

**DEVELOPMENT OF REGIONAL IMPACT
(DRI #2669)
TRAFFIC STUDY
FOR
NORTHWINDS SUMMIT MIXED-USE DEVELOPMENT
ALPHARETTA, GEORGIA**



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EXECUTIVE SUMMARY

Traffic impacts were evaluated for the added traffic from the proposed Northwinds Summit mixed-use development located on Haynes Bridge Road between Northwinds Parkway and US 19/GA 400 in Alpharetta, Georgia. The development will consist of:

- 1,230,000 square feet of office space
- 30,000 square feet of retail space
- 140 multi-family units
- 32 condominiums
- 140-room hotel

The development proposes access at the following locations:

- Site Driveway 1: Existing full-access driveway on Haynes Bridge Road, aligned with the US 19/GA 400 southbound ramps
- Site Driveway 2: Full-access driveway on Northwinds Parkway, aligned with the existing Two Northwinds Center eastern driveway

Existing and future operations after completion of the project were analyzed at the intersections of:

- Haynes Bridge Road at GA 400 Northbound Ramps
- Haynes Bridge Road at GA 400 Southbound Ramps
- Haynes Bridge Road at Lakeview Parkway/Northwinds Parkway
- Haynes Bridge Road at Morrison Parkway/Westside Parkway
- Kimball Bridge Road at Northwinds Parkway
- SR 120 (Old Milton Parkway) at Northwinds Parkway Extension

The analysis included the evaluation of Future operations for the “No-Build” and “Build” conditions, both of which account for increases in annual growth of through traffic and added traffic from other nearby planned developments. 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. These intersections have been identified below along with potential system improvements for the local municipality to consider in their future planning efforts.

Haynes Bridge Road @ GA 400 Northbound Ramps

- Install a second southbound left turn lane on Haynes Bridge Road by restriping the northbound inside through lane
- Improve the existing eastbound US 19/GA 400 Northbound on-ramp from one receiving lane to two receiving lanes
- Install a second northbound right turn lane on Haynes Bridge Road

Haynes Bridge Road @ GA 400 Southbound Ramps

- Install permissive + overlap signal phasing for the southbound right turn movement

Haynes Bridge Road @ Lakeview Parkway/Northwinds Parkway

- Remove the existing protected left turn phasing on the eastbound approach and replace it with protected + permissive phasing
- Restripe the westbound approach to operate with two dedicated left turn lanes and one shared through/right turn lane
- Replace the existing westbound protected + permissive left turn signal phasing with protected only left turn signal phasing

Haynes Bridge Road @ Morrison Parkway/Westside Parkway

- Install southbound permissive + overlap signal phasing for the right turn movement on Haynes Bridge Road

Kimball Bridge Road @ Northwinds Parkway/Northwinds Parkway Extension

As part of the Northwinds Parkway Extension project, the existing unsignalized intersection of Kimball Bridge Road at Northwinds Parkway will be upgraded to operate as a signalized intersection with the addition of Northwinds Extension as the fourth leg to the intersection.

SR 120 (Old Milton Parkway) @ 2nd Street/Northwinds Parkway Extension

- Replace the existing northbound permissive signal phasing on Northwinds Parkway Extension with protected + permissive left turn phasing

Site Access Configuration

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

- Site Driveway #1: Full-access driveway on Haynes Bridge Road
 - This driveway is recommended to operate with one entering and four exiting lanes. The westbound (driveway) approach is proposed to have two dedicated left turn lanes, one dedicated through lane, and one shared through/right turn lane for exiting traffic
 - The intersection is to continue to be signalized with split phasing on the side-street approaches
 - Entering right-turn movements are assumed to be made from the existing northbound right turn lane
- Site Driveway #2: Full-access driveway on Northwinds Parkway
 - This driveway is proposed with one entering and two exiting lanes. The northbound (driveway) approach is proposed to have a shared through/left and dedicated right turn lane for exiting traffic
 - The intersection will continue to be unsignalized with an added STOP sign on the northbound approach
 - Entering left turn movements are assumed to be made from the existing westbound left turn lane
 - It is recommended a dedicated eastbound right turn lane be constructed per local standards for entering traffic

Site Mitigation Improvements

Improvements that are identified as “Site Mitigation Improvements” address further impacts that are a result of the proposed development’s added traffic.

Haynes Bridge Road @ GA 400 Southbound Ramps

- Restripe the westbound approach to operate with two dedicated left turn lanes, one dedicated through lane, and one shared through/right turn lane

Haynes Bridge Road @ Lakeview Parkway/Northwinds Parkway

- Convert the existing yield-controlled northbound right turn movement to a free-flow movement
- Construct a second westbound right turn lane on Northwinds Parkway per local standards

Northwinds Parkway @ Site Driveway #2

The northbound approach will see minor delays for exiting traffic during the AM and PM peak hour. These delays are caused by the wait times on the driveway to turn left onto Northwinds Parkway. As the intersection does not warrant construction of a traffic signal to improve the delay on the driveway, no additional improvements will aid left turning vehicles.

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INTRODUCTION

The purpose of this study is to determine the traffic impact that will result from the Northwinds Summit mixed-use development located on Haynes Bridge Road between Northwinds Parkway and US 19/GA 400 in Alpharetta, Georgia. The development will consist of:

- 1,230,000 square feet of office space
- 30,000 square feet of retail space
- 140 multi-family units
- 32 condominiums
- 140-room hotel



The development proposes access at the following locations:

- Site Driveway 1: Existing full-access driveway on Haynes Bridge Road, aligned with the US 19/GA 400 southbound ramps
- Site Driveway 2: Full-access driveway on Northwinds Parkway, aligned with the existing Two Northwinds Center eastern driveway

The AM and PM peak hours have been analyzed in this study. In addition to the site access points, this study includes the evaluation of traffic operations at the intersections of:

1. Haynes Bridge Road at GA 400 Northbound Ramps
2. Haynes Bridge Road at GA 400 Southbound Ramps
3. Haynes Bridge Road at Lakeview Parkway/Northwinds Parkway

4. Haynes Bridge Road at Morrison Parkway/Westside Parkway
5. Kimball Bridge Road at Northwinds Parkway
6. SR 120 (Old Milton Parkway) at Northwinds Parkway Extension

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. As no intersections fell within the 7% rule, the following intersections have been selected as being suitable for evaluation in discussions with the City of Alpharetta and the Atlanta Regional Commission (ARC):

1. Haynes Bridge Road at GA 400 Northbound Ramps
2. Haynes Bridge Road at GA 400 Southbound Ramps
3. Haynes Bridge Road at Lakeview Parkway / Northwinds Parkway
4. Haynes Bridge Road at Morrison Parkway / Westside Parkway
5. Kimball Bridge Road at Northwinds Parkway
6. SR 120 (Old Milton Parkway) at Northwinds Parkway Extension

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:

US 19/GA 400

US 19/GA 400 is an eight-lane, median-divided roadway with a posted speed limit of 55 mph in the eastbound direction and 65 mph in the westbound direction in the vicinity of the site. GDOT traffic counts (Stations IDs 1210459 & 121-0458) indicate that the daily traffic volume on US 19/GA 400 is 132,000 vehicles per day north of Haynes Bridge Road and 148,000 vehicles per day south of Haynes Bridge Road. GDOT classifies US 19/GA 400 as a Principal Arterial roadway.

Haynes Bridge Road

Haynes Bridge Road is a six-lane, median-divided roadway with a posted speed limit of 45 mph in the vicinity of the site. GDOT traffic counts (Station IDs 1210823 & 1210824) indicate that the daily traffic volume on Haynes Bridge Road is 19,700 vehicles per day south of North Point Parkway and 24,100 vehicles per day north of Morrison Parkway/Westside Parkway. GDOT classifies Haynes Bridge Road as a Minor Arterial roadway.

Lakeview Parkway

Lakeview Parkway is a four-lane, median-divided roadway with a posted speed limit of 25 mph in the vicinity of the site.

Northwinds Parkway

Northwinds Parkway is a four-lane, median-divided roadway with a posted speed limit of 35 mph in the vicinity of the site. The North Fulton Community Improvement District (CID), in conjunction with GDOT and the City of Alpharetta, has plans to extend Northwinds Parkway from Kimball Bridge Road to SR 120 (Old Milton Parkway). The first phase (the northern part) of the project was completed in early Fall 2016. The second phase or southern section of the project is proposed to be completed in 2017.

Westside Parkway

Westside Parkway is a four-lane, median-divided roadway with a posted speed limit of 40 mph in the vicinity of the site. GDOT traffic counts (Station ID 1210938) indicate that the daily traffic volume on Westside Parkway is 13,100 vehicles per day north of Encore Parkway. GDOT classifies Westside Parkway as a Minor Arterial roadway.

Morrison Parkway

Morrison Parkway is a four-lane, undivided roadway with a posted speed limit of 40 mph in the vicinity of the site. Westside Parkway becomes Morrison Parkway between Haynes Bridge Road and Hembree Road.

Kimball Bridge Road

Kimball Bridge Road is a two-lane, undivided roadway with a posted speed limit of 35 mph in the vicinity of the site.

SR 120 (Old Milton Parkway)

SR 120 (Old Milton Parkway) is a six-lane, median-divided roadway with a posted speed limit of 45 mph in the vicinity of the site. GDOT traffic counts (Station IDs 1210310 & 1210312) indicate that the daily traffic volume on SR 120 (Old Milton Parkway) is 37,500 vehicles per day west of UA 19/GA 400 and 50,800 vehicles per day east of Cotton Creek Entry/Brookside Parkway. GDOT classifies SR 120 (Old Milton Parkway) as a Principal Arterial 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:

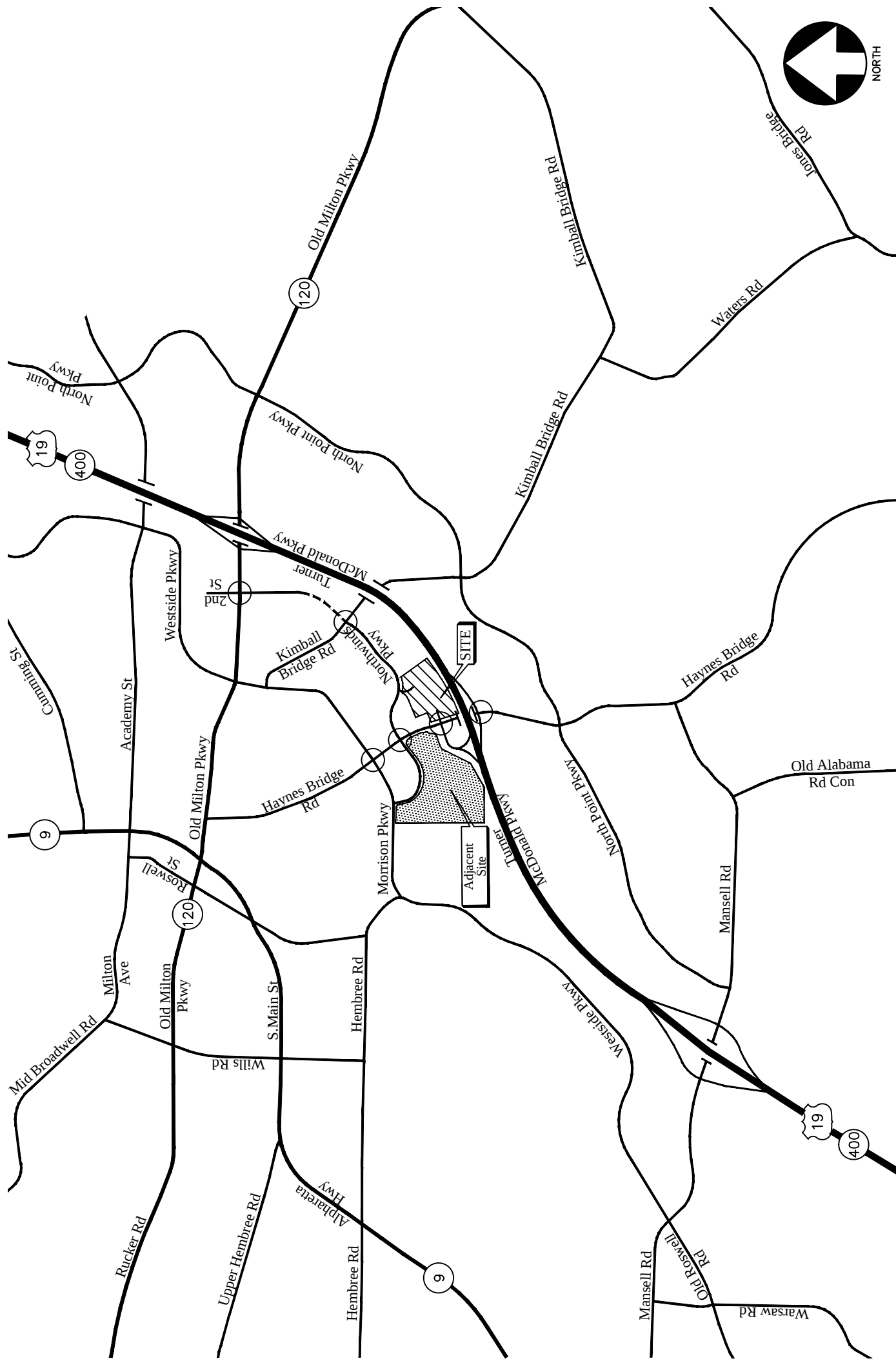
- Haynes Bridge Road: both sides of the road, between US 19/GA 400 and Academy Street/Brooke Street
- Northwinds Parkway: both sides of the road, between Haynes Bridge Road and Kimball Bridge Road
- Northwinds Parkway Extension: both sides of the road, between Kimball Bridge Road and SR 120 (Old Milton Parkway)

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

- Haynes Bridge Road: both sides of the road, between US 19/GA 400 and SR 120 (Old Milton Parkway)
- Westside Parkway/Morrison Parkway: both sides of the road, between SR 120 (Old Milton Parkway) and Encore Parkway

Existing Transit Facilities

There is one direct transit route located within the vicinity of the project site; MARTA bus route 140 has stops on Haynes Bridge Road in both directions, just north of US 19/GA 400. Route 140 operates from the North Springs MARTA Station along US 19/GA 400 to the Mansell Road Park and Ride, then North Point Parkway, Haynes Bridge Road and SR 9 (N. Main Street) with alternating service via Windward Parkway and Deerfield Parkway to the Windward Park and Ride.



LOCATION MAP AND STUDY INTERSECTIONS

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	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 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	≤ 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. Haynes Bridge Road at GA 400 Northbound Ramps
2. Haynes Bridge Road at GA 400 Southbound Ramps
3. Haynes Bridge Road at Lakeview Parkway/Northwinds Parkway
4. Haynes Bridge Road at Morrison Parkway/Westside Parkway
5. Kimball Bridge Road at Northwinds Parkway
6. SR 120 (Old Milton Parkway) at Northwinds Parkway Extension

Turning movement counts were collected on Wednesday, January 18, 2017. 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.

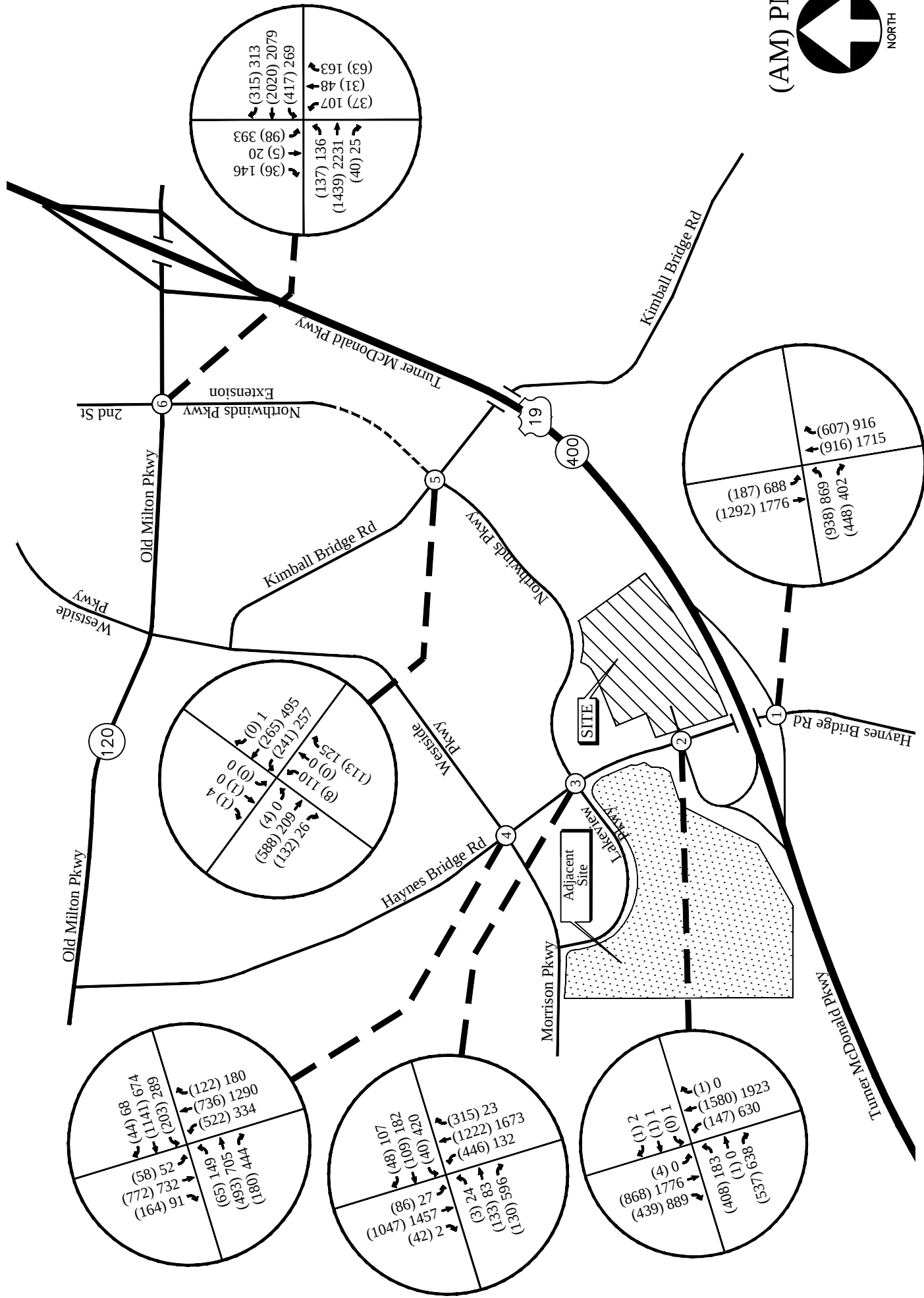
Existing Traffic Operations

Existing traffic operations were analyzed at the study intersections in accordance with the HCM methodology and using signal timing provided by the City of Alpharetta. The results of the analysis are shown in Table 3. The existing traffic control and lane geometry for the intersections is shown in Figure 3.

