                                                                                | 0.12                                                                                | 0.58                                                                                | 0.31                                                                                |                                                                                     |
| Uniform Delay, d1                 |                                                                                   | 23.3                                                                              |                                                                                   | 34.7                                                                              | 28.7                                                                              |                                                                                   | 24.1                                                                                | 31.0                                                                                | 24.7                                                                                | 19.1                                                                                | 16.6                                                                                |                                                                                     |
| Progression Factor                |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.53                                                                                | 0.66                                                                                | 0.89                                                                                | 1.31                                                                                | 0.37                                                                                |                                                                                     |
| Incremental Delay, d2             |                                                                                   | 0.0                                                                               |                                                                                   | 19.0                                                                              | 1.0                                                                               |                                                                                   | 0.4                                                                                 | 2.2                                                                                 | 0.4                                                                                 | 2.2                                                                                 | 0.3                                                                                 |                                                                                     |
| Delay (s)                         |                                                                                   | 23.4                                                                              |                                                                                   | 53.7                                                                              | 29.7                                                                              |                                                                                   | 13.1                                                                                | 22.7                                                                                | 22.3                                                                                | 27.2                                                                                | 6.4                                                                                 |                                                                                     |
| Level of Service                  |                                                                                   | C                                                                                 |                                                                                   | D                                                                                 | C                                                                                 |                                                                                   | B                                                                                   | C                                                                                   | C                                                                                   | C                                                                                   | A                                                                                   |                                                                                     |
| Approach Delay (s)                |                                                                                   | 23.4                                                                              |                                                                                   |                                                                                   | 40.9                                                                              |                                                                                   |                                                                                     | 22.4                                                                                |                                                                                     |                                                                                     | 11.1                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                     | C                                                                                   |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 25.4                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.75                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                     |                                                                                     | 18.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 71.4%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Queues

Future Build PM - Improved

5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd

11/16/2016

|                         |  |  |  |  |  |  |   |  |  |  |  |
|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 |
| Lane Configurations     |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 23                                                                                | 17                                                                                | 21                                                                                | 287                                                                               | 7                                                                                 | 122                                                                               | 6                                                                                   | 797                                                                                 | 384                                                                                 | 172                                                                                 | 745                                                                                 |
| Future Volume (vph)     | 23                                                                                | 17                                                                                | 21                                                                                | 287                                                                               | 7                                                                                 | 122                                                                               | 6                                                                                   | 797                                                                                 | 384                                                                                 | 172                                                                                 | 745                                                                                 |
| Lane Group Flow (vph)   | 0                                                                                 | 76                                                                                | 42                                                                                | 0                                                                                 | 331                                                                               | 153                                                                               | 12                                                                                  | 960                                                                                 | 404                                                                                 | 198                                                                                 | 920                                                                                 |
| Turn Type               | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                | Perm                                                                                | NA                                                                                  |
| Protected Phases        |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |
| Permitted Phases        | 4                                                                                 |                                                                                   | 4                                                                                 | 8                                                                                 |                                                                                   | 8                                                                                 | 2                                                                                   |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     |
| Detector Phase          | 4                                                                                 | 4                                                                                 | 4                                                                                 | 8                                                                                 | 8                                                                                 | 8                                                                                 | 2                                                                                   | 2                                                                                   | 2                                                                                   | 6                                                                                   | 6                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 15.0                                                                                | 15.0                                                                                | 15.0                                                                                | 15.0                                                                                | 15.0                                                                                |
| Minimum Split (s)       | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                              | 24.0                                                                                | 24.0                                                                                | 24.0                                                                                | 24.0                                                                                | 24.0                                                                                |
| Total Split (s)         | 44.0                                                                              | 44.0                                                                              | 44.0                                                                              | 44.0                                                                              | 44.0                                                                              | 44.0                                                                              | 76.0                                                                                | 76.0                                                                                | 76.0                                                                                | 76.0                                                                                | 76.0                                                                                |
| Total Split (%)         | 36.7%                                                                             | 36.7%                                                                             | 36.7%                                                                             | 36.7%                                                                             | 36.7%                                                                             | 36.7%                                                                             | 63.3%                                                                               | 63.3%                                                                               | 63.3%                                                                               | 63.3%                                                                               | 63.3%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    |                                                                                   | 0.0                                                                               | 0.0                                                                               |                                                                                   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Lost Time (s)     |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lead/Lag                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | C-Min                                                                               | C-Min                                                                               | C-Min                                                                               | C-Min                                                                               | C-Min                                                                               |
| v/c Ratio               |                                                                                   | 0.21                                                                              | 0.09                                                                              |                                                                                   | 0.90                                                                              | 0.28                                                                              | 0.04                                                                                | 0.44                                                                                | 0.35                                                                                | 0.68                                                                                | 0.44                                                                                |
| Control Delay           |                                                                                   | 33.0                                                                              | 9.1                                                                               |                                                                                   | 69.0                                                                              | 9.5                                                                               | 5.2                                                                                 | 5.8                                                                                 | 0.6                                                                                 | 21.5                                                                                | 5.2                                                                                 |
| Queue Delay             |                                                                                   | 0.0                                                                               | 0.0                                                                               |                                                                                   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             |                                                                                   | 33.0                                                                              | 9.1                                                                               |                                                                                   | 69.0                                                                              | 9.5                                                                               | 5.2                                                                                 | 5.8                                                                                 | 0.6                                                                                 | 21.5                                                                                | 5.2                                                                                 |
| Queue Length 50th (ft)  |                                                                                   | 43                                                                                | 0                                                                                 |                                                                                   | 239                                                                               | 16                                                                                | 2                                                                                   | 97                                                                                  | 0                                                                                   | 64                                                                                  | 115                                                                                 |
| Queue Length 95th (ft)  |                                                                                   | 34                                                                                | 4                                                                                 |                                                                                   | 138                                                                               | 49                                                                                | m2                                                                                  | 101                                                                                 | m0                                                                                  | m123                                                                                | 106                                                                                 |
| Internal Link Dist (ft) |                                                                                   | 275                                                                               |                                                                                   |                                                                                   | 4179                                                                              |                                                                                   |                                                                                     | 3868                                                                                |                                                                                     |                                                                                     | 2104                                                                                |
| Turn Bay Length (ft)    |                                                                                   |                                                                                   | 105                                                                               |                                                                                   |                                                                                   | 250                                                                               | 230                                                                                 |                                                                                     | 230                                                                                 | 200                                                                                 |                                                                                     |
| Base Capacity (vph)     |                                                                                   | 395                                                                               | 515                                                                               |                                                                                   | 409                                                                               | 596                                                                               | 309                                                                                 | 2180                                                                                | 1149                                                                                | 292                                                                                 | 2078                                                                                |
| Starvation Cap Reductn  |                                                                                   | 0                                                                                 | 0                                                                                 |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   |                                                                                   | 0                                                                                 | 0                                                                                 |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     |                                                                                   | 0                                                                                 | 0                                                                                 |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       |                                                                                   | 0.19                                                                              | 0.08                                                                              |                                                                                   | 0.81                                                                              | 0.26                                                                              | 0.04                                                                                | 0.44                                                                                | 0.35                                                                                | 0.68                                                                                | 0.44                                                                                |

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 23 (19%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: SR 13 (Buford Hwy) &amp; Makita Co. Drwy/Thompson Mill Rd

|                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Ø2 (R)                                                                              | Ø4                                                                                  | Ø6 (R)                                                                              | Ø4                                                                                    | Ø8                                                                                    |                                                                                       |
| 76 s                                                                                | 44 s                                                                                | 76 s                                                                                | 44 s                                                                                  |                                                                                       |                                                                                       |