TABLE 3 — EXISTING INTERSECTION OPERATIONS					
Intersection		Traffic Control	AM Peak	PM Peak	LOS Standard
1	<u>Haynes Bridge Rd @ GA 400 NB Ramps</u>	Signalized	<u>D (41.9)</u>	<u>F (154.1)</u>	<u>D / E</u>
	-Eastbound Approach		E (59.0)	F (144.0)	-
	-Northbound Approach		D (42.4)	F (233.4)	-
	-Southbound Approach		C (24.7)	E (63.7)	-
2	<u>Haynes Bridge Rd @ GA 400 SB Ramps</u>	Signalized	<u>D (48.8)</u>	<u>D (42.2)</u>	<u>D / D</u>
	-Eastbound Approach		E (66.7)	F (99.4)	-
	-Westbound Approach		E (78.0)	E (78.3)	-
	-Northbound Approach		D (37.5)	C (20.8)	-
	-Southbound Approach		D (49.4)	D (42.7)	-
3	<u>Haynes Bridge Rd @ Northwinds Pkwy</u>	Signalized	<u>C (29.5)</u>	<u>E (76.0)</u>	<u>D / E</u>
	-Eastbound Approach		E (63.6)	F (132.7)	-
	-Westbound Approach		E (55.8)	E (69.9)	-
	-Northbound Approach		C (27.9)	E (76.1)	-
	-Southbound Approach		B (18.5)	D (49.6)	-
4	<u>Haynes Bridge Rd @ Westside Pkwy</u>	Signalized	<u>E (55.8)</u>	<u>E (60.3)</u>	<u>E / E</u>
	-Eastbound Approach		D (41.8)	E (63.3)	-
	-Westbound Approach		E (59.0)	F (84.5)	-
	-Northbound Approach		E (59.4)	D (49.7)	-
	-Southbound Approach		E (57.2)	D (48.4)	-
Table Continued on Next Page...					

Intersection		Traffic Control	AM Peak	PM Peak	LOS Standard
5	<u>Kimball Bridge Rd @ Northwinds Pkwy</u>	Stop Controlled on NB/SB Approaches			
	-Eastbound Left		A (0.2)	A (0.0)	D / D
	-Westbound Left		B (10.0)	A (8.6)	D / D
	-Northbound Approach		C (19.5)	F (145.2)	D / E
	-Southbound Approach		D (27.1)	B (12.1)	D / D
6	<u>Old Milton Pkwy @ Northwinds Pkwy Ext</u>	Signalized	<u>F (128.2)</u>	<u>F (93.0)</u>	<u>E / E</u>
	-Eastbound Approach		C (29.8)	D (50.9)	-
	-Westbound Approach		F (191.1)	F (125.8)	-
	-Northbound Approach		E (76.2)	F (174.8)	-
	-Southbound Approach		E (64.7)	E (62.3)	-

The results of the existing conditions analysis indicate that several of the study intersections are operating below an acceptable level-of-service ("D" or better by local standards) in the AM and PM peak hours. These areas are addressed in the Future Traffic Operations section.

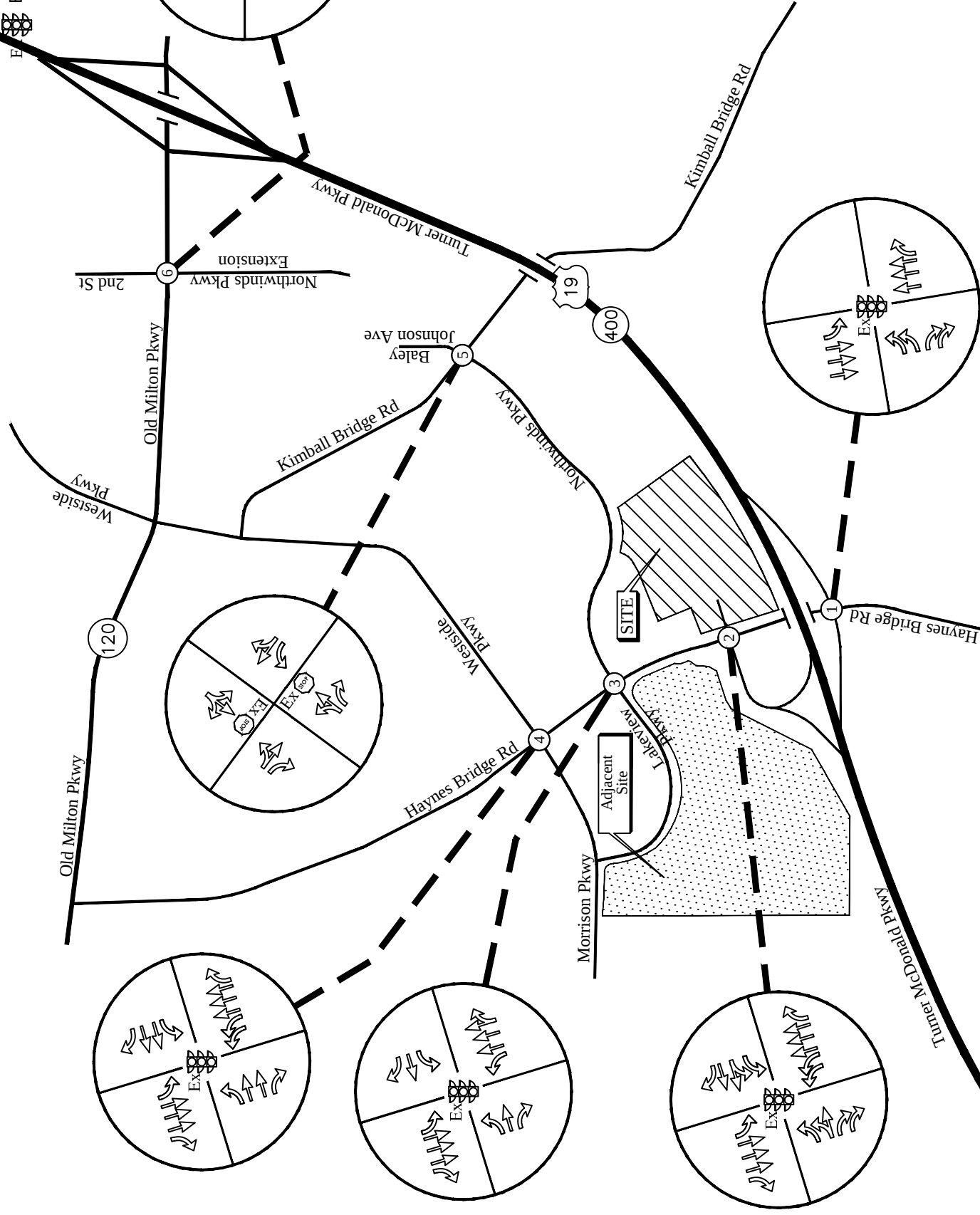


EXISTING WEEKDAY PEAK HOUR VOLUMES

FIGURE 2

LEGEND

- Ex. (pro) Existing Signed Approach
- Existing Lane Geometry
- Existing Traffic Signal



EXISTING TRAFFIC CONTROL AND LANE GEOMETRY

PROJECT DESCRIPTION

The proposed Northwinds Summit mixed-use site will be located on Haynes Bridge Road between Northwinds Parkway and US 19/GA 400 in Alpharetta, Georgia. The development will consist of:

- 1,230,000 square feet of office space
- 30,000 square feet of retail space
- 140 multi-family units
- 32 condominiums
- 140-room hotel

The development proposes access at the following locations:

- Site Driveway 1: Existing full-access driveway on Haynes Bridge Road, aligned with the US 19/GA 400 southbound ramps
- Site Driveway 2: Full-access driveway on Northwinds Parkway, aligned with the existing Two Northwinds Center eastern driveway

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 proposed development will be comprised of residential/hotel, retail, and office uses. Pedestrian connections are proposed between the mixed-uses on the site.
- The development plan includes several design elements that enhance the character and quality the site by incorporating building orientation, parking locations, and walking trails.
- The site benefits from the convenience and flexibility of public access to adjacent streets and internal connectivity between some of the parcels.

Planned Transit Facilities

The site is not directly served by transit. However, there is one direct transit route located within the vicinity of the project site; MARTA bus route 140 has stops on Haynes Bridge Road in both directions, just north of US 19/GA 400. Route 140 operates from the North Springs MARTA Station along US 19/GA 400 to the Mansell Road Park and Ride, then North Point Parkway, Haynes Bridge Road and SR 9 (N. Main Street) with alternating service via Windward Parkway and Deerfield Parkway to the Windward Park and Ride.

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.

Project Phasing

A phasing schedule shall be provided for any proposed DRIs involving multiple phases. The phasing schedule shall include the types and amounts of land uses to be developed and should be identified by phase, the site location of each land use by phase, the amenities to be developed with each phase, and all transportation elements. The transportation elements shall focus upon infrastructure in place, access to the development, and internal mobility during each phase analyzed. This project has been evaluated for the complete build-out of the development in 2019.

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: 220 – Apartment, 230 – Residential Condominium/Townhouse, 310 – Hotel, 710 – General Office Building 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 4.

Land Use	Size	AM Peak Hour			PM Peak Hour			24-Hour
		Enter	Exit	Total	Enter	Exit	Total	Two-way
ITE 820 – Shopping Center	30,000 sf	46	29	75	128	139	267	3,105
	<i>Mixed-Use Reduction</i>	-5	-4	-9	-15	-21	-36	-420
	<i>Pass-by Trips (0%) 34%</i>	0	0	0	-38	-40	-78	-780
ITE 230 – Condominium	32 Units	4	17	21	16	8	24	239
	<i>Mixed-Use Reduction</i>	0	0	0	-2	-2	-4	-40
ITE 310 – Hotel	140 Rooms	44	30	74	43	41	84	880
	<i>Mixed-Use Reduction</i>	-2	-2	-4	-8	-5	-13	-144
ITE 710 – Office	1,230,000 sf	1,254	171	1,425	248	1,208	1,456	8,842
	<i>Mixed-Use Reduction</i>	-1	-2	-3	-4	-5	-9	-140
ITE 220 – Apartment	140 Units	14	58	72	62	33	95	972
	<i>Mixed-Use Reduction</i>	-2	-2	-4	-9	-5	-14	-158
Total Trips (without Reductions)		1,362	305	1,667	497	1,429	1,926	14,038
New External Trips (with Reductions)		1,352	295	1,647	412	1,350	1,772	12,356

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

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. The site-generated peak hour traffic volumes, shown in Table 4, were assigned to the study area intersections based on this distribution. The outer-leg distribution and AM and PM peak hour new traffic generated by the site are shown in Figure 5.

[illegible]

WDA JOB No. 2018-335

[illegible]

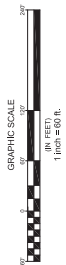
TRACT AREA 24,547 AC

GREEN SPACE 5.07 ACRES 20.6%
UNDISTURBED BUFFER 3.22 ACRES 13%
TOTAL GREENSPACE 8.29 ACRES 33.8%

PRIVATE AMENITY SPACE 0.72 ACRES
PUBLIC PLAZA/COURT YARDS/SEATING AREAS 2.73 ACRES
WALKING PATHS AND TRAIL AREAS 0.75 ACRES
TOTAL OPEN SPACE 4.20 ACRES 17.11%

TOTAL BUILDING AND DECK AREA 420,355 SF - 9.65 AC.
TOTAL BUILDING AND DECK SITE COVERAGE 39%

MINIMUM PARKING REQUIREMENTS TO BE PROVIDED BY JURISDICTIONAL REQUIREMENTS

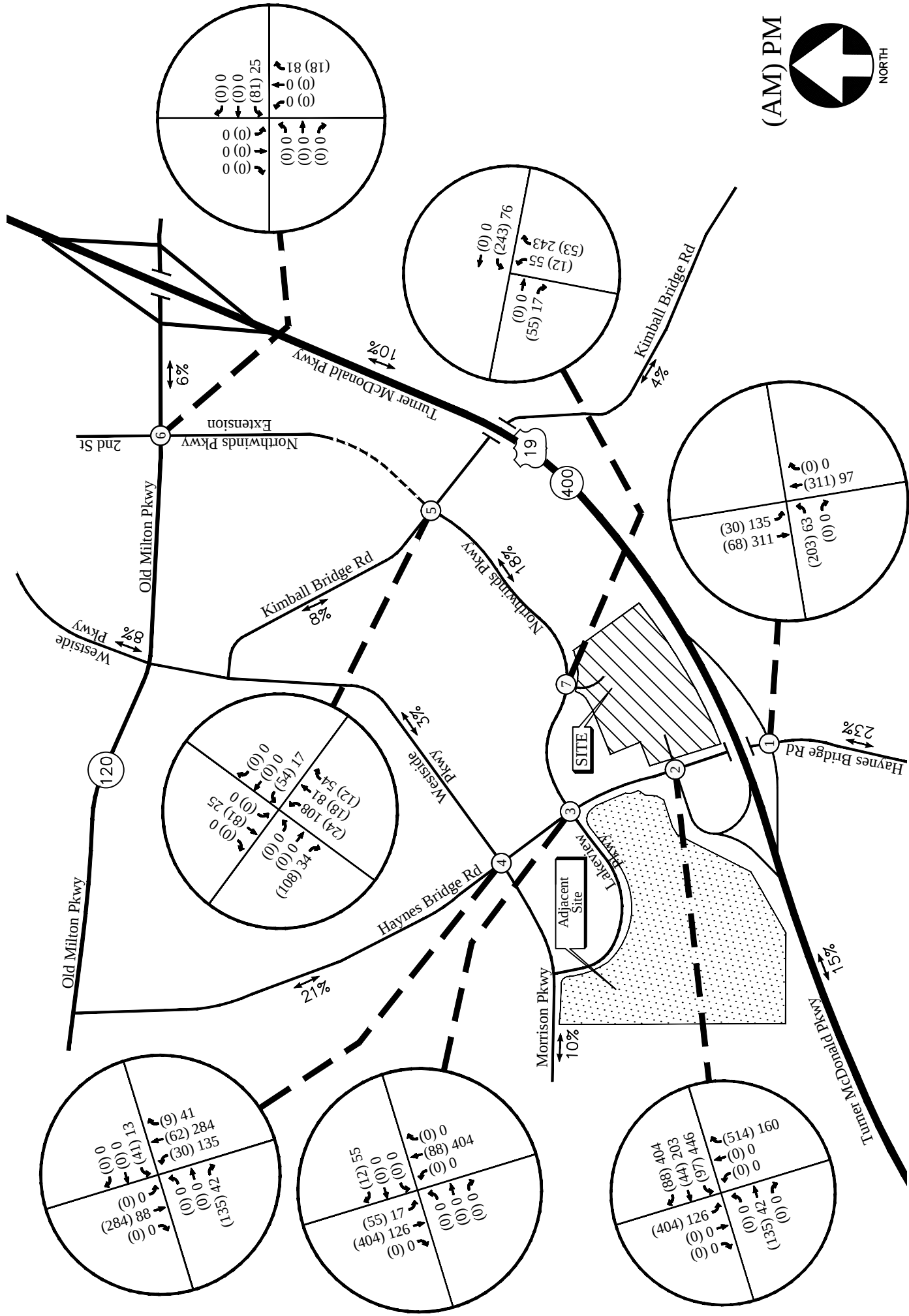
GRTA DRI
SITE PLAN

LOCATION MAP

GEORGIA81
Lantern Production Center, Inc.

Call before you dig.
Dial 811
Or Call 800-282-7411

CAUTION-NOTE TO CONTRACTOR



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. The Future “No-Build” volumes consist of the existing traffic volumes (Figure 2) plus increases for annual growth of through traffic and added traffic from other nearby planned developments.

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 several years revealed no consistent positive growth of through traffic; therefore, a growth rate of 1% was used in the analysis. 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.

Planned and Programmed Improvements in Study Area

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

TABLE 5 — PLANNED AND PROGRAMMED IMPROVEMENTS				
ARC#/GDOT#/ City#	Project	Type of Improvement	Network Year	Source
S014454/ Alph-CID-03	Northwinds Parkway Extension	Roadway Corridor (Multimodal)	2017	North Fulton CID
ALP-009	Kimball Bridge Road Bike/Ped/Operational Improvements	Roadway Corridor (Multimodal)	Tier 2	North Fulton TSPLOST
AR-ML- 300/0001757	Express Lanes SR 400 from I-285 to McFarland Road	Reconstruction/ Rehabilitation	Long Range (2040)	ARC/GDOT

Projects included in the model for the Future conditions include:

North Fulton CID Project Alph-CID-03: North Fulton Community Improvement District (CID), in conjunction with GDOT and City of Alpharetta, has plans to extend Northwinds Parkway from Kimball Bridge Road to SR 120 (Old Milton Parkway). The first phase (the northern part) of the project was completed in early Fall 2016. The second phase or southern section of the project is proposed to be completed in 2017 by a private developer. The extension project includes addition of a traffic signal at the Kimball Bridge Road intersection with Northwinds Parkway.

Nearby Planned Developments

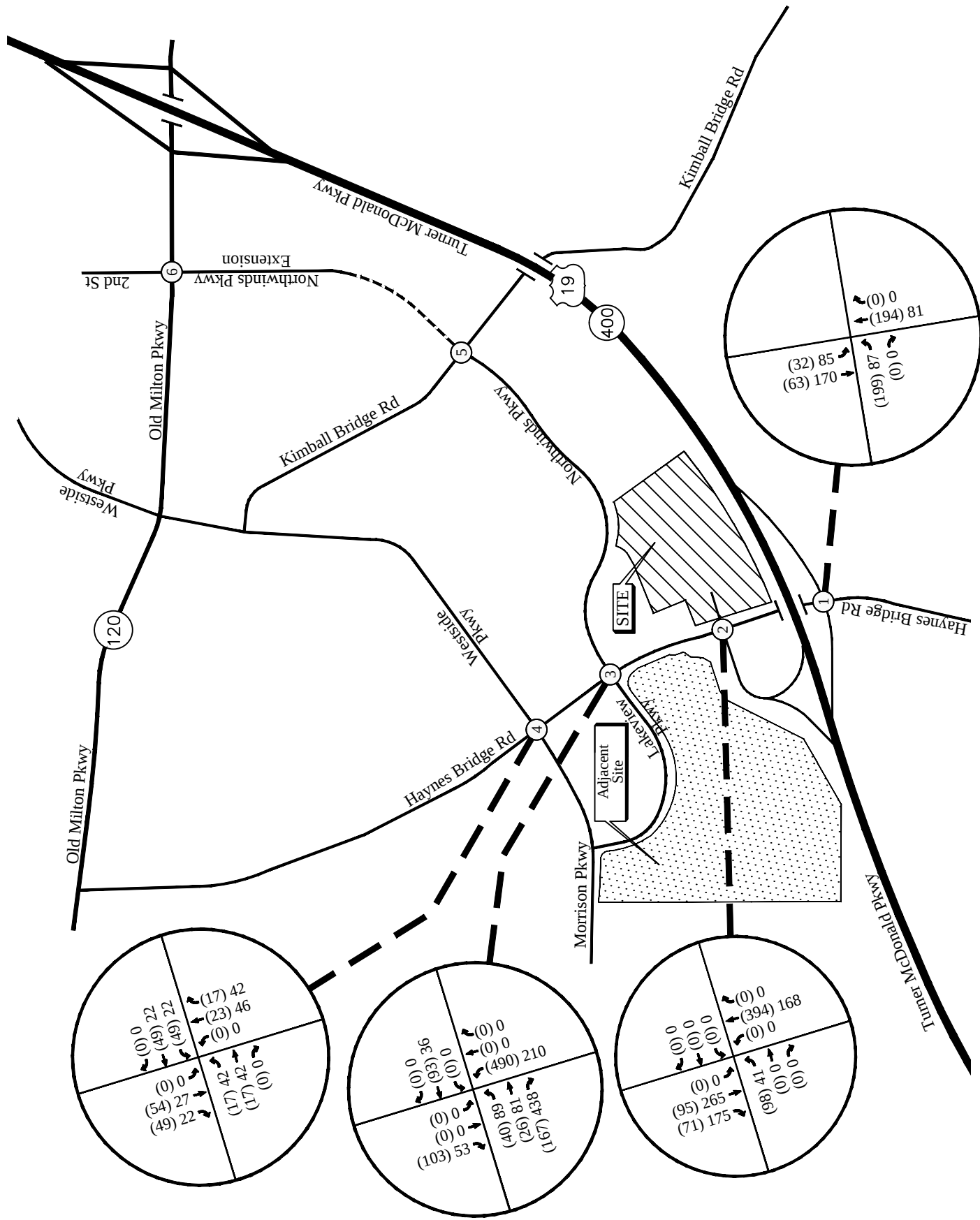
360 Tech Village (Fuqua Development)

There is a planned mixed-use development located on the west side of Haynes Bridge Road south of Lakeview Parkway. The most recent site plan submitted to the City of Alpharetta indicates the development will consist of 161,800 square feet of commercial space, 487 residential units, and 664,400 square feet of office space. The proposed development is expected to be completed by 2019. The AM and PM peak hour site traffic volumes were derived from Figure 6 of the original Innovation DRI traffic study completed by Kimley Horn in July 2015. As part of the original DRI, roadway improvements will be implemented at the intersection of Haynes Bridge Road at Lakeview Parkway/Northwinds Parkway that were analyzed in the Future “No-Build” conditions. These improvements include the addition of a second eastbound right turn lane as well as a second northbound left turn lane. The 360 Tech Village peak hour volumes are shown in Figure 6.

Jackson Healthcare Expansion

There is a planned expansion project for the Jackson Healthcare campus located on Northwinds Parkway west of US 19/GA 400. The expansion will include a 294,200 square foot office building and will be completed in 2019. The AM and PM peak hour site traffic volumes were derived by calculating the trips generated by a 292,200 square foot office building using the rates and equations published in the 9th edition of the Institute of Transportation Engineers (ITE) Trip Generation report. The trips generated by the additional building were distributed through the study network using the approved outer leg distribution for the Northwinds Summit development. The Jackson Healthcare Expansion peak hour volumes are shown in Figure 7.

The peak hour volumes from the nearby planned developments were added to the base year traffic volumes prior to construction of the proposed Northwinds Summit development. The resulting Future “No-Build” peak hour traffic volumes are shown in Figure 8.

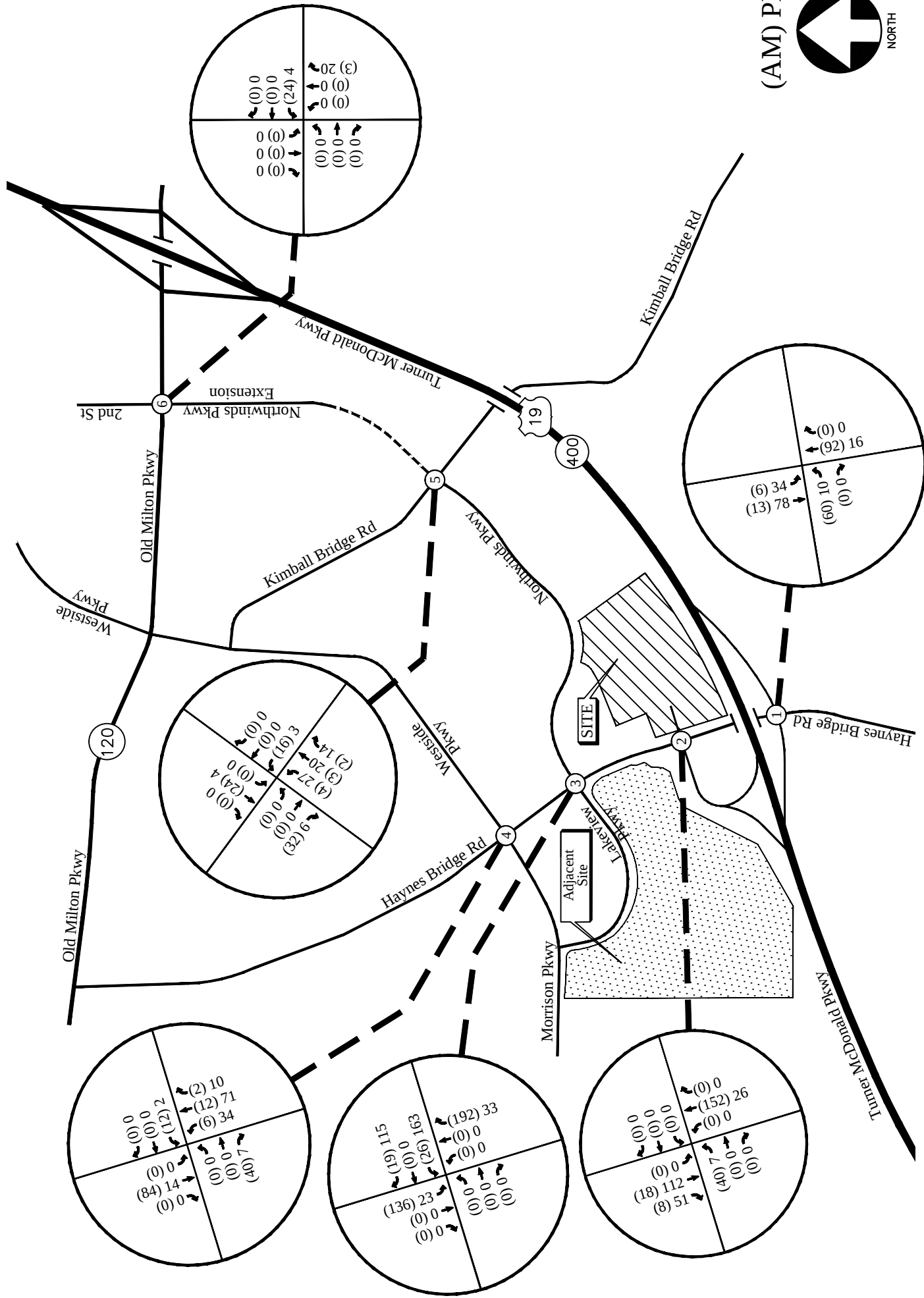


(AM) PM



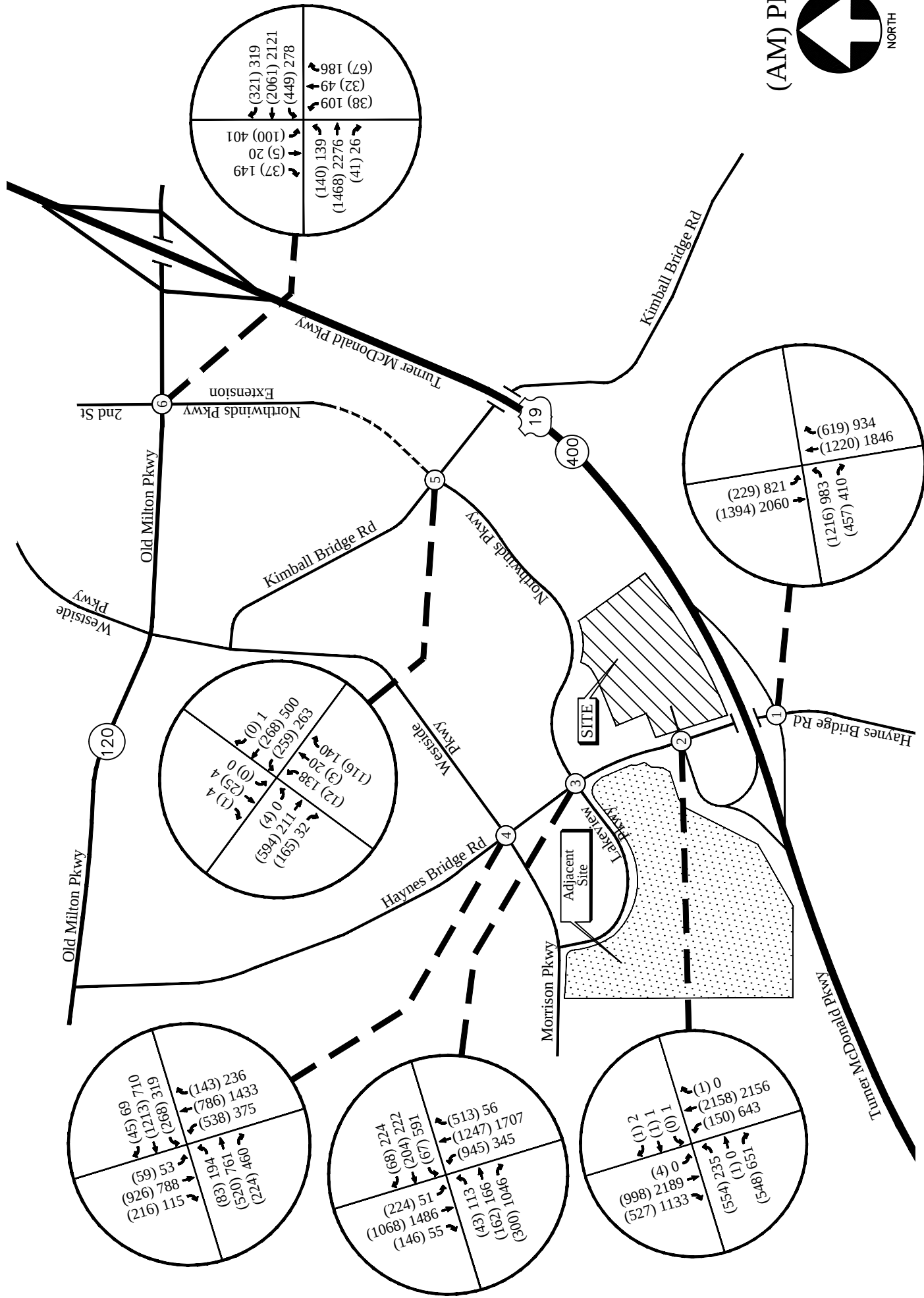
360 TECH VILLAGE SITE-GENERATED PEAK HOUR VOLUMES

FIGURE 6



JACKSON HEALTHCARE EXPANSION SITE-GENERATED PEAK HOUR VOLUMES

FIGURE 7



(AM) PM



FUTURE (NO-BUILD) PEAK HOUR VOLUMES

The future “No-Build” traffic operations were analyzed using the volumes in Figure 8 and the results are shown in Table 6 below. The results of the “No-Build” improved analysis, with optimized signal timing and including the recommended system improvements, are discussed in detail in the next section.

Recommendations for System Improvements

One or more of the study intersections are found to have delays that will (or currently) exceed the local level-of-service threshold (“D” or better) without any added traffic from the proposed development. These intersections have been identified below along with potential system improvements for the local municipality to consider in their future planning efforts. 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.

Haynes Bridge Road @ GA 400 Northbound Ramps

- Install a second southbound left turn lane on Haynes Bridge Road by restriping the northbound inside through lane
- Improve the existing eastbound US 19/GA 400 Northbound on-ramp from one receiving lane to two receiving lanes
- Install a second northbound right turn lane on Haynes Bridge Road

Haynes Bridge Road @ GA 400 Southbound Ramps

- Install permissive + overlap signal phasing for the southbound right turn movement

Haynes Bridge Road @ Lakeview Parkway/Northwinds Parkway

- Remove the existing protected left turn phasing on the eastbound approach and replace it with protected + permissive phasing
- Restripe the westbound approach to operate with two dedicated left turn lanes and one shared through/right turn lane
- Replace the existing westbound protected + permissive left turn signal phasing with protected only left turn signal phasing

Haynes Bridge Road @ Morrison Parkway/Westside Parkway

- Install southbound permissive + overlap signal phasing for the right turn movement on Haynes Bridge Road

Kimball Bridge Road @ Northwinds Parkway/Northwinds Parkway Extension

As part of the Northwinds Parkway Extension project, the existing unsignalized intersection of Kimball Bridge Road at Northwinds Parkway will be upgraded to operate as a signalized intersection with the addition of Northwinds Extension as the fourth leg to the intersection.

SR 120 (Old Milton Parkway) @ 2nd Street/Northwinds Parkway Extension

- Replace the existing northbound permissive signal phasing on Northwinds Parkway Extension with protected + permissive left turn phasing

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 (Figure 5) and pass-by volumes 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 analysis with the assumed site access configuration is shown in Table 7.