# HCM Signalized Intersection Capacity Analysis

## 5: SR 13 (Buford Hwy) & Makita Co. Drwy/Thompson Mill Rd

Future Build PM - Improved

11/16/2016

|                                   |  |  |  |  |  |  |   |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)              | 23                                                                                | 17                                                                                | 21                                                                                | 287                                                                               | 7                                                                                 | 122                                                                               | 6                                                                                   | 797                                                                                 | 384                                                                                 | 172                                                                                 | 745                                                                                 | 0                                                                                   |
| Future Volume (vph)               | 23                                                                                | 17                                                                                | 21                                                                                | 287                                                                               | 7                                                                                 | 122                                                                               | 6                                                                                   | 797                                                                                 | 384                                                                                 | 172                                                                                 | 745                                                                                 | 0                                                                                   |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Lane Util. Factor                 |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                |                                                                                     |
| Frt                               |                                                                                   | 1.00                                                                              | 0.85                                                                              |                                                                                   | 1.00                                                                              | 0.85                                                                              | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Flt Protected                     |                                                                                   | 0.98                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                              | 1.00                                                                              | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (prot)                 |                                                                                   | 1860                                                                              | 1538                                                                              |                                                                                   | 1814                                                                              | 1615                                                                              | 1805                                                                                | 3539                                                                                | 1615                                                                                | 1805                                                                                | 3374                                                                                |                                                                                     |
| Flt Permitted                     |                                                                                   | 0.66                                                                              | 1.00                                                                              |                                                                                   | 0.68                                                                              | 1.00                                                                              | 0.26                                                                                | 1.00                                                                                | 1.00                                                                                | 0.25                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (perm)                 |                                                                                   | 1248                                                                              | 1538                                                                              |                                                                                   | 1295                                                                              | 1615                                                                              | 502                                                                                 | 3539                                                                                | 1615                                                                                | 475                                                                                 | 3374                                                                                |                                                                                     |
| Peak-hour factor, PHF             | 0.69                                                                              | 0.40                                                                              | 0.50                                                                              | 0.91                                                                              | 0.44                                                                              | 0.80                                                                              | 0.50                                                                                | 0.83                                                                                | 0.95                                                                                | 0.87                                                                                | 0.81                                                                                | 0.73                                                                                |
| Adj. Flow (vph)                   | 33                                                                                | 42                                                                                | 42                                                                                | 315                                                                               | 16                                                                                | 152                                                                               | 12                                                                                  | 960                                                                                 | 404                                                                                 | 198                                                                                 | 920                                                                                 | 0                                                                                   |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 30                                                                                | 0                                                                                 | 0                                                                                 | 89                                                                                | 0                                                                                   | 0                                                                                   | 155                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Lane Group Flow (vph)             | 0                                                                                 | 76                                                                                | 12                                                                                | 0                                                                                 | 331                                                                               | 64                                                                                | 12                                                                                  | 960                                                                                 | 249                                                                                 | 198                                                                                 | 920                                                                                 | 0                                                                                   |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 5%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 0%                                                                                  | 2%                                                                                  | 0%                                                                                  | 0%                                                                                  | 7%                                                                                  | 0%                                                                                  |
| Turn Type                         | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                              | NA                                                                                | Perm                                                                              | Perm                                                                                | NA                                                                                  | Perm                                                                                | Perm                                                                                | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   | 4                                                                                 | 8                                                                                 |                                                                                   | 8                                                                                 | 2                                                                                   |                                                                                     | 2                                                                                   | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             |                                                                                   | 34.1                                                                              | 34.1                                                                              |                                                                                   | 34.1                                                                              | 34.1                                                                              | 73.9                                                                                | 73.9                                                                                | 73.9                                                                                | 73.9                                                                                | 73.9                                                                                |                                                                                     |
| Effective Green, g (s)            |                                                                                   | 34.1                                                                              | 34.1                                                                              |                                                                                   | 34.1                                                                              | 34.1                                                                              | 73.9                                                                                | 73.9                                                                                | 73.9                                                                                | 73.9                                                                                | 73.9                                                                                |                                                                                     |
| Actuated g/C Ratio                |                                                                                   | 0.28                                                                              | 0.28                                                                              |                                                                                   | 0.28                                                                              | 0.28                                                                              | 0.62                                                                                | 0.62                                                                                | 0.62                                                                                | 0.62                                                                                | 0.62                                                                                |                                                                                     |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Vehicle Extension (s)             |                                                                                   | 3.0                                                                               | 3.0                                                                               |                                                                                   | 3.0                                                                               | 3.0                                                                               | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |                                                                                     |
| Lane Grp Cap (vph)                |                                                                                   | 354                                                                               | 437                                                                               |                                                                                   | 367                                                                               | 458                                                                               | 309                                                                                 | 2179                                                                                | 994                                                                                 | 292                                                                                 | 2077                                                                                |                                                                                     |
| v/s Ratio Prot                    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     | 0.27                                                                                |                                                                                     |                                                                                     | 0.27                                                                                |                                                                                     |
| v/s Ratio Perm                    |                                                                                   | 0.06                                                                              | 0.01                                                                              |                                                                                   | 0.26                                                                              | 0.04                                                                              | 0.02                                                                                |                                                                                     | 0.15                                                                                | 0.42                                                                                |                                                                                     |                                                                                     |
| v/c Ratio                         |                                                                                   | 0.21                                                                              | 0.03                                                                              |                                                                                   | 0.90                                                                              | 0.14                                                                              | 0.04                                                                                | 0.44                                                                                | 0.25                                                                                | 0.68                                                                                | 0.44                                                                                |                                                                                     |
| Uniform Delay, d1                 |                                                                                   | 32.7                                                                              | 31.0                                                                              |                                                                                   | 41.3                                                                              | 32.0                                                                              | 9.1                                                                                 | 12.2                                                                                | 10.5                                                                                | 15.2                                                                                | 12.2                                                                                |                                                                                     |
| Progression Factor                |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              | 0.46                                                                                | 0.42                                                                                | 0.06                                                                                | 0.52                                                                                | 0.35                                                                                |                                                                                     |
| Incremental Delay, d2             |                                                                                   | 0.3                                                                               | 0.0                                                                               |                                                                                   | 24.4                                                                              | 0.1                                                                               | 0.1                                                                                 | 0.4                                                                                 | 0.4                                                                                 | 11.0                                                                                | 0.6                                                                                 |                                                                                     |
| Delay (s)                         |                                                                                   | 33.0                                                                              | 31.0                                                                              |                                                                                   | 65.7                                                                              | 32.2                                                                              | 4.3                                                                                 | 5.5                                                                                 | 1.0                                                                                 | 18.8                                                                                | 4.9                                                                                 |                                                                                     |
| Level of Service                  |                                                                                   | C                                                                                 | C                                                                                 |                                                                                   | E                                                                                 | C                                                                                 | A                                                                                   | A                                                                                   | A                                                                                   | B                                                                                   | A                                                                                   |                                                                                     |
| Approach Delay (s)                |                                                                                   | 32.3                                                                              |                                                                                   |                                                                                   | 55.1                                                                              |                                                                                   |                                                                                     | 4.2                                                                                 |                                                                                     |                                                                                     | 7.4                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                     | A                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   | 14.4                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   | 0.75                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   | 72.5%                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

Queues  
6: SR 13 (Buford Hwy) & S. Hill St/Hamilton Mill Rd

Future Build PM - Improved

11/16/2016

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|-------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Lane Group              | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | NBL                                                                               | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations     |  |  |  |  |  |  |    |  |  |  |  |
| Traffic Volume (vph)    | 82                                                                                | 279                                                                               | 55                                                                                | 405                                                                               | 222                                                                               | 83                                                                                | 970                                                                                 | 770                                                                                 | 297                                                                                 | 786                                                                                 | 54                                                                                  |
| Future Volume (vph)     | 82                                                                                | 279                                                                               | 55                                                                                | 405                                                                               | 222                                                                               | 83                                                                                | 970                                                                                 | 770                                                                                 | 297                                                                                 | 786                                                                                 | 54                                                                                  |
| Lane Group Flow (vph)   | 93                                                                                | 291                                                                               | 68                                                                                | 460                                                                               | 516                                                                               | 122                                                                               | 1066                                                                                | 837                                                                                 | 349                                                                                 | 936                                                                                 | 61                                                                                  |
| Turn Type               | Perm                                                                              | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                | pm+pt                                                                             | NA                                                                                  | Free                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases        |                                                                                   | 4                                                                                 |                                                                                   | 3                                                                                 | 8                                                                                 | 5                                                                                 | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases        | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 2                                                                                 |                                                                                     | Free                                                                                | 6                                                                                   |                                                                                     | 6                                                                                   |
| Detector Phase          | 4                                                                                 | 4                                                                                 | 4                                                                                 | 3                                                                                 | 8                                                                                 | 5                                                                                 | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   | 6                                                                                   |
| Switch Phase            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Minimum Initial (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 4.0                                                                               | 6.0                                                                               | 4.0                                                                               | 15.0                                                                                |                                                                                     | 4.0                                                                                 | 15.0                                                                                | 15.0                                                                                |
| Minimum Split (s)       | 41.0                                                                              | 41.0                                                                              | 41.0                                                                              | 11.0                                                                              | 46.0                                                                              | 11.0                                                                              | 37.0                                                                                |                                                                                     | 11.0                                                                                | 40.0                                                                                | 40.0                                                                                |
| Total Split (s)         | 36.0                                                                              | 36.0                                                                              | 36.0                                                                              | 24.0                                                                              | 60.0                                                                              | 12.0                                                                              | 41.0                                                                                |                                                                                     | 19.0                                                                                | 48.0                                                                                | 48.0                                                                                |
| Total Split (%)         | 30.0%                                                                             | 30.0%                                                                             | 30.0%                                                                             | 20.0%                                                                             | 50.0%                                                                             | 10.0%                                                                             | 34.2%                                                                               |                                                                                     | 15.8%                                                                               | 40.0%                                                                               | 40.0%                                                                               |
| Yellow Time (s)         | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                               | 4.0                                                                                 |                                                                                     | 4.0                                                                                 | 4.0                                                                                 | 4.0                                                                                 |
| All-Red Time (s)        | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                               | 2.0                                                                                 |                                                                                     | 2.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 |
| Lost Time Adjust (s)    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 |                                                                                     | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Lost Time (s)     | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lead/Lag                | Lag                                                                               | Lag                                                                               | Lag                                                                               | Lead                                                                              |                                                                                   | Lead                                                                              | Lag                                                                                 |                                                                                     | Lead                                                                                | Lag                                                                                 | Lag                                                                                 |
| Lead-Lag Optimize?      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Recall Mode             | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | None                                                                              | C-Min                                                                               |                                                                                     | None                                                                                | C-Min                                                                               | C-Min                                                                               |
| v/c Ratio               | 0.53                                                                              | 0.78                                                                              | 0.14                                                                              | 0.92                                                                              | 0.73                                                                              | 0.54                                                                              | 0.86                                                                                | 0.53                                                                                | 1.39                                                                                | 0.67                                                                                | 0.08                                                                                |
| Control Delay           | 53.5                                                                              | 60.6                                                                              | 0.7                                                                               | 75.2                                                                              | 33.3                                                                              | 29.4                                                                              | 45.7                                                                                | 1.3                                                                                 | 226.2                                                                               | 33.3                                                                                | 1.3                                                                                 |
| Queue Delay             | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Total Delay             | 53.5                                                                              | 60.6                                                                              | 0.7                                                                               | 75.2                                                                              | 33.3                                                                              | 29.4                                                                              | 45.7                                                                                | 1.3                                                                                 | 226.2                                                                               | 33.3                                                                                | 1.3                                                                                 |
| Queue Length 50th (ft)  | 65                                                                                | 216                                                                               | 0                                                                                 | 183                                                                               | 300                                                                               | 49                                                                                | 403                                                                                 | 0                                                                                   | ~310                                                                                | 292                                                                                 | 1                                                                                   |
| Queue Length 95th (ft)  | 112                                                                               | 296                                                                               | 0                                                                                 | #270                                                                              | 366                                                                               | 69                                                                                | #596                                                                                | 0                                                                                   | m#462                                                                               | 406                                                                                 | m5                                                                                  |
| Internal Link Dist (ft) |                                                                                   | 660                                                                               |                                                                                   |                                                                                   | 1618                                                                              |                                                                                   | 1320                                                                                |                                                                                     |                                                                                     | 3868                                                                                |                                                                                     |
| Turn Bay Length (ft)    | 180                                                                               |                                                                                   | 300                                                                               | 250                                                                               |                                                                                   | 240                                                                               |                                                                                     | 1000                                                                                | 400                                                                                 |                                                                                     | 280                                                                                 |
| Base Capacity (vph)     | 224                                                                               | 475                                                                               | 547                                                                               | 500                                                                               | 802                                                                               | 224                                                                               | 1238                                                                                | 1568                                                                                | 251                                                                                 | 1391                                                                                | 734                                                                                 |
| Starvation Cap Reductn  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Spillback Cap Reductn   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Storage Cap Reductn     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Reduced v/c Ratio       | 0.42                                                                              | 0.61                                                                              | 0.12                                                                              | 0.92                                                                              | 0.64                                                                              | 0.54                                                                              | 0.86                                                                                | 0.53                                                                                | 1.39                                                                                | 0.67                                                                                | 0.08                                                                                |

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 4 (3%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.

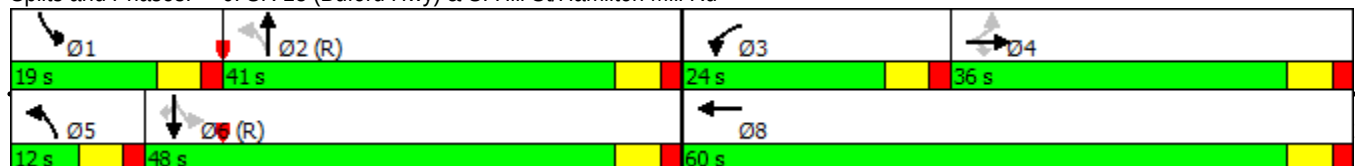
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: SR 13 (Buford Hwy) & S. Hill St/Hamilton Mill Rd



# HCM Signalized Intersection Capacity Analysis

## 6: SR 13 (Buford Hwy) & S. Hill St/Hamilton Mill Rd

Future Build PM - Improved

11/16/2016

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |  |  |  |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (vph)              | 82                                                                                | 279                                                                               | 55                                                                                | 405                                                                               | 222                                                                               | 201                                                                               | 83                                                                                  | 970                                                                                 | 770                                                                                 | 297                                                                                 | 786                                                                                 | 54                                                                                  |
| Future Volume (vph)               | 82                                                                                | 279                                                                               | 55                                                                                | 405                                                                               | 222                                                                               | 201                                                                               | 83                                                                                  | 970                                                                                 | 770                                                                                 | 297                                                                                 | 786                                                                                 | 54                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Total Lost time (s)               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 | 4.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Lane Util. Factor                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.97                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                |
| Frt                               | 1.00                                                                              | 1.00                                                                              | 0.85                                                                              | 1.00                                                                              | 0.93                                                                              |                                                                                   | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                | 1.00                                                                                | 1.00                                                                                | 0.85                                                                                |
| Flt Protected                     | 0.95                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                | 0.95                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (prot)                 | 1805                                                                              | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1715                                                                              |                                                                                   | 1805                                                                                | 3574                                                                                | 1568                                                                                | 1752                                                                                | 3438                                                                                | 1615                                                                                |
| Flt Permitted                     | 0.47                                                                              | 1.00                                                                              | 1.00                                                                              | 0.95                                                                              | 1.00                                                                              |                                                                                   | 0.20                                                                                | 1.00                                                                                | 1.00                                                                                | 0.08                                                                                | 1.00                                                                                | 1.00                                                                                |
| Satd. Flow (perm)                 | 899                                                                               | 1900                                                                              | 1615                                                                              | 3335                                                                              | 1715                                                                              |                                                                                   | 386                                                                                 | 3574                                                                                | 1568                                                                                | 155                                                                                 | 3438                                                                                | 1615                                                                                |
| Peak-hour factor, PHF             | 0.88                                                                              | 0.96                                                                              | 0.81                                                                              | 0.88                                                                              | 0.86                                                                              | 0.78                                                                              | 0.68                                                                                | 0.91                                                                                | 0.92                                                                                | 0.85                                                                                | 0.84                                                                                | 0.88                                                                                |
| Adj. Flow (vph)                   | 93                                                                                | 291                                                                               | 68                                                                                | 460                                                                               | 258                                                                               | 258                                                                               | 122                                                                                 | 1066                                                                                | 837                                                                                 | 349                                                                                 | 936                                                                                 | 61                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 0                                                                                 | 55                                                                                | 0                                                                                 | 33                                                                                | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 36                                                                                  |
| Lane Group Flow (vph)             | 93                                                                                | 291                                                                               | 13                                                                                | 460                                                                               | 483                                                                               | 0                                                                                 | 122                                                                                 | 1066                                                                                | 837                                                                                 | 349                                                                                 | 936                                                                                 | 25                                                                                  |
| Heavy Vehicles (%)                | 0%                                                                                | 0%                                                                                | 0%                                                                                | 5%                                                                                | 1%                                                                                | 4%                                                                                | 0%                                                                                  | 1%                                                                                  | 3%                                                                                  | 3%                                                                                  | 5%                                                                                  | 0%                                                                                  |
| Turn Type                         | Perm                                                                              | NA                                                                                | Perm                                                                              | Prot                                                                              | NA                                                                                |                                                                                   | pm+pt                                                                               | NA                                                                                  | Free                                                                                | pm+pt                                                                               | NA                                                                                  | Perm                                                                                |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   | 3                                                                                 | 8                                                                                 |                                                                                   | 5                                                                                   | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   |                                                                                   | 2                                                                                   |                                                                                     | Free                                                                                | 6                                                                                   |                                                                                     | 6                                                                                   |
| Actuated Green, G (s)             | 23.4                                                                              | 23.4                                                                              | 23.4                                                                              | 18.0                                                                              | 47.4                                                                              |                                                                                   | 47.6                                                                                | 41.6                                                                                | 120.0                                                                               | 60.6                                                                                | 48.6                                                                                | 48.6                                                                                |
| Effective Green, g (s)            | 23.4                                                                              | 23.4                                                                              | 23.4                                                                              | 18.0                                                                              | 47.4                                                                              |                                                                                   | 47.6                                                                                | 41.6                                                                                | 120.0                                                                               | 60.6                                                                                | 48.6                                                                                | 48.6                                                                                |
| Actuated g/C Ratio                | 0.19                                                                              | 0.19                                                                              | 0.19                                                                              | 0.15                                                                              | 0.39                                                                              |                                                                                   | 0.40                                                                                | 0.35                                                                                | 1.00                                                                                | 0.51                                                                                | 0.41                                                                                | 0.41                                                                                |
| Clearance Time (s)                | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               | 6.0                                                                               |                                                                                   | 6.0                                                                                 | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 | 6.0                                                                                 |
| Vehicle Extension (s)             | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               | 3.0                                                                               |                                                                                   | 3.0                                                                                 | 5.0                                                                                 |                                                                                     | 3.0                                                                                 | 5.0                                                                                 | 5.0                                                                                 |
| Lane Grp Cap (vph)                | 175                                                                               | 370                                                                               | 314                                                                               | 500                                                                               | 677                                                                               |                                                                                   | 224                                                                                 | 1238                                                                                | 1568                                                                                | 251                                                                                 | 1392                                                                                | 654                                                                                 |
| v/s Ratio Prot                    |                                                                                   | 0.15                                                                              |                                                                                   | c0.14                                                                             | c0.28                                                                             |                                                                                   | 0.03                                                                                | 0.30                                                                                |                                                                                     | c0.15                                                                               | 0.27                                                                                |                                                                                     |
| v/s Ratio Perm                    | 0.10                                                                              |                                                                                   | 0.01                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.19                                                                                |                                                                                     | 0.53                                                                                | c0.55                                                                               |                                                                                     | 0.02                                                                                |
| v/c Ratio                         | 0.53                                                                              | 0.79                                                                              | 0.04                                                                              | 0.92                                                                              | 0.71                                                                              |                                                                                   | 0.54                                                                                | 0.86                                                                                | 0.53                                                                                | 1.39                                                                                | 0.67                                                                                | 0.04                                                                                |
| Uniform Delay, d1                 | 43.4                                                                              | 45.9                                                                              | 39.2                                                                              | 50.3                                                                              | 30.6                                                                              |                                                                                   | 24.4                                                                                | 36.5                                                                                | 0.0                                                                                 | 35.9                                                                                | 29.2                                                                                | 21.6                                                                                |
| Progression Factor                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.06                                                                                | 1.01                                                                                | 1.00                                                                                |
| Incremental Delay, d2             | 3.1                                                                               | 10.5                                                                              | 0.1                                                                               | 22.3                                                                              | 3.6                                                                               |                                                                                   | 2.7                                                                                 | 8.0                                                                                 | 1.3                                                                                 | 195.9                                                                               | 2.3                                                                                 | 0.1                                                                                 |
| Delay (s)                         | 46.5                                                                              | 56.5                                                                              | 39.3                                                                              | 72.6                                                                              | 34.1                                                                              |                                                                                   | 27.1                                                                                | 44.5                                                                                | 1.3                                                                                 | 233.9                                                                               | 31.9                                                                                | 21.7                                                                                |
| Level of Service                  | D                                                                                 | E                                                                                 | D                                                                                 | E                                                                                 | C                                                                                 |                                                                                   | C                                                                                   | D                                                                                   | A                                                                                   | F                                                                                   | C                                                                                   | C                                                                                   |
| Approach Delay (s)                |                                                                                   | 51.8                                                                              |                                                                                   |                                                                                   | 52.3                                                                              |                                                                                   |                                                                                     | 25.6                                                                                |                                                                                     |                                                                                     | 83.8                                                                                |                                                                                     |
| Approach LOS                      |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                     | C                                                                                   |                                                                                     |                                                                                     | F                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 49.8                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                     |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 1.20                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 120.0                                                                             |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                     |                                                                                     | 24.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 92.2%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                     |                                                                                     | F                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM Unsignalized Intersection Capacity Analysis