Site Access Configuration

The following access configuration was utilized when modeling the proposed site driveway intersections:

- Site Driveway #1: Full-access driveway on Haynes Bridge Road
 - This driveway is recommended to operate with one entering and four exiting lanes. The westbound (driveway) approach is proposed to have two dedicated left turn lanes, one dedicated through lane, and one shared through/right turn lane for exiting traffic
 - The intersection is to continue to be signalized with split phasing on the side-street approaches
 - Entering right-turn movements are assumed to be made from the existing northbound right turn lane
- Site Driveway #2: Full-access driveway on Northwinds Parkway
 - This driveway is proposed with one entering and two exiting lanes. The northbound (driveway) approach is proposed to have a shared through/left and dedicated right turn lane for exiting traffic
 - The intersection will continue to be unsignalized with an added STOP sign on the northbound approach
 - Entering left turn movements are assumed to be made from the existing westbound left turn lane
 - It is recommended a dedicated eastbound right turn lane be constructed per local standards for entering traffic

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. The results of the analyses, including the recommended system improvements, are discussed in detail in the following section.

TABLE 7 — FUTURE “BUILD” INTERSECTION OPERATIONS						
Intersection		Build Condition: LOS (Delay)				LOS Standard
		NO IMPROVEMENTS		SYSTEM AND SITE IMPROVEMENTS		
		AM Peak	PM Peak	AM Peak	PM Peak	
1	<u>Haynes Bridge Rd @ GA 400 NB Ramps</u>	<u>F (84.9)</u>	<u>F (177.3)</u>	<u>D (51.0)</u>	<u>E (76.0)</u>	<u>D / E</u>
	-Eastbound Approach	F (151.8)	F (206.8)	D (51.9)	F (111.3)	-
	-Northbound Approach	E (62.0)	F (227.7)	E (57.1)	F (87.1)	-
	-Southbound Approach	D (40.4)	F (118.7)	D (42.4)	D (50.9)	-
2	<u>Haynes Bridge Rd @ GA 400 SB Ramps</u>	<u>E (73.6)</u>	<u>F (127.8)</u>	<u>D (49.5)</u>	<u>E (68.7)</u>	<u>D / D</u>
	-Eastbound Approach	F (94.1)	F (144.5)	F (95.0)	E (67.7)	-
	-Westbound Approach	F (98.9)	F (461.6)	E (72.9)	F (115.9)	-
	-Northbound Approach	C (23.5)	D (39.2)	C (25.7)	C (32.3)	-
	-Southbound Approach	F (133.6)	F (107.8)	D (52.1)	F (87.8)	-
3	<u>Haynes Bridge Rd @ Northwinds Pkwy</u>	<u>F (120.1)</u>	<u>F (134.2)</u>	<u>D (53.2)</u>	<u>E (77.9)</u>	<u>D / E</u>
	-Eastbound Approach	E (57.9)	F (170.4)	D (43.3)	F (182.9)	-
	-Westbound Approach	F (95.9)	F (261.9)	E (69.7)	E (62.3)	-
	-Northbound Approach	D (53.6)	F (93.2)	D (47.0)	D (47.6)	-
	-Southbound Approach	F (241.0)	E (68.1)	E (60.7)	D (48.7)	-

4	<u>Haynes Bridge Rd @ Westside Pkwy</u>	<u>E (69.5)</u>	<u>E (65.3)</u>	<u>E (57.5)</u>	<u>D (49.6)</u>	<u>E / E</u>
	-Eastbound Approach	D (49.5)	E (68.7)	D (44.1)	E (65.9)	-
	-Westbound Approach	F (98.7)	E (71.3)	E (68.7)	E (68.0)	-
	-Northbound Approach	E (61.4)	E (65.8)	D (46.2)	C (26.4)	-
	-Southbound Approach	E (60.4)	D (53.4)	E (67.0)	E (62.4)	-
5	<u>Kimball Bridge Rd @ Northwinds Pkwy</u>	<u>C (20.8)</u>	<u>C (20.2)</u>	<u>C (20.8)</u>	<u>C (20.2)</u>	<u>D / D</u>
	-Eastbound Left	C (20.0)	C (28.5)	C (20.0)	C (28.5)	-
	-Westbound Left	B (13.2)	B (16.3)	B (13.2)	B (16.3)	-
	-Northbound Approach	C (32.9)	C (20.1)	C (32.9)	C (20.1)	-
	-Southbound Approach	D (41.9)	C (33.4)	D (41.9)	C (33.4)	-
6	<u>Old Milton Pkwy @ Northwinds Pkwy Ext</u>	<u>F (103.7)</u>	<u>F (98.5)</u>	<u>D (41.1)</u>	<u>E (68.7)</u>	<u>E / E</u>
	-Eastbound Approach	C (32.8)	D (51.8)	D (41.3)	E (55.2)	-
	-Westbound Approach	F (148.6)	F (114.9)	C (33.0)	D (54.1)	-
	-Northbound Approach	F (92.1)	F (283.0)	E (76.4)	F (80.8)	-
	-Southbound Approach	E (64.5)	E (62.2)	F (106.5)	F (174.3)	-
7	<u>Northwinds Pkwy @ Site Drwy 2</u>					
	-Eastbound Approach	A (0.0)	A (0.0)	A (0.0)	A (0.0)	D / D
	-Westbound Left	B (14.5)	A (8.3)	B (14.5)	A (8.3)	D / D
	-Northbound Approach	F (85.1)	E (36.4)	F (85.1)	E (36.4)	D / D

Recommendations for Site Mitigation Improvements

Improvements that are identified as 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.

Haynes Bridge Road @ GA 400 Southbound Ramps

- Restripe the westbound approach to operate with two dedicated left turn lanes, one dedicated through lane, and one shared through/right turn lane

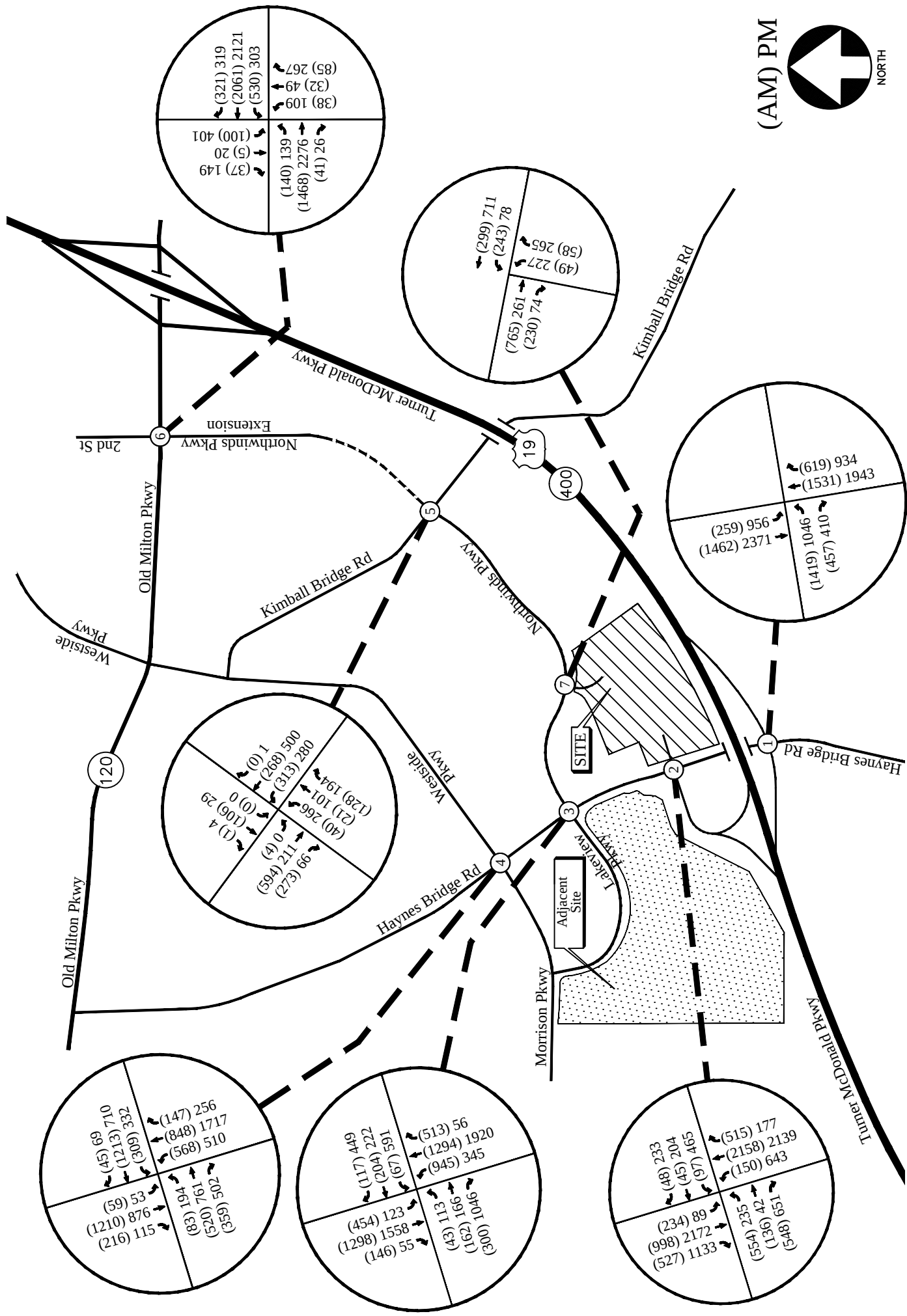
Though the recommended system and site improvements decrease the overall delay at the intersection by 43% in the AM peak hour and 47% in the PM peak hour, the intersection will begin to operate at a level-of-service “E” during the PM peak hour. As the intersection will operate above capacity without the addition of site traffic and delays are likely caused by the operational constraints at the intersection, it is the study’s goal to maintain a level-of-service “E”.

Haynes Bridge Road @ Lakeview Parkway/Northwinds Parkway

- Convert the existing yield-controlled northbound right turn movement to a free-flow movement
- Construct a second westbound right turn lane on Northwinds Parkway per local standards

Northwinds Parkway @ Site Driveway #2

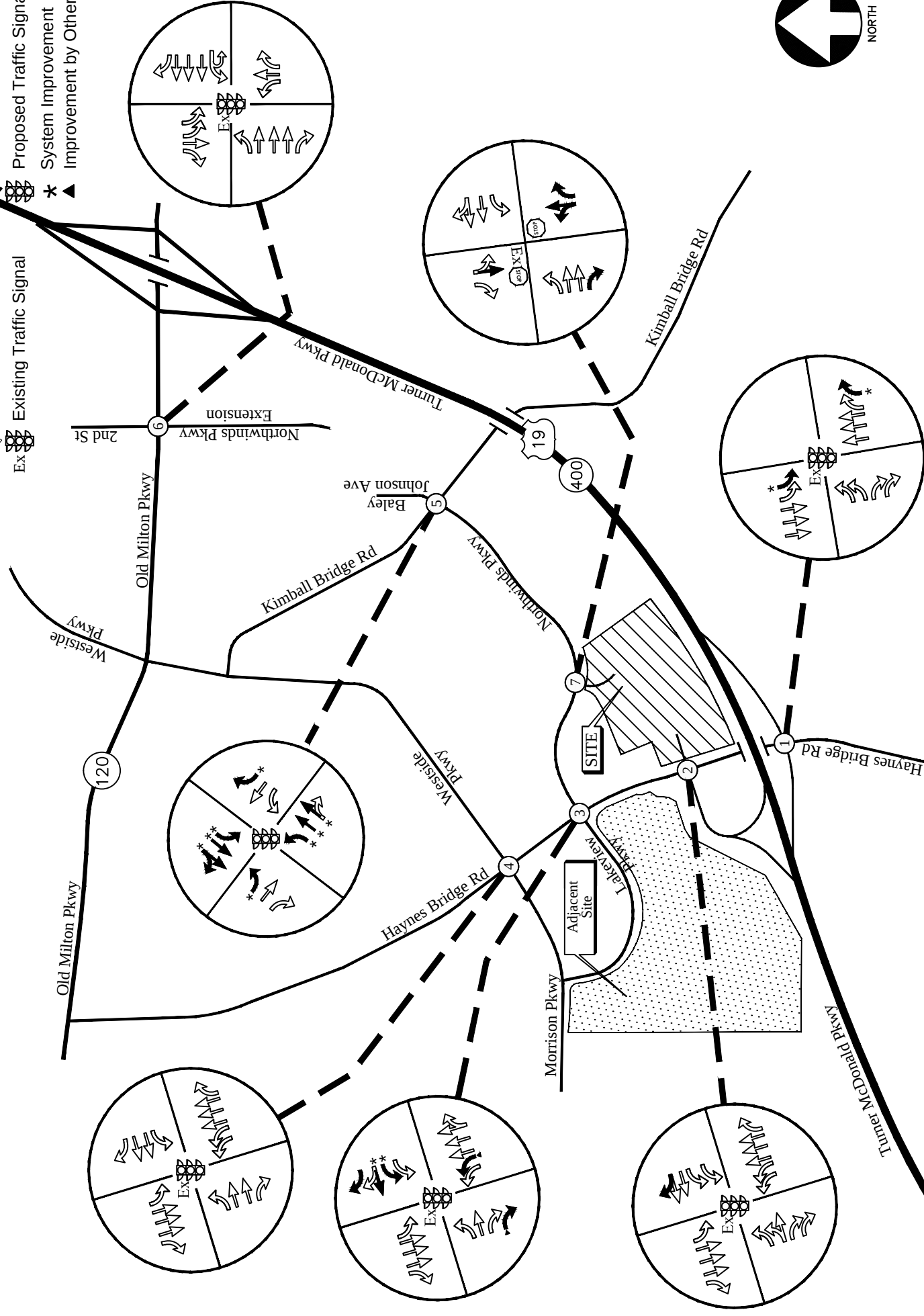
The northbound approach will see minor delays for exiting traffic during the AM and PM peak hour. These delays are caused by the wait times on the driveway to turn left onto Northwinds Parkway. As the intersection does not warrant construction of a traffic signal to improve the delay on the driveway, no additional improvements will aid left turning vehicles.



FUTURE (BUILD) PEAK HOUR VOLUMES

LEGEND

- Existing Signed Approach
- Existing Lane Geometry
- Existing Traffic Signal
- Proposed Signed Approach
- Proposed Lane Geometry
- Proposed Traffic Signal
- System Improvement
- Improvement by Others



FUTURE TRAFFIC CONTROL AND LANE GEOMETRY

CONCLUSIONS AND RECOMMENDATIONS

Traffic impacts were evaluated for the added traffic from the proposed Northwinds Summit mixed-use development located on Haynes Bridge Road between Northwinds Parkway and US 19/GA 400 in Alpharetta, Georgia. The development will consist of:

- 1,230,000 square feet of office space
- 30,000 square feet of retail space
- 140 multi-family units
- 32 condominiums
- 140-room hotel

The development proposes access at the following locations:

- Site Driveway 1: Existing full-access driveway on Haynes Bridge Road, aligned with the US 19/GA 400 southbound ramps
- Site Driveway 2: Full-access driveway on Northwinds Parkway, aligned with the existing Two Northwinds Center eastern driveway

Existing and future operations after completion of the project were analyzed at the intersections of:

1. Haynes Bridge Road at GA 400 Northbound Ramps
2. Haynes Bridge Road at GA 400 Southbound Ramps
3. Haynes Bridge Road at Lakeview Parkway/Northwinds Parkway
4. Haynes Bridge Road at Morrison Parkway/Westside Parkway
5. Kimball Bridge Road at Northwinds Parkway
6. SR 120 (Old Milton Parkway) at Northwinds Parkway Extension

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 and added traffic from other nearby planned developments. 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. These intersections have been identified below along with potential system improvements for the local municipality to consider in their future planning efforts.

Haynes Bridge Road @ GA 400 Northbound Ramps

- Install a second southbound left turn lane on Haynes Bridge Road by restriping the northbound inside through lane
- Improve the existing eastbound US 19/GA 400 Northbound on-ramp from one receiving lane to two receiving lanes
- Install a second northbound right turn lane on Haynes Bridge Road

Haynes Bridge Road @ GA 400 Southbound Ramps

- Install permissive + overlap signal phasing for the southbound right turn movement

Haynes Bridge Road @ Lakeview Parkway/Northwinds Parkway

- Remove the existing protected left turn phasing on the eastbound approach and replace it with protected + permissive phasing
- Restripe the westbound approach to operate with two dedicated left turn lanes and one shared through/right turn lane
- Replace the existing westbound protected + permissive left turn signal phasing with protected only left turn signal phasing

Haynes Bridge Road @ Morrison Parkway/Westside Parkway

- Install southbound permissive + overlap signal phasing for the right turn movement on Haynes Bridge Road

Kimball Bridge Road @ Northwinds Parkway/Northwinds Parkway Extension

As part of the Northwinds Parkway Extension project, the existing unsignalized intersection of Kimball Bridge Road at Northwinds Parkway will be upgraded to operate as a signalized intersection with the addition of Northwinds Extension as the fourth leg to the intersection.

SR 120 (Old Milton Parkway) @ 2nd Street/Northwinds Parkway Extension

- Replace the existing northbound permissive signal phasing on Northwinds Parkway Extension with protected + permissive left turn phasing

Site Access Configuration

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

- Site Driveway #1: Full-access driveway on Haynes Bridge Road
 - This driveway is recommended to operate with one entering and four exiting lanes. The westbound (driveway) approach is proposed to have two dedicated left turn lanes, one dedicated through lane, and one shared through/right turn lane for exiting traffic
 - The intersection is to continue to be signalized with split phasing on the side-street approaches
 - Entering right-turn movements are assumed to be made from the existing northbound right turn lane
- Site Driveway #2: Full-access driveway on Northwinds Parkway
 - This driveway is proposed with one entering and two exiting lanes. The northbound (driveway) approach is proposed to have a shared through/left and dedicated right turn lane for exiting traffic
 - The intersection will continue to be unsignalized with an added STOP sign on the northbound approach
 - Entering left turn movements are assumed to be made from the existing westbound left turn lane
 - It is recommended a dedicated eastbound right turn lane be constructed per local standards for entering traffic

Site Mitigation Improvements

Improvements that are identified as “Site Mitigation Improvements” address further impacts that are a result of the proposed development’s added traffic.