## 7: Pvt. Drwy/Bryant Rd & Thompson Mill Rd

Future Build PM - Improved

11/16/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                     |  |                                                                                     |                                                                                     |  |                                                                                     |
| Traffic Volume (veh/h)            | 5                                                                                 | 516                                                                               | 0                                                                                 | 0                                                                                 | 296                                                                               | 11                                                                                | 0                                                                                   | 0                                                                                   | 0                                                                                   | 32                                                                                  | 0                                                                                   | 8                                                                                   |
| Future Volume (Veh/h)             | 5                                                                                 | 516                                                                               | 0                                                                                 | 0                                                                                 | 296                                                                               | 11                                                                                | 0                                                                                   | 0                                                                                   | 0                                                                                   | 32                                                                                  | 0                                                                                   | 8                                                                                   |
| Sign Control                      |                                                                                   | Free                                                                              |                                                                                   |                                                                                   | Free                                                                              |                                                                                   |                                                                                     | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Grade                             |                                                                                   | 0%                                                                                |                                                                                   |                                                                                   | 0%                                                                                |                                                                                   |                                                                                     | 0%                                                                                  |                                                                                     |                                                                                     | 0%                                                                                  |                                                                                     |
| Peak Hour Factor                  | 0.31                                                                              | 0.80                                                                              | 0.25                                                                              | 0.92                                                                              | 0.96                                                                              | 0.58                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.61                                                                                | 0.92                                                                                | 0.67                                                                                |
| Hourly flow rate (vph)            | 16                                                                                | 645                                                                               | 0                                                                                 | 0                                                                                 | 308                                                                               | 19                                                                                | 0                                                                                   | 0                                                                                   | 0                                                                                   | 52                                                                                  | 0                                                                                   | 12                                                                                  |
| Pedestrians                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane Width (ft)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Walking Speed (ft/s)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Percent Blockage                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Right turn flare (veh)            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median type                       |                                                                                   | None                                                                              |                                                                                   |                                                                                   | None                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median storage (veh)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Upstream signal (ft)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| pX, platoon unblocked             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC, conflicting volume            | 327                                                                               |                                                                                   |                                                                                   | 645                                                                               |                                                                                   |                                                                                   | 1006                                                                                | 1004                                                                                | 645                                                                                 | 994                                                                                 | 994                                                                                 | 318                                                                                 |
| vC1, stage 1 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC2, stage 2 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vCu, unblocked vol                | 327                                                                               |                                                                                   |                                                                                   | 645                                                                               |                                                                                   |                                                                                   | 1006                                                                                | 1004                                                                                | 645                                                                                 | 994                                                                                 | 994                                                                                 | 318                                                                                 |
| tC, single (s)                    | 4.1                                                                               |                                                                                   |                                                                                   | 4.1                                                                               |                                                                                   |                                                                                   | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 |
| tC, 2 stage (s)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| tF (s)                            | 2.2                                                                               |                                                                                   |                                                                                   | 2.2                                                                               |                                                                                   |                                                                                   | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 |
| p0 queue free %                   | 99                                                                                |                                                                                   |                                                                                   | 100                                                                               |                                                                                   |                                                                                   | 100                                                                                 | 100                                                                                 | 100                                                                                 | 77                                                                                  | 100                                                                                 | 98                                                                                  |
| cM capacity (veh/h)               | 1244                                                                              |                                                                                   |                                                                                   | 950                                                                               |                                                                                   |                                                                                   | 216                                                                                 | 241                                                                                 | 476                                                                                 | 224                                                                                 | 244                                                                                 | 728                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total                      | 661                                                                               | 327                                                                               | 0                                                                                 | 64                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left                       | 16                                                                                | 0                                                                                 | 0                                                                                 | 52                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right                      | 0                                                                                 | 19                                                                                | 0                                                                                 | 12                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| cSH                               | 1244                                                                              | 950                                                                               | 1700                                                                              | 257                                                                               |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume to Capacity                | 0.01                                                                              | 0.00                                                                              | 0.00                                                                              | 0.25                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Queue Length 95th (ft)            | 1                                                                                 | 0                                                                                 | 0                                                                                 | 24                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 0.4                                                                               | 0.0                                                                               | 0.0                                                                               | 23.6                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane LOS                          | A                                                                                 |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 0.4                                                                               | 0.0                                                                               | 0.0                                                                               | 23.6                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   |                                                                                   | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Average Delay                     |                                                                                   |                                                                                   | 1.7                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 41.1%                                                                             |                                                                                   | ICU Level of Service                                                              |                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM Unsignalized Intersection Capacity Analysis 8: N. Bogan Rd & Thompson Mill Rd

Future Build PM - Improved

11/16/2016

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |  |                                                                                   |  |                                                                                   |                                                                                    |  |  |                                                                                     |  |  |
| Sign Control                      |                                                                                   | Stop                                                                              |                                                                                   |                                                                                   | Stop                                                                              |                                                                                   |                                                                                    | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Traffic Volume (vph)              | 74                                                                                | 380                                                                               | 112                                                                               | 58                                                                                | 182                                                                               | 15                                                                                | 74                                                                                 | 150                                                                                 | 87                                                                                  | 15                                                                                  | 158                                                                                 | 50                                                                                  |
| Future Volume (vph)               | 74                                                                                | 380                                                                               | 112                                                                               | 58                                                                                | 182                                                                               | 15                                                                                | 74                                                                                 | 150                                                                                 | 87                                                                                  | 15                                                                                  | 158                                                                                 | 50                                                                                  |
| Peak Hour Factor                  | 0.83                                                                              | 0.90                                                                              | 0.79                                                                              | 0.92                                                                              | 0.86                                                                              | 0.88                                                                              | 0.92                                                                               | 0.81                                                                                | 0.77                                                                                | 0.70                                                                                | 0.75                                                                                | 0.80                                                                                |
| Hourly flow rate (vph)            | 89                                                                                | 422                                                                               | 142                                                                               | 63                                                                                | 212                                                                               | 17                                                                                | 80                                                                                 | 185                                                                                 | 113                                                                                 | 21                                                                                  | 211                                                                                 | 63                                                                                  |
| Direction, Lane #                 | EB 1                                                                              | EB 2                                                                              | WB 1                                                                              | NB 1                                                                              | NB 2                                                                              | SB 1                                                                              | SB 2                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total (vph)                | 511                                                                               | 142                                                                               | 292                                                                               | 265                                                                               | 113                                                                               | 232                                                                               | 63                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left (vph)                 | 89                                                                                | 0                                                                                 | 63                                                                                | 80                                                                                | 0                                                                                 | 21                                                                                | 0                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right (vph)                | 0                                                                                 | 142                                                                               | 17                                                                                | 0                                                                                 | 113                                                                               | 0                                                                                 | 63                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Hadj (s)                          | 0.03                                                                              | -0.60                                                                             | 0.01                                                                              | 0.06                                                                              | -0.58                                                                             | 0.02                                                                              | -0.60                                                                              |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Departure Headway (s)             | 6.7                                                                               | 3.2                                                                               | 7.2                                                                               | 7.5                                                                               | 3.2                                                                               | 7.6                                                                               | 3.2                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Degree Utilization, x             | 0.95                                                                              | 0.13                                                                              | 0.58                                                                              | 0.55                                                                              | 0.10                                                                              | 0.49                                                                              | 0.06                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Capacity (veh/h)                  | 533                                                                               | 1121                                                                              | 474                                                                               | 452                                                                               | 1121                                                                              | 442                                                                               | 1121                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 52.1                                                                              | 6.7                                                                               | 19.8                                                                              | 19.5                                                                              | 6.6                                                                               | 17.7                                                                              | 6.4                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 42.2                                                                              |                                                                                   | 19.8                                                                              | 15.6                                                                              |                                                                                   | 15.3                                                                              |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      | E                                                                                 |                                                                                   | C                                                                                 | C                                                                                 |                                                                                   | C                                                                                 |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Delay                             |                                                                                   |                                                                                   | 27.1                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Level of Service                  |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 72.3%                                                                             | ICU Level of Service                                                              |                                                                                   |                                                                                   |                                                                                    | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

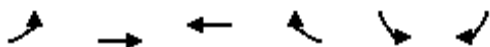
Intersection: 8: N. Bogan Rd & Thompson Mill Rd

| Movement              | EB   | EB  | WB   | NB  | SB  |
|-----------------------|------|-----|------|-----|-----|
| Directions Served     | LT   | R   | LTR  | LT  | LT  |
| Maximum Queue (ft)    | 224  | 150 | 85   | 76  | 86  |
| Average Queue (ft)    | 105  | 30  | 49   | 50  | 45  |
| 95th Queue (ft)       | 210  | 129 | 83   | 78  | 82  |
| Link Distance (ft)    | 2179 |     | 1026 | 850 | 591 |
| Upstream Blk Time (%) |      |     |      |     |     |
| Queuing Penalty (veh) |      |     |      |     |     |
| Storage Bay Dist (ft) |      | 100 |      |     |     |
| Storage Blk Time (%)  | 12   |     |      |     | 0   |
| Queuing Penalty (veh) | 13   |     |      |     | 0   |

# HCM Unsignalized Intersection Capacity Analysis

## 9: Thompson Mill Rd & Site Drwy

Future Build PM - Improved  
11/16/2016



| Movement                          | EBL  | EBT  | WBT   | WBR  | SBL                  | SBR  |
|-----------------------------------|------|------|-------|------|----------------------|------|
| Lane Configurations               |      | ↑    | ↑     | ↗    | ↘                    |      |
| Traffic Volume (veh/h)            | 0    | 548  | 307   | 8    | 29                   | 0    |
| Future Volume (Veh/h)             | 0    | 548  | 307   | 8    | 29                   | 0    |
| Sign Control                      |      | Free | Free  |      | Stop                 |      |
| Grade                             |      | 0%   | 0%    |      | 0%                   |      |
| Peak Hour Factor                  | 0.92 | 0.80 | 0.96  | 0.92 | 0.92                 | 0.92 |
| Hourly flow rate (vph)            | 0    | 685  | 320   | 9    | 32                   | 0    |
| Pedestrians                       |      |      |       |      |                      |      |
| Lane Width (ft)                   |      |      |       |      |                      |      |
| Walking Speed (ft/s)              |      |      |       |      |                      |      |
| Percent Blockage                  |      |      |       |      |                      |      |
| Right turn flare (veh)            |      |      |       |      |                      |      |
| Median type                       |      | None | None  |      |                      |      |
| Median storage veh)               |      |      |       |      |                      |      |
| Upstream signal (ft)              |      |      |       |      |                      |      |
| pX, platoon unblocked             |      |      |       |      |                      |      |
| vC, conflicting volume            | 320  |      |       |      | 1005                 | 320  |
| vC1, stage 1 conf vol             |      |      |       |      |                      |      |
| vC2, stage 2 conf vol             |      |      |       |      |                      |      |
| vCu, unblocked vol                | 320  |      |       |      | 1005                 | 320  |
| tC, single (s)                    | 4.1  |      |       |      | 6.4                  | 6.2  |
| tC, 2 stage (s)                   |      |      |       |      |                      |      |
| tF (s)                            | 2.2  |      |       |      | 3.5                  | 3.3  |
| p0 queue free %                   | 100  |      |       |      | 88                   | 100  |
| cM capacity (veh/h)               | 1240 |      |       |      | 268                  | 721  |
| Direction, Lane #                 | EB 1 | WB 1 | WB 2  | SB 1 |                      |      |
| Volume Total                      | 685  | 320  | 9     | 32   |                      |      |
| Volume Left                       | 0    | 0    | 0     | 32   |                      |      |
| Volume Right                      | 0    | 0    | 9     | 0    |                      |      |
| cSH                               | 1700 | 1700 | 1700  | 268  |                      |      |
| Volume to Capacity                | 0.40 | 0.19 | 0.01  | 0.12 |                      |      |
| Queue Length 95th (ft)            | 0    | 0    | 0     | 10   |                      |      |
| Control Delay (s)                 | 0.0  | 0.0  | 0.0   | 20.3 |                      |      |
| Lane LOS                          |      |      |       | C    |                      |      |
| Approach Delay (s)                | 0.0  | 0.0  |       | 20.3 |                      |      |
| Approach LOS                      |      |      |       | C    |                      |      |
| Intersection Summary              |      |      |       |      |                      |      |
| Average Delay                     |      |      | 0.6   |      |                      |      |
| Intersection Capacity Utilization |      |      | 38.8% |      | ICU Level of Service |      |
| Analysis Period (min)             |      |      | 15    |      | A                    |      |

## **Traffic Volume Worksheets**



# 16-106 Longacre Development - SR 13 (Buford Hwy) - Buford, GA

Traffic Volumes  
Future Conditions

A&R Engineering  
November 2016

1. SR 347 @ I-985 NB Ramps

## A.M. Peak Hour

| Condition                | Northbound |     |     | Southbound |     |     | Eastbound |     |     | Westbound |     |     |
|--------------------------|------------|-----|-----|------------|-----|-----|-----------|-----|-----|-----------|-----|-----|
|                          | L          | T   | R   | Tot        | L   | T   | R         | Tot | L   | T         | R   | Tot |
| Existing:                | 303        | 4   | 83  | 390        | 0   | 0   | 0         | 0   | 355 | 387       | 0   | 742 |
| Growth Factor (%):       | 0.5        | 0.5 | 0.5 |            | 0.5 | 0.5 | 0.5       |     | 0.5 | 0.5       | 0.5 |     |
| Shifted Bryant Rd Trips: | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Base Condition:          | 318        | 4   | 87  | 409        | 0   | 0   | 0         | 0   | 373 | 407       | 0   | 780 |
| Industrial Car Trips:    | 48         | 0   | 0   | 48         | 0   | 0   | 0         | 0   | 14  | 6         | 0   | 20  |
| Industrial Truck Trips:  | 20         | 0   | 0   | 20         | 0   | 0   | 0         | 0   | 6   | 1         | 0   | 7   |
| Retail Trips:            | 6          | 0   | 0   | 6          | 0   | 0   | 0         | 0   | 5   | 2         | 0   | 7   |
| Total New Trips:         | 74         | 0   | 0   | 74         | 0   | 0   | 0         | 0   | 25  | 9         | 0   | 34  |
| Pass-by Trips:           | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Future Traffic Volumes:  | 392        | 4   | 87  | 483        | 0   | 0   | 0         | 0   | 398 | 416       | 0   | 814 |

## P.M. Peak Hour

| Condition                | Northbound |     |     | Southbound |     |     | Eastbound |     |     | Westbound |     |      |
|--------------------------|------------|-----|-----|------------|-----|-----|-----------|-----|-----|-----------|-----|------|
|                          | L          | T   | R   | Tot        | L   | T   | R         | Tot | L   | T         | R   | Tot  |
| Existing:                | 330        | 1   | 535 | 866        | 0   | 0   | 0         | 0   | 449 | 1234      | 0   | 1683 |
| Growth Factor (%):       | 0.5        | 0.5 | 0.5 |            | 0.5 | 0.5 | 0.5       |     | 0.5 | 0.5       | 0.5 |      |
| Shifted Bryant Rd Trips: | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0    |
| Base Condition:          | 347        | 1   | 562 | 910        | 0   | 0   | 0         | 0   | 472 | 1297      | 0   | 1769 |
| Industrial Car Trips:    | 14         | 0   | 0   | 14         | 0   | 0   | 0         | 0   | 62  | 25        | 0   | 87   |
| Industrial Truck Trips:  | 6          | 0   | 0   | 6          | 0   | 0   | 0         | 0   | 23  | 4         | 0   | 27   |
| Retail Trips:            | 12         | 0   | 0   | 12         | 0   | 0   | 0         | 0   | 16  | 6         | 0   | 22   |
| Total New Trips:         | 32         | 0   | 0   | 32         | 0   | 0   | 0         | 0   | 101 | 35        | 0   | 136  |
| Pass-by Trips:           | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0    |
| Future Traffic Volumes:  | 379        | 1   | 562 | 942        | 0   | 0   | 0         | 0   | 573 | 1332      | 0   | 1905 |