Haynes Bridge Road @ GA 400 Southbound Ramps

- Restripe the westbound approach to operate with two dedicated left turn lanes, one dedicated through lane, and one shared through/right turn lane

Though the recommended system and site improvements decrease the overall delay at the intersection by 43% in the AM peak hour and 47% in the PM peak hour, the intersection will begin to operate at a level-of-service “E” during the PM peak hour. As the intersection will operate above capacity without the addition of site traffic and delays are likely caused by the operational constraints at the intersection, it is the study’s goal to maintain a level-of-service “E”.

Haynes Bridge Road @ Lakeview Parkway/Northwinds Parkway

- Convert the existing yield-controlled northbound right turn movement to a free-flow movement
- Construct a second westbound right turn lane on Northwinds Parkway per local standards

Northwinds Parkway @ Site Driveway #2

The northbound approach will see minor delays for exiting traffic during the AM and PM peak hour. These delays are caused by the wait times on the driveway to turn left onto Northwinds Parkway. As the intersection does not warrant construction of a traffic signal to improve the delay on the driveway, no additional improvements will aid left turning vehicles.

Appendix

Existing Intersection Traffic Counts	A
GRTA Letter of Understanding	B
Linear Regression of Daily Traffic	C
Fact Sheets for Planned and Programmed Improvements	D
Existing Intersection Analysis	E
Future “No-Build” Intersection Analysis	F
Future “No-Build” Improved Intersection Analysis	G
Future “Build” Intersection Analysis.....	H
Future “Build” Improved Intersection Analysis.....	I
Traffic Volume Worksheets.....	J

Appendix A:
Existing Intersection Traffic Counts

Reliable Traffic Data Services, LLC

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

TMC Data

Haynes Bridge Rd @ GA 400 NB Ramps

7-9am | 12-2pm | 4-6pm

File Name : 39800001

Site Code : 39800001

Start Date : 1/18/2017

Page No : 1

Groups Printed- Cars, Buses, Trucks

	Haynes Bridge Rd Northbound					Haynes Bridge Rd Southbound					GA 400 NB Off Ramp Eastbound					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	133	74	0	207	26	192	0	0	218	145	2	75	0	222	0	0	0	0	0	647
07:15 AM	0	181	95	0	276	26	233	0	0	259	190	0	77	0	267	0	0	0	0	0	802
07:30 AM	0	236	128	0	364	48	307	0	0	355	207	0	93	0	300	0	0	0	0	0	1019
07:45 AM	0	267	159	0	426	59	318	0	0	377	282	0	104	0	386	0	0	0	0	0	1189
Total	0	817	456	0	1273	159	1050	0	0	1209	824	2	349	0	1175	0	0	0	0	0	3657
08:00 AM	0	218	152	0	370	48	331	0	0	379	212	0	107	0	319	0	0	0	0	0	1068
08:15 AM	0	216	136	0	352	51	360	0	0	411	225	0	120	0	345	0	0	0	0	0	1108
08:30 AM	0	215	160	0	375	29	283	0	0	312	219	0	117	0	336	0	0	0	0	0	1023
08:45 AM	0	206	133	0	339	64	292	0	0	356	178	1	119	0	298	0	0	0	0	0	993
Total	0	855	581	0	1436	192	1266	0	0	1458	834	1	463	0	1298	0	0	0	0	0	4192
*** BREAK ***																					
12:00 PM	0	299	146	0	445	53	381	0	0	434	110	2	91	0	203	0	0	0	0	0	1082
12:15 PM	0	345	147	0	492	61	422	0	0	483	130	0	82	0	212	0	0	0	0	0	1187
12:30 PM	0	372	176	0	548	62	398	0	0	460	112	0	80	0	192	0	0	0	0	0	1200
12:45 PM	0	359	220	0	579	58	371	0	0	429	154	0	102	0	256	0	0	0	0	0	1264
Total	0	1375	689	0	2064	234	1572	0	0	1806	506	2	355	0	863	0	0	0	0	0	4733
01:00 PM	0	435	215	0	650	57	344	1	0	402	109	0	89	0	198	0	0	0	0	0	1250
01:15 PM	0	353	243	0	596	52	337	0	0	389	180	0	111	0	291	0	0	0	0	0	1276
01:30 PM	0	364	190	0	554	51	326	0	0	377	146	1	102	0	249	0	0	0	0	0	1180
01:45 PM	0	332	229	0	561	59	313	0	0	372	168	0	88	0	256	0	0	0	0	0	1189
Total	0	1484	877	0	2361	219	1320	1	0	1540	603	1	390	0	994	0	0	0	0	0	4895
*** BREAK ***																					
04:00 PM	0	364	222	0	586	170	278	0	0	448	203	0	100	0	303	0	0	0	0	0	1337
04:15 PM	0	368	209	0	577	141	272	0	0	413	170	0	107	0	277	0	0	0	0	0	1267
04:30 PM	0	471	247	0	718	166	345	0	0	511	187	0	101	0	288	0	0	0	0	0	1517
04:45 PM	0	358	220	0	578	182	380	0	0	562	234	2	101	0	337	0	0	0	0	0	1477
Total	0	1561	898	0	2459	659	1275	0	0	1934	794	2	409	0	1205	0	0	0	0	0	5598
05:00 PM	0	508	236	0	744	192	424	0	0	616	221	0	82	0	303	0	0	0	0	0	1663
05:15 PM	0	428	276	0	704	166	456	0	0	622	201	0	102	0	303	0	0	0	0	0	1629
05:30 PM	0	388	216	0	604	177	451	0	0	628	247	0	104	0	351	0	0	0	0	0	1583
05:45 PM	0	391	188	0	579	153	445	0	0	598	200	0	114	0	314	0	0	0	0	0	1491
Total	0	1715	916	0	2631	688	1776	0	0	2464	869	0	402	0	1271	0	0	0	0	0	6366
Grand Total	0	7807	4417	0	12224	2151	8259	1	0	10411	4430	8	2368	0	6806	0	0	0	0	0	29441
Apprch %	0	63.9	36.1	0		20.7	79.3	0	0		65.1	0.1	34.8	0		0	0	0	0		
Total %	0	26.5	15	0	41.5	7.3	28.1	0	0	35.4	15	0	8	0	23.1	0	0	0	0	0	

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TMC Data

Haynes Bridge Rd @ GA 400 NB Ramps

7-9am | 12-2pm | 4-6pm

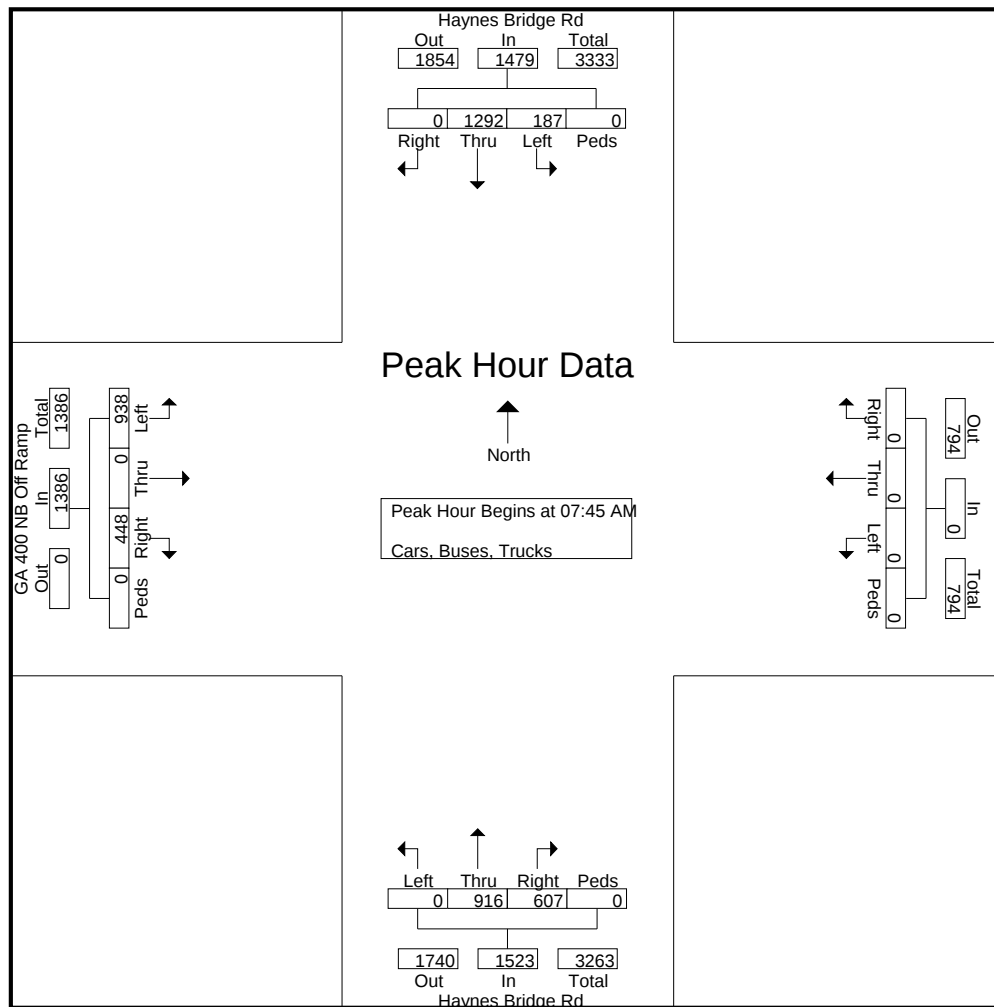
File Name : 39800001

Site Code : 39800001

Start Date : 1/18/2017

Page No : 2

	Haynes Bridge Rd Northbound					Haynes Bridge Rd Southbound					GA 400 NB Off Ramp Eastbound					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 07:45 AM																					
07:45 AM	0	267	159	0	426	59	318	0	0	377	282	0	104	0	386	0	0	0	0	0	1189
08:00 AM	0	218	152	0	370	48	331	0	0	379	212	0	107	0	319	0	0	0	0	0	1068
08:15 AM	0	216	136	0	352	51	360	0	0	411	225	0	120	0	345	0	0	0	0	0	1108
08:30 AM	0	215	160	0	375	29	283	0	0	312	219	0	117	0	336	0	0	0	0	0	1023
Total Volume	0	916	607	0	1523	187	1292	0	0	1479	938	0	448	0	1386	0	0	0	0	0	4388
% App. Total	0	60.1	39.9	0		12.6	87.4	0	0		67.7	0	32.3	0		0	0	0	0		
PHF	.000	.858	.948	.000	.894	.792	.897	.000	.000	.900	.832	.000	.933	.000	.898	.000	.000	.000	.000	.000	.923



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TMC Data

Haynes Bridge Rd @ GA 400 NB Ramps

7-9am | 12-2pm | 4-6pm

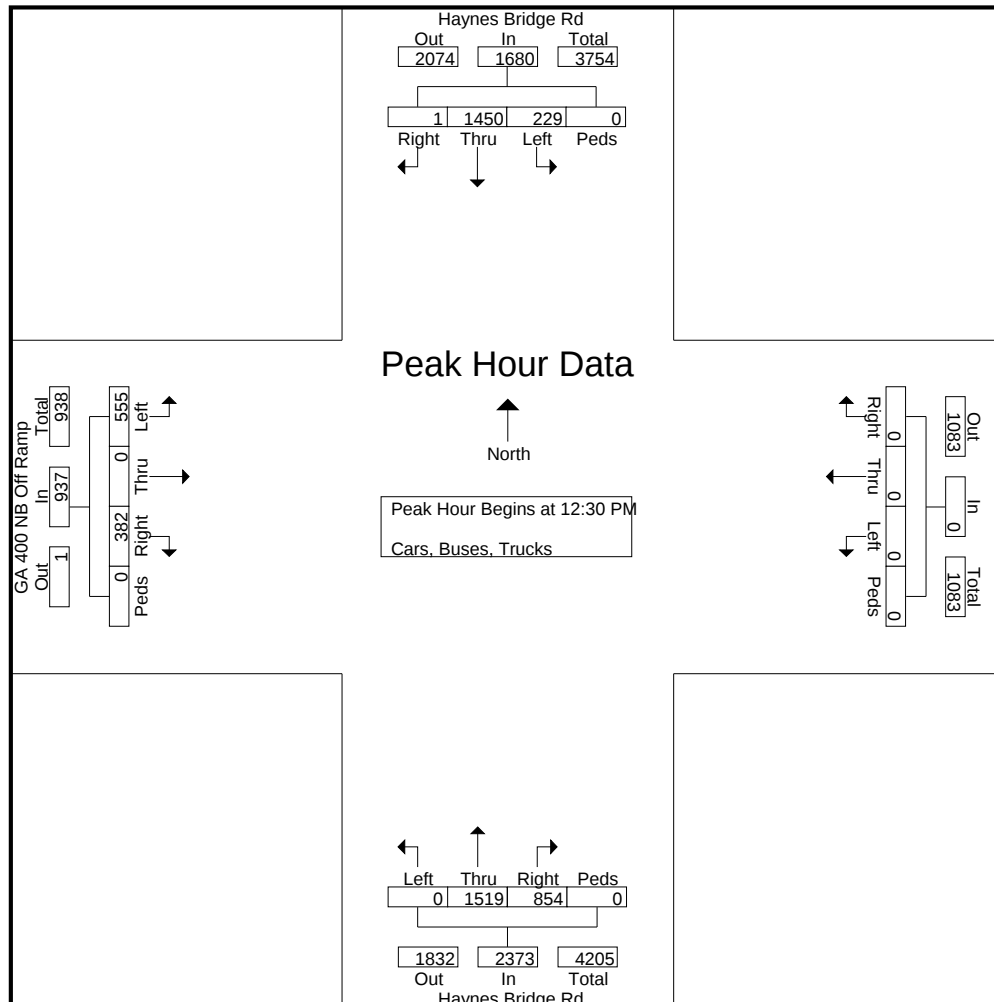
File Name : 39800001

Site Code : 39800001

Start Date : 1/18/2017

Page No : 3

	Haynes Bridge Rd Northbound					Haynes Bridge Rd Southbound					GA 400 NB Off Ramp Eastbound					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 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:30 PM																					
12:30 PM	0	372	176	0	548	62	398	0	0	460	112	0	80	0	192	0	0	0	0	0	1200
12:45 PM	0	359	220	0	579	58	371	0	0	429	154	0	102	0	256	0	0	0	0	0	1264
01:00 PM	0	435	215	0	650	57	344	1	0	402	109	0	89	0	198	0	0	0	0	0	1250
01:15 PM	0	353	243	0	596	52	337	0	0	389	180	0	111	0	291	0	0	0	0	0	1276
Total Volume	0	1519	854	0	2373	229	1450	1	0	1680	555	0	382	0	937	0	0	0	0	0	4990
% App. Total	0	64	36	0		13.6	86.3	0.1	0		59.2	0	40.8	0		0	0	0	0		
PHF	.000	.873	.879	.000	.913	.923	.911	.250	.000	.913	.771	.000	.860	.000	.805	.000	.000	.000	.000	.000	.978