# 16-106 Longacre Development - SR 13 (Buford Hwy) - Buford, GA

Traffic Volumes  
Future Conditions

A&R Engineering  
November 2016

## 2. SR 347 @ I-985 SB Ramps

### A.M. Peak Hour

| Condition                | Northbound |     |     | Southbound |     |     | Eastbound |     |     | Westbound |     |      |
|--------------------------|------------|-----|-----|------------|-----|-----|-----------|-----|-----|-----------|-----|------|
|                          | L          | T   | R   | Tot        | L   | T   | R         | Tot | L   | T         | R   | Tot  |
| Existing:                | 0          | 0   | 0   | 0          | 112 | 0   | 435       | 547 | 0   | 627       | 382 | 1009 |
| Growth Factor (%):       | 0.5        | 0.5 | 0.5 |            | 0.5 | 0.5 | 0.5       |     | 0.5 | 0.5       | 0.5 |      |
| Shifted Bryant Rd Trips: | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0    |
| Base Condition:          | 0          | 0   | 0   | 0          | 118 | 0   | 457       | 575 | 0   | 659       | 402 | 1061 |
| Industrial Car Trips:    | 0          | 0   | 0   | 0          | 0   | 0   | 60        | 60  | 0   | 20        | 11  | 31   |
| Industrial Truck Trips:  | 0          | 0   | 0   | 0          | 0   | 0   | 23        | 23  | 0   | 7         | 5   | 12   |
| Retail Trips:            | 0          | 0   | 0   | 0          | 0   | 0   | 8         | 8   | 0   | 7         | 4   | 11   |
| Total New Trips:         | 0          | 0   | 0   | 0          | 0   | 0   | 91        | 91  | 0   | 34        | 20  | 54   |
| Pass-by Trips:           | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0    |
| Future Traffic Volumes:  | 0          | 0   | 0   | 0          | 118 | 0   | 548       | 666 | 0   | 693       | 422 | 1115 |
|                          |            |     |     |            |     |     |           |     | 496 | 1221      | 0   | 1717 |

### P.M. Peak Hour

| Condition                | Northbound |     |     | Southbound |     |     | Eastbound |     |     | Westbound |     |      |
|--------------------------|------------|-----|-----|------------|-----|-----|-----------|-----|-----|-----------|-----|------|
|                          | L          | T   | R   | Tot        | L   | T   | R         | Tot | L   | T         | R   | Tot  |
| Existing:                | 0          | 0   | 0   | 0          | 304 | 0   | 336       | 640 | 0   | 1393      | 388 | 1781 |
| Growth Factor (%):       | 0.5        | 0.5 | 0.5 |            | 0.5 | 0.5 | 0.5       |     | 0.5 | 0.5       | 0.5 |      |
| Shifted Bryant Rd Trips: | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0    |
| Base Condition:          | 0          | 0   | 0   | 0          | 320 | 0   | 353       | 673 | 0   | 1464      | 408 | 1872 |
| Industrial Car Trips:    | 0          | 0   | 0   | 0          | 0   | 0   | 18        | 18  | 0   | 87        | 50  | 137  |
| Industrial Truck Trips:  | 0          | 0   | 0   | 0          | 0   | 0   | 7         | 7   | 0   | 27        | 19  | 46   |
| Retail Trips:            | 0          | 0   | 0   | 0          | 0   | 0   | 15        | 15  | 0   | 23        | 13  | 36   |
| Total New Trips:         | 0          | 0   | 0   | 0          | 0   | 0   | 40        | 40  | 0   | 137       | 82  | 219  |
| Pass-by Trips:           | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0    |
| Future Traffic Volumes:  | 0          | 0   | 0   | 0          | 320 | 0   | 393       | 713 | 0   | 1601      | 490 | 2091 |
|                          |            |     |     |            |     |     |           |     | 162 | 792       | 0   | 954  |

# 16-106 Longacre Development - SR 13 (Buford Hwy) - Buford, GA

Traffic Volumes  
Future Conditions

A&R Engineering  
November 2016

3. SR 347 @ SR 13 (Atlanta Hwy)

## A.M. Peak Hour

| Condition                | Northbound |     |     | Southbound |     |     | Eastbound |     |     | Westbound |     |     |
|--------------------------|------------|-----|-----|------------|-----|-----|-----------|-----|-----|-----------|-----|-----|
|                          | L          | T   | R   | Tot        | L   | T   | R         | Tot | L   | T         | R   | Tot |
| Existing:                | 87         | 131 | 161 | 379        | 232 | 268 | 123       | 623 | 135 | 570       | 94  | 799 |
| Growth Factor (%):       | 0.5        | 0.5 | 0.5 |            | 0.5 | 0.5 | 0.5       |     | 0.5 | 0.5       | 0.5 |     |
| Shifted Bryant Rd Trips: | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Base Condition:          | 91         | 138 | 169 | 398        | 244 | 282 | 129       | 655 | 142 | 599       | 99  | 840 |
| Industrial Car Trips:    | 3          | 10  | 31  | 44         | 0   | 40  | 0         | 40  | 0   | 0         | 12  | 12  |
| Industrial Truck Trips:  | 0          | 2   | 11  | 13         | 0   | 6   | 0         | 6   | 0   | 0         | 0   | 0   |
| Retail Trips:            | 1          | 3   | 11  | 15         | 0   | 5   | 0         | 5   | 0   | 0         | 2   | 2   |
| Total New Trips:         | 4          | 15  | 53  | 72         | 0   | 51  | 0         | 51  | 0   | 0         | 14  | 14  |
| Pass-by Trips:           | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Future Traffic Volumes:  | 95         | 153 | 222 | 470        | 244 | 333 | 129       | 706 | 142 | 599       | 113 | 854 |

## P.M. Peak Hour

| Condition                | Northbound |     |     | Southbound |     |     | Eastbound |     |     | Westbound |     |      |
|--------------------------|------------|-----|-----|------------|-----|-----|-----------|-----|-----|-----------|-----|------|
|                          | L          | T   | R   | Tot        | L   | T   | R         | Tot | L   | T         | R   | Tot  |
| Existing:                | 108        | 339 | 339 | 786        | 165 | 152 | 98        | 415 | 184 | 829       | 71  | 1084 |
| Growth Factor (%):       | 0.5        | 0.5 | 0.5 |            | 0.5 | 0.5 | 0.5       |     | 0.5 | 0.5       | 0.5 |      |
| Shifted Bryant Rd Trips: | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0    |
| Base Condition:          | 114        | 356 | 356 | 826        | 173 | 160 | 103       | 436 | 193 | 871       | 75  | 1139 |
| Industrial Car Trips:    | 12         | 41  | 136 | 189        | 0   | 12  | 0         | 12  | 0   | 0         | 4   | 4    |
| Industrial Truck Trips:  | 0          | 6   | 46  | 52         | 0   | 2   | 0         | 2   | 0   | 0         | 0   | 0    |
| Retail Trips:            | 3          | 11  | 36  | 50         | 0   | 10  | 0         | 10  | 0   | 0         | 3   | 3    |
| Total New Trips:         | 15         | 58  | 218 | 291        | 0   | 24  | 0         | 24  | 0   | 0         | 7   | 7    |
| Pass-by Trips:           | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0    |
| Future Traffic Volumes:  | 129        | 414 | 574 | 1117       | 173 | 184 | 103       | 460 | 193 | 871       | 82  | 1146 |

# 16-106 Longacre Development - SR 13 (Buford Hwy) - Buford, GA

Traffic Volumes  
Future Conditions

A&R Engineering  
November 2016

4. SR 13 @ Roy Carlson Blvd

## A.M. Peak Hour

| Condition                | Northbound |     |     | Southbound |     |     | Eastbound |      |     | Westbound |     |     |
|--------------------------|------------|-----|-----|------------|-----|-----|-----------|------|-----|-----------|-----|-----|
|                          | L          | T   | R   | Tot        | L   | T   | R         | Tot  | L   | T         | R   | Tot |
| Existing:                | 0          | 379 | 49  | 428        | 35  | 703 | 0         | 738  | 0   | 0         | 5   | 12  |
| Growth Factor (%):       | 0.5        | 0.5 | 0.5 |            | 0.5 | 0.5 | 0.5       |      | 0.5 | 0.5       | 0.5 |     |
| Shifted Bryant Rd Trips: | 41         | -21 | 2   | 22         | 10  | -12 | 2         | 0    | 0   | 13        | 42  | 55  |
| Base Condition:          | 41         | 377 | 54  | 472        | 47  | 727 | 2         | 776  | 0   | 13        | 42  | 55  |
| Industrial Car Trips:    | 0          | 0   | 189 | 189        | 185 | 0   | 0         | 185  | 0   | 0         | 0   | 0   |
| Industrial Truck Trips:  | 0          | 0   | 25  | 25         | 53  | 0   | 0         | 53   | 0   | 0         | 0   | 0   |
| Retail Trips:            | 0          | 0   | 27  | 27         | 25  | 0   | 0         | 25   | 0   | 0         | 0   | 0   |
| Total New Trips:         | 0          | 0   | 241 | 241        | 263 | 0   | 0         | 263  | 0   | 0         | 0   | 0   |
| Pass-by Trips:           | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0    | 0   | 0         | 0   | 0   |
| Future Traffic Volumes:  | 41         | 377 | 295 | 713        | 310 | 727 | 2         | 1039 | 0   | 13        | 42  | 55  |