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TMC Data

Haynes Bridge Rd @ GA 400 NB Ramps

7-9am | 12-2pm | 4-6pm

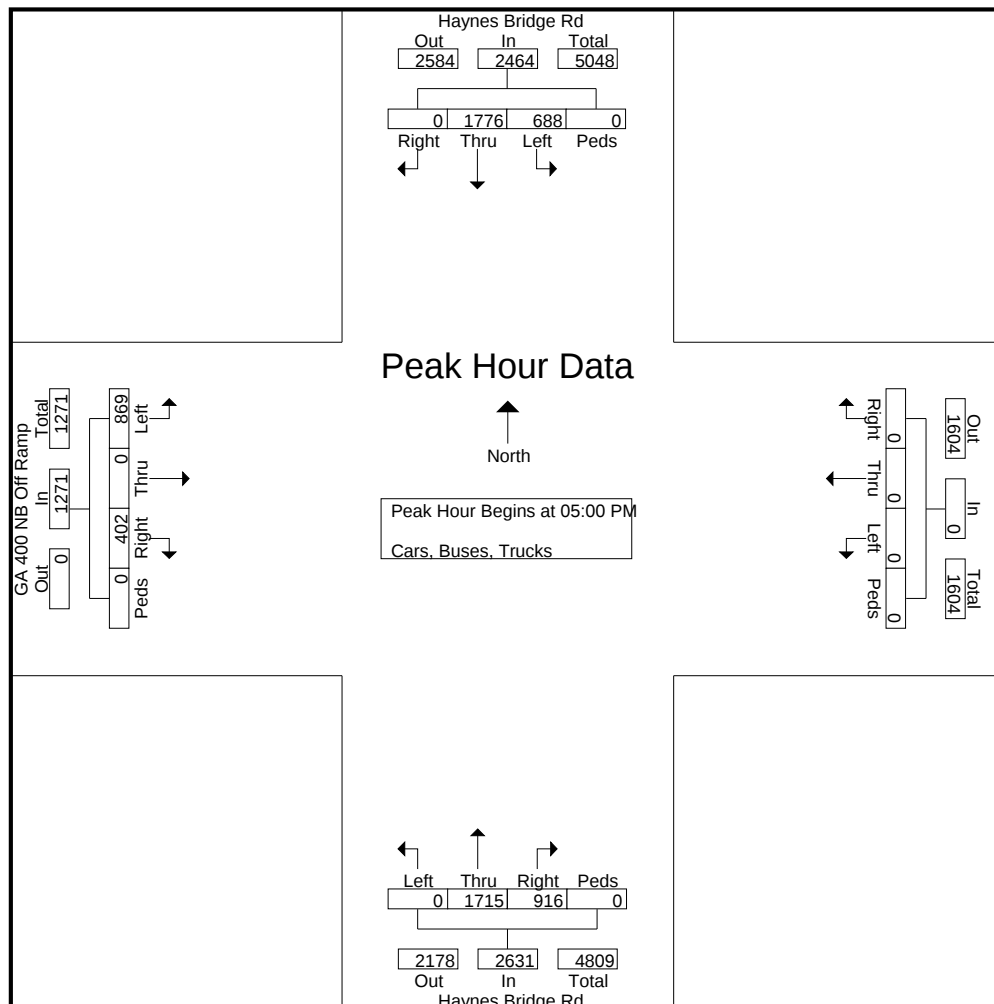
File Name : 39800001

Site Code : 39800001

Start Date : 1/18/2017

Page No : 4

	Haynes Bridge Rd Northbound					Haynes Bridge Rd Southbound					GA 400 NB Off Ramp Eastbound					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	508	236	0	744	192	424	0	0	616	221	0	82	0	303	0	0	0	0	0	1663
05:15 PM	0	428	276	0	704	166	456	0	0	622	201	0	102	0	303	0	0	0	0	0	1629
05:30 PM	0	388	216	0	604	177	451	0	0	628	247	0	104	0	351	0	0	0	0	0	1583
05:45 PM	0	391	188	0	579	153	445	0	0	598	200	0	114	0	314	0	0	0	0	0	1491
Total Volume	0	1715	916	0	2631	688	1776	0	0	2464	869	0	402	0	1271	0	0	0	0	0	6366
% App. Total	0	65.2	34.8	0		27.9	72.1	0	0		68.4	0	31.6	0		0	0	0	0		
PHF	.000	.844	.830	.000	.884	.896	.974	.000	.000	.981	.880	.000	.882	.000	.905	.000	.000	.000	.000	.000	.957



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TMC Data

Haynes Bridge Rd @ GA 400 SB Ramps

7-9am | 12-2pm | 4-6pm

File Name : 39800002

Site Code : 39800002

Start Date : 1/18/2017

Page No : 1

Groups Printed- Cars, Buses, Trucks

	Haynes Bridge Rd Northbound					Haynes Bridge Rd Southbound					GA 400 SB Off Ramp Eastbound					Northwinds Summit Comm Drwy 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	38	293	1	0	332	1	162	160	0	323	18	0	78	0	96	0	0	0	0	0	751
07:15 AM	28	358	0	0	386	0	197	125	0	322	42	0	96	0	138	0	0	0	0	0	846
07:30 AM	26	392	0	0	418	3	212	137	0	352	91	0	138	0	229	0	0	0	0	0	999
07:45 AM	39	436	1	0	476	1	220	100	0	321	84	0	124	0	208	0	0	1	0	1	1006
Total	131	1479	2	0	1612	5	791	522	0	1318	235	0	436	0	671	0	0	1	0	1	3602
08:00 AM	42	361	0	0	403	0	216	100	0	316	96	0	126	0	222	0	0	0	0	0	941
08:15 AM	40	391	0	0	431	0	220	102	0	322	137	1	149	0	287	0	1	0	0	1	1041
08:30 AM	36	374	0	0	410	3	222	92	0	317	115	0	156	0	271	1	0	0	0	1	999
08:45 AM	32	354	0	0	386	1	213	79	0	293	108	0	113	0	221	0	0	0	0	0	900
Total	150	1480	0	0	1630	4	871	373	0	1248	456	1	544	0	1001	1	1	0	0	2	3881
*** BREAK ***																					
12:00 PM	93	319	1	0	413	5	306	155	0	466	29	0	157	0	186	1	0	0	0	1	1066
12:15 PM	98	359	4	0	461	5	314	149	0	468	37	0	154	0	191	0	0	1	0	1	1121
12:30 PM	92	361	0	0	453	3	323	152	0	478	44	0	134	0	178	0	0	0	0	0	1109
12:45 PM	104	429	0	0	533	3	336	133	0	472	35	0	136	0	171	0	0	1	0	1	1177
Total	387	1468	5	0	1860	16	1279	589	0	1884	145	0	581	0	726	1	0	2	0	3	4473
01:00 PM	107	379	0	0	486	3	298	171	0	472	36	0	130	0	166	1	0	0	0	1	1125
01:15 PM	101	412	0	0	513	2	263	154	0	419	33	0	130	0	163	0	0	1	0	1	1096
01:30 PM	96	432	1	0	529	4	263	144	0	411	40	0	115	0	155	0	0	0	0	0	1095
01:45 PM	93	423	1	0	517	3	265	130	0	398	41	3	140	0	184	1	1	1	0	3	1102
Total	397	1646	2	0	2045	12	1089	599	0	1700	150	3	515	0	668	2	1	2	0	5	4418
*** BREAK ***																					
04:00 PM	119	428	0	0	547	0	361	227	0	588	30	0	76	0	106	0	0	0	0	0	1241
04:15 PM	128	432	0	0	560	1	347	200	0	548	41	0	90	0	131	0	0	1	0	1	1240
04:30 PM	125	463	0	0	588	0	391	223	0	614	35	0	120	0	155	1	0	0	0	1	1358
04:45 PM	139	495	0	0	634	0	418	208	0	626	32	0	144	0	176	0	0	1	0	1	1437
Total	511	1818	0	0	2329	1	1517	858	0	2376	138	0	430	0	568	1	0	2	0	3	5276
05:00 PM	171	487	0	0	658	0	475	236	0	711	44	0	160	0	204	0	1	0	0	1	1574
05:15 PM	168	478	0	0	646	0	456	228	0	684	64	0	157	0	221	1	0	1	0	2	1553
05:30 PM	152	463	0	0	615	0	427	217	0	644	43	0	177	0	220	0	0	0	0	0	1479
05:45 PM	146	452	0	0	598	1	378	171	0	550	65	0	192	0	257	0	0	0	0	0	1405
Total	637	1880	0	0	2517	1	1736	852	0	2589	216	0	686	0	902	1	1	1	0	3	6011
Grand Total	2213	9771	9	0	11993	39	7283	3793	0	11115	1340	4	3192	0	4536	6	3	8	0	17	27661
Apprch %	18.5	81.5	0.1	0		0.4	65.5	34.1	0		29.5	0.1	70.4	0		35.3	17.6	47.1	0		
Total %	8	35.3	0	0	43.4	0.1	26.3	13.7	0	40.2	4.8	0	11.5	0	16.4	0	0	0	0	0.1	

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TMC Data

Haynes Bridge Rd @ GA 400 SB Ramps

7-9am | 12-2pm | 4-6pm

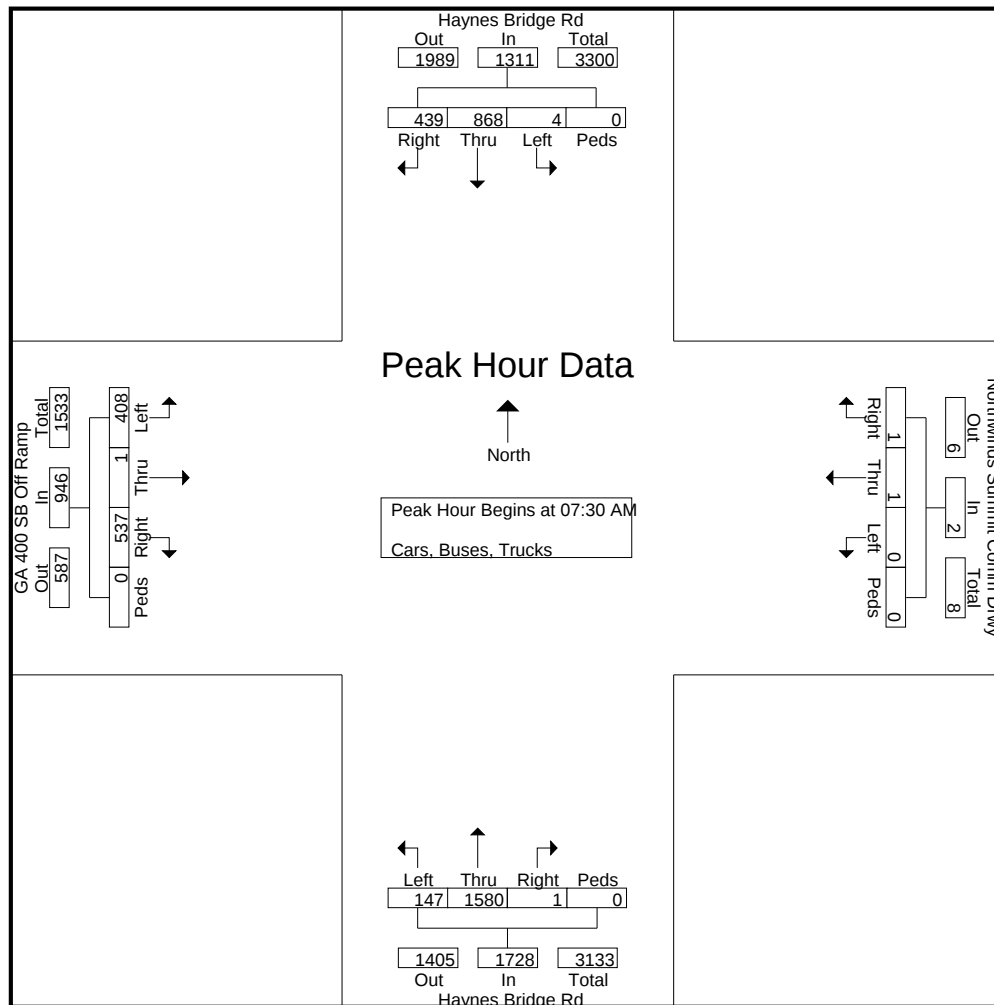
File Name : 39800002

Site Code : 39800002

Start Date : 1/18/2017

Page No : 2

	Haynes Bridge Rd Northbound					Haynes Bridge Rd Southbound					GA 400 SB Off Ramp Eastbound					Northwinds Summit Comm Drwy 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	26	392	0	0	418	3	212	137	0	352	91	0	138	0	229	0	0	0	0	0	999
07:45 AM	39	436	1	0	476	1	220	100	0	321	84	0	124	0	208	0	0	1	0	1	1006
08:00 AM	42	361	0	0	403	0	216	100	0	316	96	0	126	0	222	0	0	0	0	0	941
08:15 AM	40	391	0	0	431	0	220	102	0	322	137	1	149	0	287	0	1	0	0	1	1041
Total Volume	147	1580	1	0	1728	4	868	439	0	1311	408	1	537	0	946	0	1	1	0	2	3987
% App. Total	8.5	91.4	0.1	0		0.3	66.2	33.5	0		43.1	0.1	56.8	0		0	50	50	0		
PHF	.875	.906	.250	.000	.908	.333	.986	.801	.000	.931	.745	.250	.901	.000	.824	.000	.250	.250	.000	.500	.957



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TMC Data

Haynes Bridge Rd @ GA 400 SB Ramps

7-9am | 12-2pm | 4-6pm

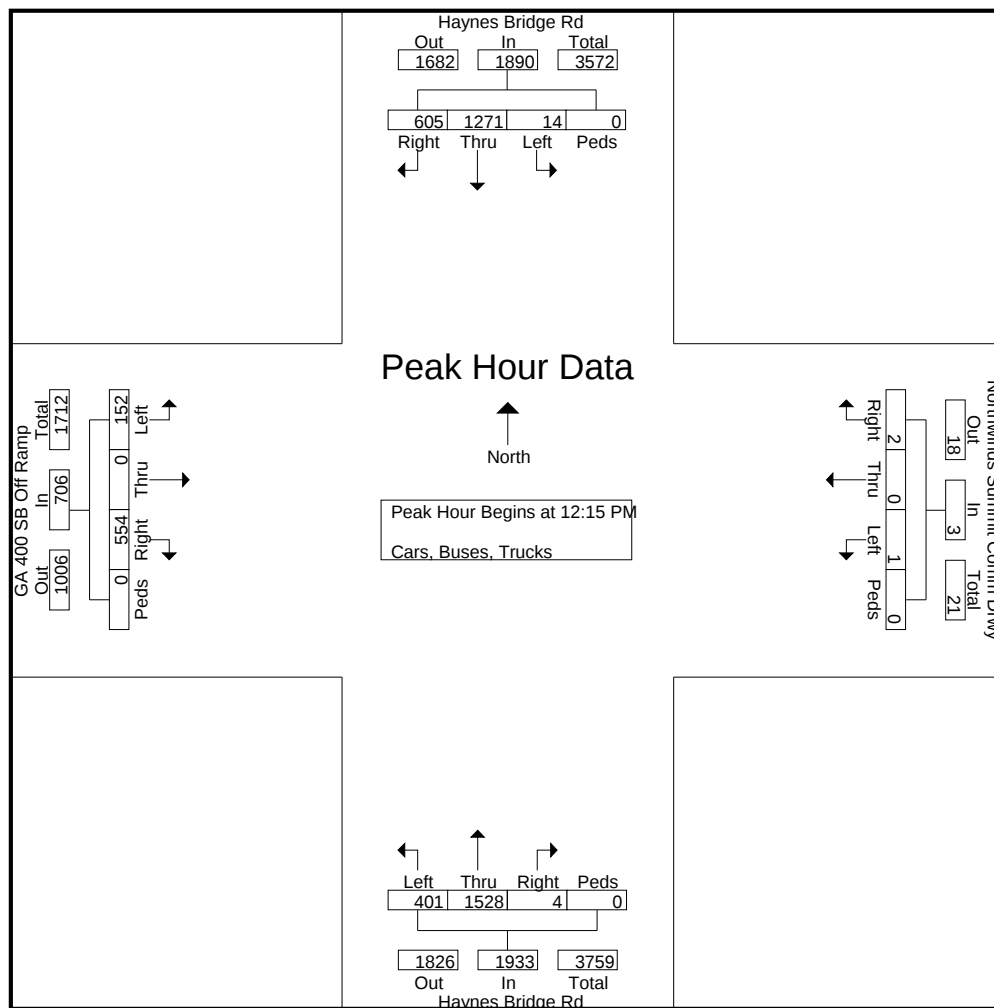
File Name : 39800002

Site Code : 39800002

Start Date : 1/18/2017

Page No : 3

	Haynes Bridge Rd Northbound					Haynes Bridge Rd Southbound					GA 400 SB Off Ramp Eastbound					Northwinds Summit Comm Drwy 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 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:15 PM																					
12:15 PM	98	359	4	0	461	5	314	149	0	468	37	0	154	0	191	0	0	1	0	1	1121
12:30 PM	92	361	0	0	453	3	323	152	0	478	44	0	134	0	178	0	0	0	0	0	1109
12:45 PM	104	429	0	0	533	3	336	133	0	472	35	0	136	0	171	0	0	1	0	1	1177
01:00 PM	107	379	0	0	486	3	298	171	0	472	36	0	130	0	166	1	0	0	0	1	1125
Total Volume	401	1528	4	0	1933	14	1271	605	0	1890	152	0	554	0	706	1	0	2	0	3	4532
% App. Total	20.7	79	0.2	0		0.7	67.2	32	0		21.5	0	78.5	0		33.3	0	66.7	0		
PHF	.937	.890	.250	.000	.907	.700	.946	.885	.000	.988	.864	.000	.899	.000	.924	.250	.000	.500	.000	.750	.963