## P.M. Peak Hour

| Condition                | Northbound |     |     | Southbound |     |     | Eastbound |     |     | Westbound |     |     |
|--------------------------|------------|-----|-----|------------|-----|-----|-----------|-----|-----|-----------|-----|-----|
|                          | L          | T   | R   | Tot        | L   | T   | R         | Tot | L   | T         | R   | Tot |
| Existing:                | 0          | 750 | 18  | 768        | 4   | 459 | 0         | 463 | 0   | 0         | 77  | 152 |
| Growth Factor (%):       | 0.5        | 0.5 | 0.5 |            | 0.5 | 0.5 | 0.5       |     | 0.5 | 0.5       | 0.5 |     |
| Shifted Bryant Rd Trips: | 18         | -10 | 2   | 10         | 11  | -11 | 0         | 0   | 0   | 12        | 51  | 63  |
| Base Condition:          | 18         | 778 | 21  | 817        | 15  | 471 | 0         | 486 | 0   | 12        | 51  | 63  |
| Industrial Car Trips:    | 0          | 0   | 55  | 55         | 54  | 0   | 0         | 54  | 0   | 0         | 0   | 0   |
| Industrial Truck Trips:  | 0          | 0   | 7   | 7          | 15  | 0   | 0         | 15  | 0   | 0         | 0   | 0   |
| Retail Trips:            | 0          | 0   | 51  | 51         | 46  | 0   | 0         | 46  | 0   | 0         | 0   | 0   |
| Total New Trips:         | 0          | 0   | 113 | 113        | 115 | 0   | 0         | 115 | 0   | 0         | 0   | 0   |
| Pass-by Trips:           | 0          | -32 | 32  | 0          | 20  | -20 | 0         | 0   | 0   | 0         | 0   | 0   |
| Future Traffic Volumes:  | 18         | 746 | 166 | 930        | 150 | 451 | 0         | 601 | 0   | 12        | 51  | 63  |

# 16-106 Longacre Development - SR 13 (Buford Hwy) - Buford, GA

Traffic Volumes  
Future Conditions

A&R Engineering  
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5. SR 13 @ Thompson Mill Rd

## A.M. Peak Hour

| Condition                | Northbound |     |     | Southbound |     |     | Eastbound |     |     | Westbound |     |     |
|--------------------------|------------|-----|-----|------------|-----|-----|-----------|-----|-----|-----------|-----|-----|
|                          | L          | T   | R   | Tot        | L   | T   | R         | Tot | L   | T         | R   | Tot |
| Existing:                | 21         | 442 | 176 | 639        | 113 | 594 | 38        | 745 | 0   | 1         | 6   | 7   |
| Growth Factor (%):       | 0.5        | 0.5 | 0.5 |            | 0.5 | 0.5 | 0.5       |     | 0.5 | 0.5       | 0.5 |     |
| Shifted Bryant Rd Trips: | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Base Condition:          | 22         | 465 | 185 | 672        | 119 | 624 | 40        | 783 | 0   | 1         | 6   | 7   |
| Industrial Car Trips:    | 0          | 177 | 0   | 177        | 0   | 42  | 0         | 42  | 0   | 0         | 0   | 0   |
| Industrial Truck Trips:  | 0          | 25  | 0   | 25         | 0   | 6   | 0         | 6   | 0   | 0         | 0   | 0   |
| Retail Trips:            | 0          | 24  | 0   | 24         | 1   | 15  | 0         | 16  | 0   | 0         | 0   | 0   |
| Total New Trips:         | 0          | 226 | 0   | 226        | 1   | 63  | 0         | 64  | 0   | 0         | 0   | 0   |
| Pass-by Trips:           | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Future Traffic Volumes:  | 22         | 691 | 185 | 898        | 120 | 687 | 40        | 847 | 0   | 1         | 6   | 7   |

## P.M. Peak Hour

| Condition                | Northbound |     |     | Southbound |     |     | Eastbound |     |     | Westbound |     |     |
|--------------------------|------------|-----|-----|------------|-----|-----|-----------|-----|-----|-----------|-----|-----|
|                          | L          | T   | R   | Tot        | L   | T   | R         | Tot | L   | T         | R   | Tot |
| Existing:                | 6          | 661 | 365 | 1032       | 160 | 466 | 0         | 626 | 22  | 16        | 20  | 58  |
| Growth Factor (%):       | 0.5        | 0.5 | 0.5 |            | 0.5 | 0.5 | 0.5       |     | 0.5 | 0.5       | 0.5 |     |
| Shifted Bryant Rd Trips: | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Base Condition:          | 6          | 695 | 384 | 1085       | 168 | 490 | 0         | 658 | 23  | 17        | 21  | 61  |
| Industrial Car Trips:    | 0          | 51  | 0   | 51         | 0   | 182 | 0         | 182 | 0   | 0         | 0   | 0   |
| Industrial Truck Trips:  | 0          | 7   | 0   | 7          | 0   | 25  | 0         | 25  | 0   | 0         | 0   | 0   |
| Retail Trips:            | 0          | 44  | 0   | 44         | 4   | 48  | 0         | 52  | 0   | 0         | 0   | 0   |
| Total New Trips:         | 0          | 102 | 0   | 102        | 4   | 255 | 0         | 259 | 0   | 0         | 0   | 0   |
| Pass-by Trips:           | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Future Traffic Volumes:  | 6          | 797 | 384 | 1187       | 172 | 745 | 0         | 917 | 23  | 17        | 21  | 61  |

# 16-106 Longacre Development - SR 13 (Buford Hwy) - Buford, GA

Traffic Volumes  
Future Conditions

A&R Engineering  
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6. SR 13 @ Hamilton Mill Rd

## A.M. Peak Hour

| Condition                | Northbound |     |     | Southbound |     |     | Eastbound |      |     | Westbound |     |     |
|--------------------------|------------|-----|-----|------------|-----|-----|-----------|------|-----|-----------|-----|-----|
|                          | L          | T   | R   | Tot        | L   | T   | R         | Tot  | L   | T         | R   | Tot |
| Existing:                | 42         | 432 | 304 | 778        | 222 | 741 | 51        | 1014 | 28  | 158       | 65  | 251 |
| Growth Factor (%):       | 0.5        | 0.5 | 0.5 |            | 0.5 | 0.5 | 0.5       |      | 0.5 | 0.5       | 0.5 |     |
| Shifted Bryant Rd Trips: | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0    | 0   | 0         | 0   | 0   |
| Base Condition:          | 44         | 454 | 320 | 818        | 233 | 779 | 54        | 1066 | 29  | 166       | 68  | 263 |
| Industrial Car Trips:    | 0          | 149 | 0   | 149        | 5   | 35  | 2         | 42   | 8   | 0         | 0   | 8   |
| Industrial Truck Trips:  | 0          | 22  | 0   | 22         | 1   | 5   | 0         | 6    | 0   | 0         | 0   | 0   |
| Retail Trips:            | 0          | 20  | 0   | 20         | 2   | 12  | 1         | 15   | 1   | 0         | 0   | 1   |
| Total New Trips:         | 0          | 191 | 0   | 191        | 8   | 52  | 3         | 63   | 9   | 0         | 0   | 9   |
| Pass-by Trips:           | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0    | 0   | 0         | 0   | 0   |
| Future Traffic Volumes:  | 44         | 645 | 320 | 1009       | 241 | 831 | 57        | 1129 | 38  | 166       | 68  | 272 |
|                          |            |     |     |            |     |     |           |      | 509 | 250       | 231 | 990 |

## P.M. Peak Hour

| Condition                | Northbound |     |     | Southbound |     |     | Eastbound |      |     | Westbound |     |     |
|--------------------------|------------|-----|-----|------------|-----|-----|-----------|------|-----|-----------|-----|-----|
|                          | L          | T   | R   | Tot        | L   | T   | R         | Tot  | L   | T         | R   | Tot |
| Existing:                | 79         | 841 | 733 | 1653       | 255 | 543 | 42        | 840  | 74  | 265       | 52  | 391 |
| Growth Factor (%):       | 0.5        | 0.5 | 0.5 |            | 0.5 | 0.5 | 0.5       |      | 0.5 | 0.5       | 0.5 |     |
| Shifted Bryant Rd Trips: | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0    | 0   | 0         | 0   | 0   |
| Base Condition:          | 83         | 884 | 770 | 1737       | 268 | 571 | 44        | 883  | 78  | 279       | 55  | 412 |
| Industrial Car Trips:    | 0          | 43  | 0   | 43         | 21  | 153 | 8         | 182  | 2   | 0         | 0   | 2   |
| Industrial Truck Trips:  | 0          | 6   | 0   | 6          | 3   | 22  | 0         | 25   | 0   | 0         | 0   | 0   |
| Retail Trips:            | 0          | 37  | 0   | 37         | 5   | 40  | 2         | 47   | 2   | 0         | 0   | 2   |
| Total New Trips:         | 0          | 86  | 0   | 86         | 29  | 215 | 10        | 254  | 4   | 0         | 0   | 4   |
| Pass-by Trips:           | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0    | 0   | 0         | 0   | 0   |
| Future Traffic Volumes:  | 83         | 970 | 770 | 1823       | 297 | 786 | 54        | 1137 | 82  | 279       | 55  | 416 |
|                          |            |     |     |            |     |     |           |      | 405 | 222       | 201 | 828 |

# 16-106 Longacre Development - SR 13 (Buford Hwy) - Buford, GA

Traffic Volumes  
Future Conditions

A&R Engineering  
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7. Thompson Mill Rd @ Bryant Rd

## A.M. Peak Hour

| Condition                | Northbound |     |     | Southbound |     |     | Eastbound |     |     | Westbound |     |     |
|--------------------------|------------|-----|-----|------------|-----|-----|-----------|-----|-----|-----------|-----|-----|
|                          | L          | T   | R   | Tot        | L   | T   | R         | Tot | L   | T         | R   | Tot |
| Existing:                | 0          | 0   | 0   | 0          | 12  | 0   | 6         | 18  | 5   | 202       | 1   | 208 |
| Growth Factor (%):       | 0.5        | 0.5 | 0.5 |            | 0.5 | 0.5 | 0.5       |     | 0.5 | 0.5       | 0.5 |     |
| Shifted Bryant Rd Trips: | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Base Condition:          | 0          | 0   | 0   | 0          | 13  | 0   | 6         | 19  | 5   | 212       | 1   | 218 |
| Industrial Car Trips:    | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Industrial Truck Trips:  | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Retail Trips:            | 0          | 0   | 0   | 0          | 1   | 0   | 0         | 1   | 0   | 1         | 0   | 1   |
| Total New Trips:         | 0          | 0   | 0   | 0          | 1   | 0   | 0         | 1   | 0   | 1         | 0   | 1   |
| Pass-by Trips:           | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Future Traffic Volumes:  | 0          | 0   | 0   | 0          | 14  | 0   | 6         | 20  | 5   | 213       | 1   | 219 |

## P.M. Peak Hour

| Condition                | Northbound |     |     | Southbound |     |     | Eastbound |     |     | Westbound |     |     |
|--------------------------|------------|-----|-----|------------|-----|-----|-----------|-----|-----|-----------|-----|-----|
|                          | L          | T   | R   | Tot        | L   | T   | R         | Tot | L   | T         | R   | Tot |
| Existing:                | 0          | 0   | 0   | 0          | 27  | 0   | 8         | 35  | 5   | 487       | 0   | 492 |
| Growth Factor (%):       | 0.5        | 0.5 | 0.5 |            | 0.5 | 0.5 | 0.5       |     | 0.5 | 0.5       | 0.5 |     |
| Shifted Bryant Rd Trips: | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Base Condition:          | 0          | 0   | 0   | 0          | 28  | 0   | 8         | 36  | 5   | 512       | 0   | 517 |
| Industrial Car Trips:    | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Industrial Truck Trips:  | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Retail Trips:            | 0          | 0   | 0   | 0          | 4   | 0   | 0         | 4   | 0   | 4         | 0   | 4   |
| Total New Trips:         | 0          | 0   | 0   | 0          | 4   | 0   | 0         | 4   | 0   | 4         | 0   | 4   |
| Pass-by Trips:           | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Future Traffic Volumes:  | 0          | 0   | 0   | 0          | 32  | 0   | 8         | 40  | 5   | 516       | 0   | 521 |

# 16-106 Longacre Development - SR 13 (Buford Hwy) - Buford, GA

Traffic Volumes  
Future Conditions

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8. Thompson Mill @ N. Bogan Rd

## A.M. Peak Hour

| Condition                | Northbound |     |     | Southbound |     |     | Eastbound |     |     | Westbound |     |     |
|--------------------------|------------|-----|-----|------------|-----|-----|-----------|-----|-----|-----------|-----|-----|
|                          | L          | T   | R   | Tot        | L   | T   | R         | Tot | L   | T         | R   | Tot |
| Existing:                | 113        | 66  | 16  | 195        | 8   | 93  | 121       | 222 | 53  | 106       | 66  | 225 |
| Growth Factor (%):       | 0.5        | 0.5 | 0.5 |            | 0.5 | 0.5 | 0.5       |     | 0.5 | 0.5       | 0.5 |     |
| Shifted Bryant Rd Trips: | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Base Condition:          | 119        | 69  | 17  | 205        | 8   | 98  | 127       | 233 | 56  | 111       | 69  | 236 |
| Industrial Car Trips:    | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 7         | 0   | 7   |
| Industrial Truck Trips:  | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Retail Trips:            | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 2         | 0   | 2   |
| Total New Trips:         | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 9         | 0   | 9   |
| Pass-by Trips:           | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Future Traffic Volumes:  | 119        | 69  | 17  | 205        | 8   | 98  | 127       | 233 | 56  | 120       | 69  | 245 |
|                          |            |     |     |            |     |     |           |     | 54  | 438       | 9   | 501 |

## P.M. Peak Hour

| Condition                | Northbound |     |     | Southbound |     |     | Eastbound |     |     | Westbound |     |     |
|--------------------------|------------|-----|-----|------------|-----|-----|-----------|-----|-----|-----------|-----|-----|
|                          | L          | T   | R   | Tot        | L   | T   | R         | Tot | L   | T         | R   | Tot |
| Existing:                | 70         | 143 | 83  | 296        | 14  | 150 | 48        | 212 | 70  | 326       | 107 | 503 |
| Growth Factor (%):       | 0.5        | 0.5 | 0.5 |            | 0.5 | 0.5 | 0.5       |     | 0.5 | 0.5       | 0.5 |     |
| Shifted Bryant Rd Trips: | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Base Condition:          | 74         | 150 | 87  | 311        | 15  | 158 | 50        | 223 | 74  | 343       | 112 | 529 |
| Industrial Car Trips:    | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 29        | 0   | 29  |
| Industrial Truck Trips:  | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Retail Trips:            | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 8         | 0   | 8   |
| Total New Trips:         | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 37        | 0   | 37  |
| Pass-by Trips:           | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Future Traffic Volumes:  | 74         | 150 | 87  | 311        | 15  | 158 | 50        | 223 | 74  | 380       | 112 | 566 |
|                          |            |     |     |            |     |     |           |     | 58  | 182       | 15  | 255 |



# 16-106 Longacre Development - SR 13 (Buford Hwy) - Buford, GA

Traffic Volumes  
Future Conditions

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## 9. Thompson Mill @ Site Drwy

### A.M. Peak Hour

| Condition                | Northbound |     |     | Southbound |     |     | Eastbound |     |     | Westbound |     |     |
|--------------------------|------------|-----|-----|------------|-----|-----|-----------|-----|-----|-----------|-----|-----|
|                          | L          | T   | R   | Tot        | L   | T   | R         | Tot | L   | T         | R   | Tot |
| Existing:                | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 616       | 0   | 616 |
| Growth Factor (%):       | 0.5        | 0.5 | 0.5 |            | 0.5 | 0.5 | 0.5       |     | 0.5 | 0.5       | 0.5 |     |
| Shifted Bryant Rd Trips: | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Base Condition:          | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 648       | 0   | 648 |
| Industrial Car Trips:    | 0          | 0   | 0   | 0          | 7   | 0   | 0         | 7   | 0   | 0         | 28  | 28  |
| Industrial Truck Trips:  | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Retail Trips:            | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 4         | 0   | 4   |
| Total New Trips:         | 0          | 0   | 0   | 0          | 7   | 0   | 0         | 7   | 0   | 4         | 28  | 32  |
| Pass-by Trips:           | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Future Traffic Volumes:  | 0          | 0   | 0   | 0          | 7   | 0   | 0         | 7   | 0   | 652       | 28  | 680 |

### P.M. Peak Hour

| Condition                | Northbound |     |     | Southbound |     |     | Eastbound |     |     | Westbound |     |     |
|--------------------------|------------|-----|-----|------------|-----|-----|-----------|-----|-----|-----------|-----|-----|
|                          | L          | T   | R   | Tot        | L   | T   | R         | Tot | L   | T         | R   | Tot |
| Existing:                | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 285       | 0   | 285 |
| Growth Factor (%):       | 0.5        | 0.5 | 0.5 |            | 0.5 | 0.5 | 0.5       |     | 0.5 | 0.5       | 0.5 |     |
| Shifted Bryant Rd Trips: | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Base Condition:          | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 300       | 0   | 300 |
| Industrial Car Trips:    | 0          | 0   | 0   | 0          | 29  | 0   | 0         | 29  | 0   | 0         | 8   | 8   |
| Industrial Truck Trips:  | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Retail Trips:            | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 7         | 0   | 7   |
| Total New Trips:         | 0          | 0   | 0   | 0          | 29  | 0   | 0         | 29  | 0   | 7         | 8   | 15  |
| Pass-by Trips:           | 0          | 0   | 0   | 0          | 0   | 0   | 0         | 0   | 0   | 0         | 0   | 0   |
| Future Traffic Volumes:  | 0          | 0   | 0   | 0          | 29  | 0   | 0         | 29  | 0   | 307       | 8   | 315 |