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TMC Data

Haynes Bridge Rd @ GA 400 SB Ramps

7-9am | 12-2pm | 4-6pm

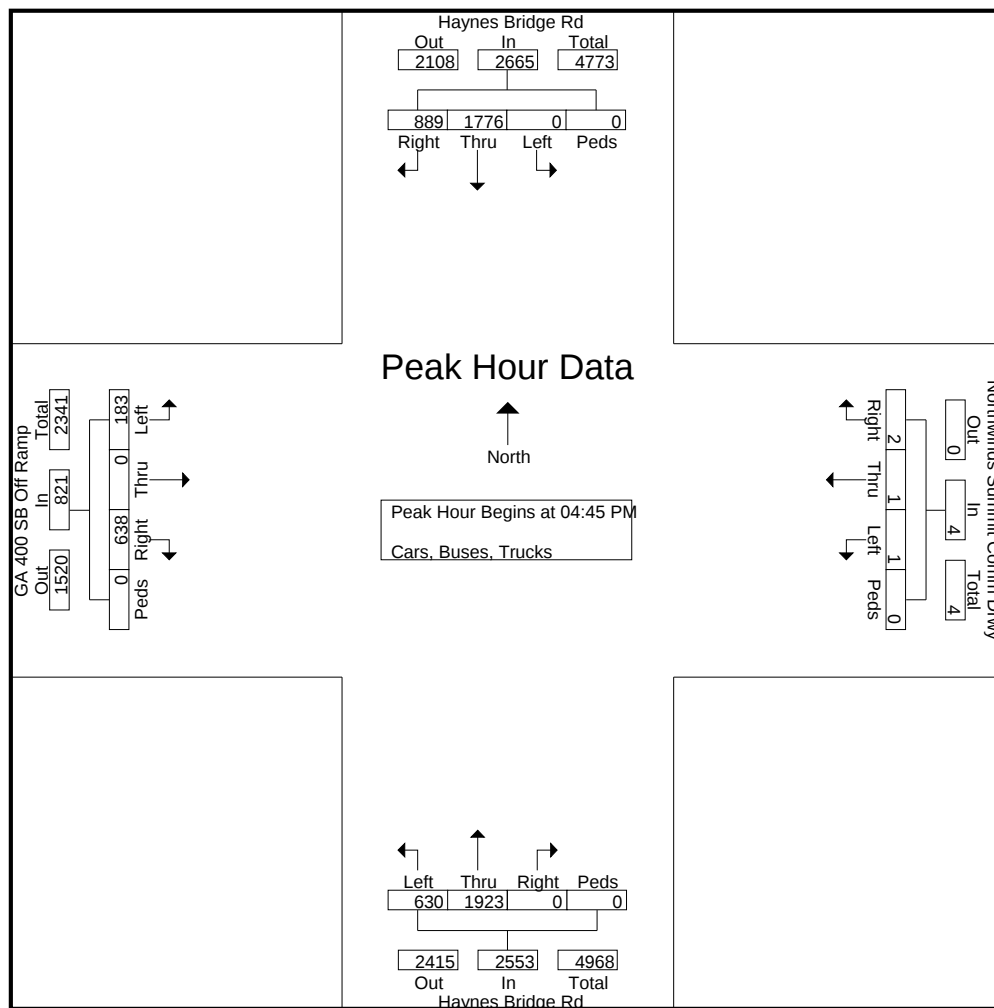
File Name : 39800002

Site Code : 39800002

Start Date : 1/18/2017

Page No : 4

	Haynes Bridge Rd Northbound					Haynes Bridge Rd Southbound					GA 400 SB Off Ramp Eastbound					Northwinds Summit Comm Drwy 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	139	495	0	0	634	0	418	208	0	626	32	0	144	0	176	0	0	1	0	1	1437
05:00 PM	171	487	0	0	658	0	475	236	0	711	44	0	160	0	204	0	1	0	0	1	1574
05:15 PM	168	478	0	0	646	0	456	228	0	684	64	0	157	0	221	1	0	1	0	2	1553
05:30 PM	152	463	0	0	615	0	427	217	0	644	43	0	177	0	220	0	0	0	0	0	1479
Total Volume	630	1923	0	0	2553	0	1776	889	0	2665	183	0	638	0	821	1	1	2	0	4	6043
% App. Total	24.7	75.3	0	0		0	66.6	33.4	0		22.3	0	77.7	0		25	25	50	0		
PHF	.921	.971	.000	.000	.970	.000	.935	.942	.000	.937	.715	.000	.901	.000	.929	.250	.250	.500	.000	.500	.960



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TMC Data
Haynes Bridge Rd @ Northwinds Pkwy/
Lakeview Pkwy
7-9am | 12-2pm | 4-6pm

File Name : 39800003
Site Code : 39800003
Start Date : 1/18/2017
Page No : 1

Groups Printed- Cars, Buses, Trucks

	Haynes Bridge Rd Northbound					Haynes Bridge Rd Southbound					Lakeview Pkwy Eastbound					Northwinds Pkwy 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	49	226	13	0	288	11	254	3	0	268	0	11	21	0	32	8	25	9	0	42	630
07:15 AM	67	278	21	0	366	15	293	7	0	315	0	17	24	0	41	8	39	9	0	56	778
07:30 AM	82	338	42	0	462	19	298	7	0	324	0	18	38	0	56	4	31	7	0	42	884
07:45 AM	102	361	58	0	521	15	250	5	0	270	1	33	38	0	72	18	35	10	0	63	926
Total	300	1203	134	0	1637	60	1095	22	0	1177	1	79	121	0	201	38	130	35	0	203	3218
08:00 AM	113	299	81	0	493	23	278	13	0	314	1	37	38	0	76	8	24	15	0	47	930
08:15 AM	105	278	78	0	461	24	267	11	0	302	1	26	31	0	58	7	23	11	0	41	862
08:30 AM	126	284	98	0	508	24	252	13	0	289	0	37	23	0	60	7	27	12	0	46	903
08:45 AM	94	278	57	0	429	27	218	9	0	254	2	26	59	0	87	8	20	14	0	42	812
Total	438	1139	314	0	1891	98	1015	46	0	1159	4	126	151	0	281	30	94	52	0	176	3507
*** BREAK ***																					
12:00 PM	43	267	16	0	326	20	280	3	0	303	4	18	76	0	98	46	15	22	0	83	810
12:15 PM	43	293	26	0	362	9	347	3	0	359	3	16	71	0	90	43	21	16	0	80	891
12:30 PM	40	303	26	0	369	22	305	4	0	331	3	6	84	0	93	42	17	22	0	81	874
12:45 PM	47	332	21	0	400	30	316	9	0	355	6	15	62	0	83	39	16	19	0	74	912
Total	173	1195	89	0	1457	81	1248	19	0	1348	16	55	293	0	364	170	69	79	0	318	3487
01:00 PM	54	326	30	0	410	12	321	11	0	344	2	15	60	0	77	38	14	23	0	75	906
01:15 PM	50	320	23	0	393	16	308	6	0	330	2	14	58	0	74	32	11	18	0	61	858
01:30 PM	48	314	18	0	380	14	291	6	0	311	6	16	46	0	68	35	13	19	0	67	826
01:45 PM	45	292	14	0	351	12	286	4	0	302	2	14	49	0	65	31	10	16	0	57	775
Total	197	1252	85	0	1534	54	1206	27	0	1287	12	59	213	0	284	136	48	76	0	260	3365
*** BREAK ***																					
04:00 PM	23	378	6	0	407	9	318	0	0	327	5	33	164	0	202	65	25	11	0	101	1037
04:15 PM	28	384	6	0	418	2	320	2	0	324	7	18	144	0	169	64	38	28	0	130	1041
04:30 PM	33	396	3	0	432	6	326	1	0	333	8	42	192	0	242	55	47	20	0	122	1129
04:45 PM	36	402	3	0	441	12	350	0	0	362	7	33	170	0	210	65	34	20	0	119	1132
Total	120	1560	18	0	1698	29	1314	3	0	1346	27	126	670	0	823	249	144	79	0	472	4339
05:00 PM	27	411	3	0	441	7	367	0	0	374	4	16	149	0	169	140	60	23	0	223	1207
05:15 PM	34	418	14	0	466	6	384	2	0	392	7	16	141	0	164	103	36	39	0	178	1200
05:30 PM	35	442	3	0	480	2	356	0	0	358	6	18	136	0	160	112	52	25	0	189	1187
05:45 PM	27	406	4	0	437	3	327	0	0	330	2	22	101	0	125	83	31	34	0	148	1040
Total	123	1677	24	0	1824	18	1434	2	0	1454	19	72	527	0	618	438	179	121	0	738	4634
Grand Total	1351	8026	664	0	10041	340	7312	119	0	7771	79	517	1975	0	2571	1061	664	442	0	2167	22550
Apprch %	13.5	79.9	6.6	0		4.4	94.1	1.5	0		3.1	20.1	76.8	0		49	30.6	20.4	0		
Total %	6	35.6	2.9	0	44.5	1.5	32.4	0.5	0	34.5	0.4	2.3	8.8	0	11.4	4.7	2.9	2	0	9.6	

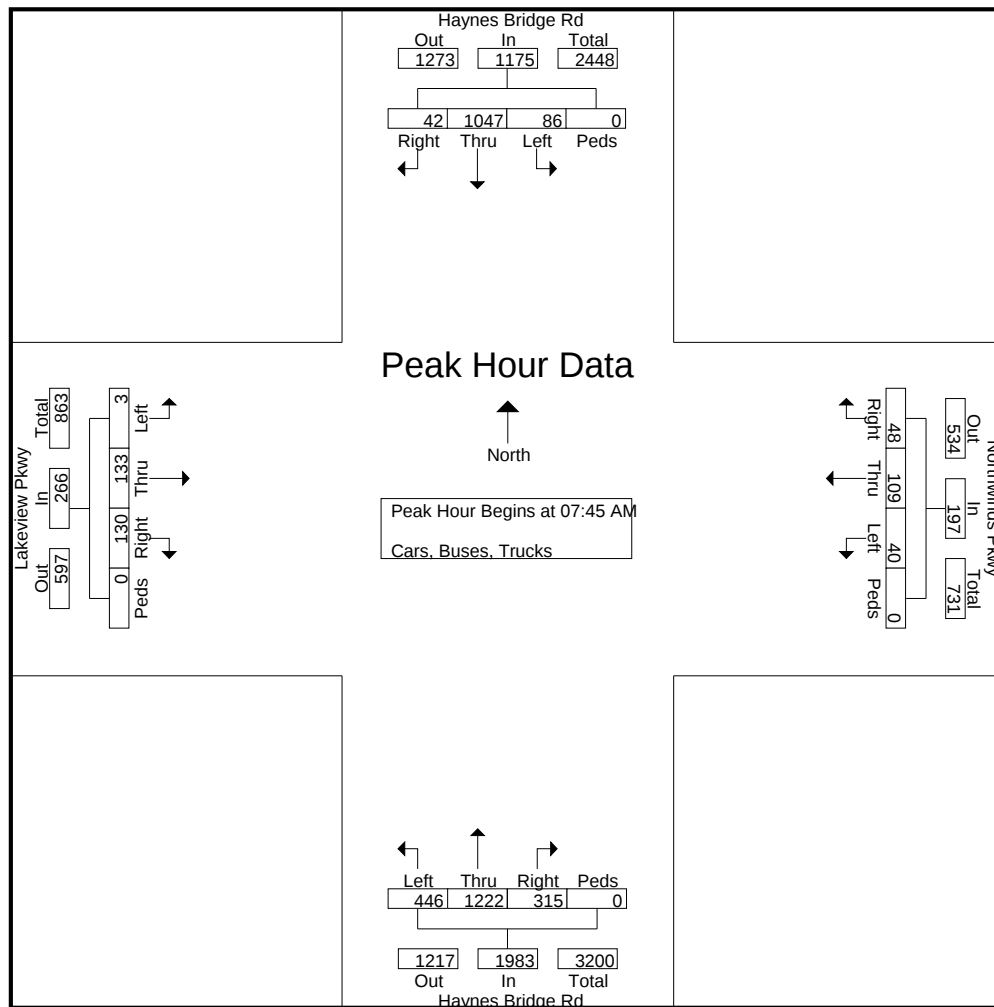
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TMC Data
Haynes Bridge Rd @ Northwinds Pkwy/
Lakeview Pkwy
7-9am | 12-2pm | 4-6pm

File Name : 39800003
Site Code : 39800003
Start Date : 1/18/2017
Page No : 2

	Haynes Bridge Rd Northbound					Haynes Bridge Rd Southbound					Lakeview Pkwy Eastbound					Northwinds Pkwy 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 07:45 AM																					
07:45 AM	102	361	58	0	521	15	250	5	0	270	1	33	38	0	72	18	35	10	0	63	926
08:00 AM	113	299	81	0	493	23	278	13	0	314	1	37	38	0	76	8	24	15	0	47	930
08:15 AM	105	278	78	0	461	24	267	11	0	302	1	26	31	0	58	7	23	11	0	41	862
08:30 AM	126	284	98	0	508	24	252	13	0	289	0	37	23	0	60	7	27	12	0	46	903
Total Volume	446	1222	315	0	1983	86	1047	42	0	1175	3	133	130	0	266	40	109	48	0	197	3621
% App. Total	22.5	61.6	15.9	0		7.3	89.1	3.6	0		1.1	50	48.9	0		20.3	55.3	24.4	0		
PHF	.885	.846	.804	.000	.952	.896	.942	.808	.000	.936	.750	.899	.855	.000	.875	.556	.779	.800	.000	.782	.973



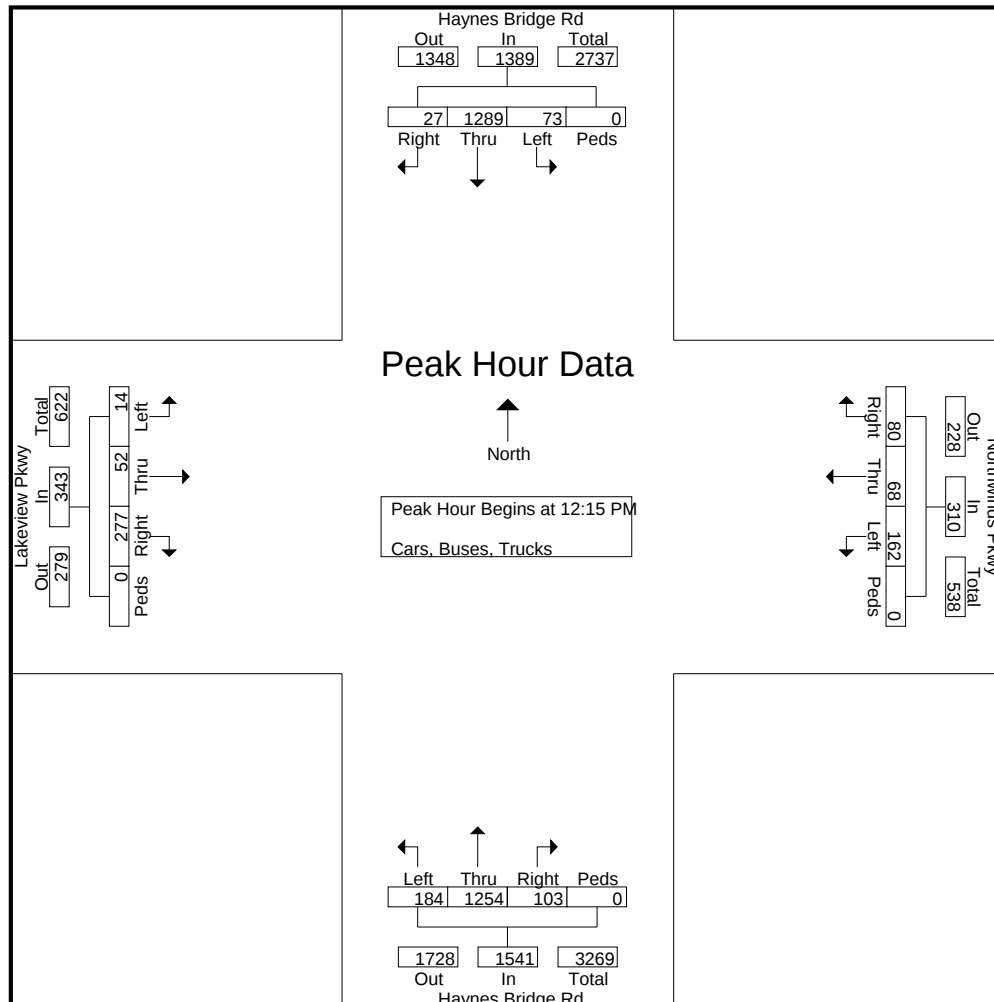
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TMC Data
Haynes Bridge Rd @ Northwinds Pkwy/
Lakeview Pkwy
7-9am I 12-2pm I 4-6pm

File Name : 39800003
Site Code : 39800003
Start Date : 1/18/2017
Page No : 3

	Haynes Bridge Rd Northbound					Haynes Bridge Rd Southbound					Lakeview Pkwy Eastbound					Northwinds Pkwy 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 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:15 PM																					
12:15 PM	43	293	26	0	362	9	347	3	0	359	3	16	71	0	90	43	21	16	0	80	891
12:30 PM	40	303	26	0	369	22	305	4	0	331	3	6	84	0	93	42	17	22	0	81	874
12:45 PM	47	332	21	0	400	30	316	9	0	355	6	15	62	0	83	39	16	19	0	74	912
01:00 PM	54	326	30	0	410	12	321	11	0	344	2	15	60	0	77	38	14	23	0	75	906
Total Volume	184	1254	103	0	1541	73	1289	27	0	1389	14	52	277	0	343	162	68	80	0	310	3583
% App. Total	11.9	81.4	6.7	0		5.3	92.8	1.9	0		4.1	15.2	80.8	0		52.3	21.9	25.8	0		
PHF	.852	.944	.858	.000	.940	.608	.929	.614	.000	.967	.583	.813	.824	.000	.922	.942	.810	.870	.000	.957	.982



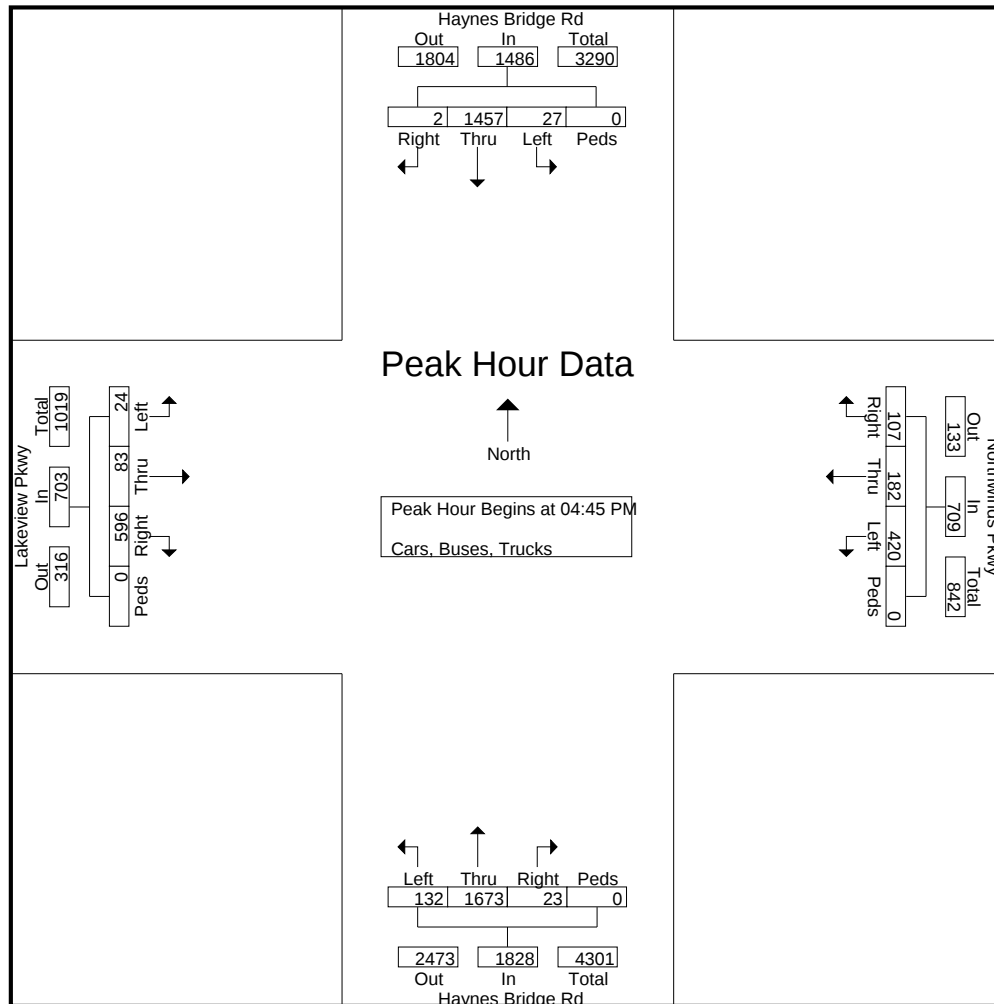
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TMC Data
Haynes Bridge Rd @ Northwinds Pkwy/
Lakeview Pkwy
7-9am | 12-2pm | 4-6pm

File Name : 39800003
Site Code : 39800003
Start Date : 1/18/2017
Page No : 4

	Haynes Bridge Rd Northbound					Haynes Bridge Rd Southbound					Lakeview Pkwy Eastbound					Northwinds Pkwy 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	36	402	3	0	441	12	350	0	0	362	7	33	170	0	210	65	34	20	0	119	1132
05:00 PM	27	411	3	0	441	7	367	0	0	374	4	16	149	0	169	140	60	23	0	223	1207
05:15 PM	34	418	14	0	466	6	384	2	0	392	7	16	141	0	164	103	36	39	0	178	1200
05:30 PM	35	442	3	0	480	2	356	0	0	358	6	18	136	0	160	112	52	25	0	189	1187
Total Volume	132	1673	23	0	1828	27	1457	2	0	1486	24	83	596	0	703	420	182	107	0	709	4726
% App. Total	7.2	91.5	1.3	0		1.8	98	0.1	0		3.4	11.8	84.8	0		59.2	25.7	15.1	0		
PHF	.917	.946	.411	.000	.952	.563	.949	.250	.000	.948	.857	.629	.876	.000	.837	.750	.758	.686	.000	.795	.979



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TMC Data
Haynes Bridge Rd @ Morrison Pkwy/
Westside Pkwy
7-9am | 12-2pm | 4-6pm

File Name : 39800004
Site Code : 39800004
Start Date : 1/18/2017
Page No : 1

Groups Printed- Cars, Buses, Trucks

	Haynes Bridge Rd Northbound					Haynes Bridge Rd Southbound					Morrison Pkwy Eastbound					Westside Pkwy 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	67	120	20	0	207	13	214	32	0	259	11	51	17	0	79	55	224	5	0	284	829
07:15 AM	88	148	24	0	260	7	198	26	0	231	10	84	30	0	124	63	309	4	0	376	991
07:30 AM	139	169	27	0	335	12	173	44	0	229	13	113	44	0	170	53	307	12	0	372	1106
07:45 AM	161	210	37	0	408	13	202	43	0	258	20	150	53	0	223	46	306	11	0	363	1252
Total	455	647	108	0	1210	45	787	145	0	977	54	398	144	0	596	217	1146	32	0	1395	4178
08:00 AM	78	185	27	0	290	16	191	43	0	250	16	130	52	0	198	47	284	12	0	343	1081
08:15 AM	144	172	31	0	347	17	206	34	0	257	16	100	31	0	147	57	244	9	0	310	1061
08:30 AM	113	163	22	0	298	17	233	31	0	281	16	102	39	0	157	42	240	7	0	289	1025
08:45 AM	96	159	28	0	283	19	142	24	0	185	13	124	32	0	169	44	238	5	0	287	924
Total	431	679	108	0	1218	69	772	132	0	973	61	456	154	0	671	190	1006	33	0	1229	4091
*** BREAK ***																					
12:00 PM	48	200	28	0	276	14	213	46	0	273	52	103	76	0	231	57	102	10	0	169	949
12:15 PM	70	210	34	0	314	14	196	41	0	251	48	84	73	0	205	74	106	18	0	198	968
12:30 PM	65	208	38	0	311	22	218	38	0	278	32	104	83	0	219	59	123	17	0	199	1007
12:45 PM	81	247	38	0	366	19	224	55	0	298	41	74	67	0	182	53	117	8	0	178	1024
Total	264	865	138	0	1267	69	851	180	0	1100	173	365	299	0	837	243	448	53	0	744	3948
01:00 PM	62	199	37	0	298	12	198	38	0	248	43	78	55	0	176	71	140	14	0	225	947
01:15 PM	77	252	33	0	362	20	209	38	0	267	23	75	67	0	165	54	108	14	0	176	970
01:30 PM	76	214	34	0	324	12	176	30	0	218	34	81	62	0	177	58	112	12	0	182	901
01:45 PM	71	233	31	0	335	14	198	35	0	247	28	78	67	0	173	31	88	15	0	134	889
Total	286	898	135	0	1319	58	781	141	0	980	128	312	251	0	691	214	448	55	0	717	3707
*** BREAK ***																					
04:00 PM	63	276	32	0	371	5	137	18	0	160	50	131	119	0	300	68	114	13	0	195	1026
04:15 PM	72	283	31	0	386	12	180	26	0	218	35	139	89	0	263	73	127	12	0	212	1079
04:30 PM	72	273	37	0	382	14	142	20	0	176	38	187	100	0	325	58	147	10	0	215	1098
04:45 PM	88	327	37	0	452	15	198	22	0	235	32	176	111	0	319	45	157	19	0	221	1227
Total	295	1159	137	0	1591	46	657	86	0	789	155	633	419	0	1207	244	545	54	0	843	4430
05:00 PM	71	292	37	0	400	10	197	19	0	226	43	182	129	0	354	91	180	22	0	293	1273
05:15 PM	91	316	41	0	448	11	175	18	0	204	34	186	102	0	322	97	181	12	0	290	1264
05:30 PM	84	355	65	0	504	16	162	32	0	210	40	161	102	0	303	56	156	15	0	227	1244
05:45 PM	61	294	50	0	405	16	164	25	0	205	30	133	80	0	243	73	199	23	0	295	1148
Total	307	1257	193	0	1757	53	698	94	0	845	147	662	413	0	1222	317	716	72	0	1105	4929
Grand Total	2038	5505	819	0	8362	340	4546	778	0	5664	718	2826	1680	0	5224	1425	4309	299	0	6033	25283
Apprch %	24.4	65.8	9.8	0		6	80.3	13.7	0		13.7	54.1	32.2	0		23.6	71.4	5	0		
Total %	8.1	21.8	3.2	0	33.1	1.3	18	3.1	0	22.4	2.8	11.2	6.6	0	20.7	5.6	17	1.2	0	23.9	

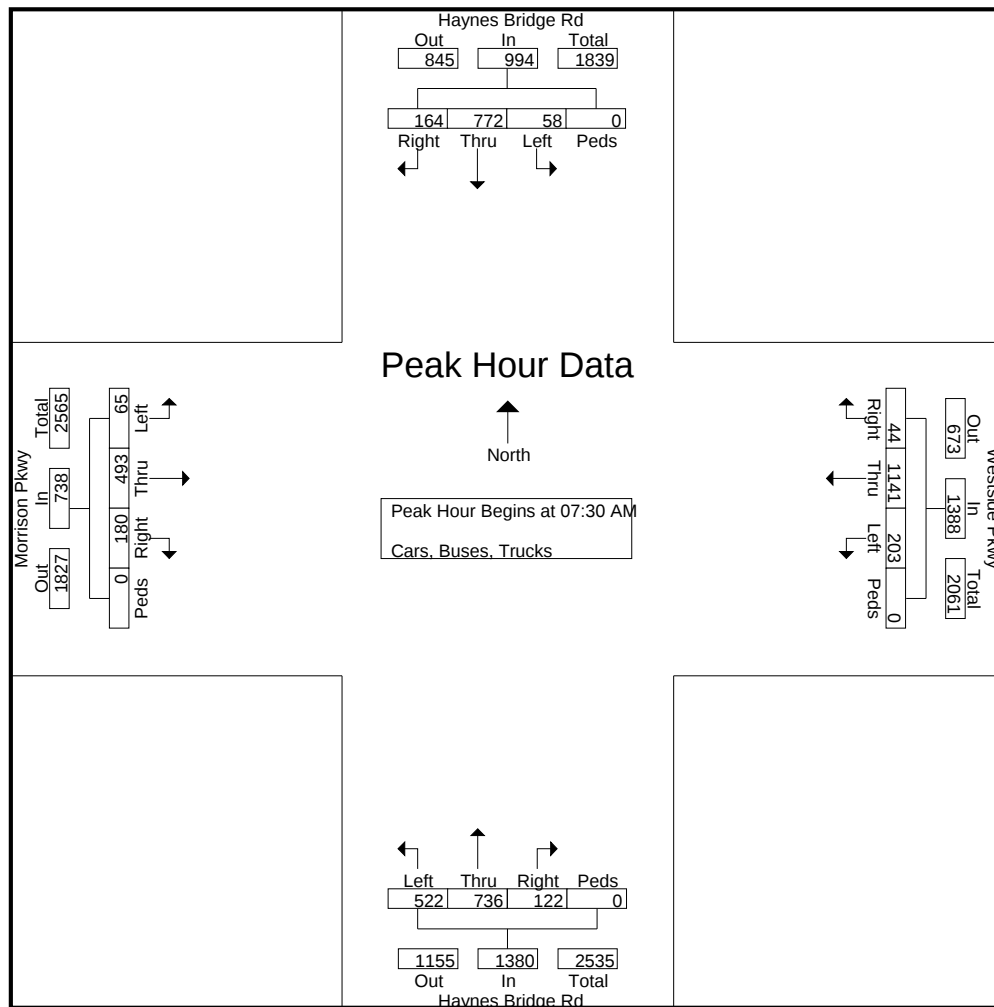
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TMC Data
Haynes Bridge Rd @ Morrison Pkwy/
Westside Pkwy
7-9am | 12-2pm | 4-6pm

File Name : 39800004
Site Code : 39800004
Start Date : 1/18/2017
Page No : 2

	Haynes Bridge Rd Northbound					Haynes Bridge Rd Southbound					Morrison Pkwy Eastbound					Westside Pkwy 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	139	169	27	0	335	12	173	44	0	229	13	113	44	0	170	53	307	12	0	372	1106
07:45 AM	161	210	37	0	408	13	202	43	0	258	20	150	53	0	223	46	306	11	0	363	1252
08:00 AM	78	185	27	0	290	16	191	43	0	250	16	130	52	0	198	47	284	12	0	343	1081
08:15 AM	144	172	31	0	347	17	206	34	0	257	16	100	31	0	147	57	244	9	0	310	1061
Total Volume	522	736	122	0	1380	58	772	164	0	994	65	493	180	0	738	203	1141	44	0	1388	4500
% App. Total	37.8	53.3	8.8	0		5.8	77.7	16.5	0		8.8	66.8	24.4	0		14.6	82.2	3.2	0		
PHF	.811	.876	.824	.000	.846	.853	.937	.932	.000	.963	.813	.822	.849	.000	.827	.890	.929	.917	.000	.933	.899



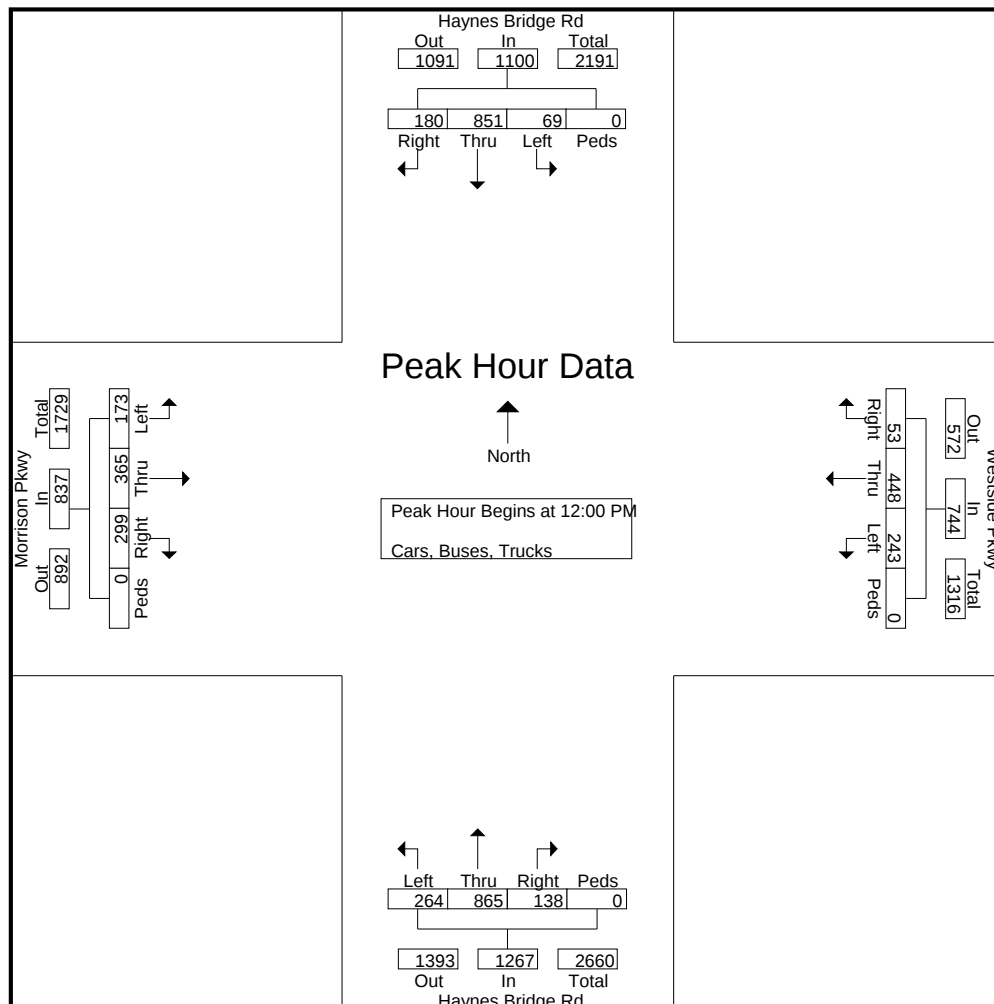
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TMC Data
Haynes Bridge Rd @ Morrison Pkwy/
Westside Pkwy
7-9am I 12-2pm I 4-6pm

File Name : 39800004
Site Code : 39800004
Start Date : 1/18/2017
Page No : 3

	Haynes Bridge Rd Northbound					Haynes Bridge Rd Southbound					Morrison Pkwy Eastbound					Westside Pkwy 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 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	48	200	28	0	276	14	213	46	0	273	52	103	76	0	231	57	102	10	0	169	949
12:15 PM	70	210	34	0	314	14	196	41	0	251	48	84	73	0	205	74	106	18	0	198	968
12:30 PM	65	208	38	0	311	22	218	38	0	278	32	104	83	0	219	59	123	17	0	199	1007
12:45 PM	81	247	38	0	366	19	224	55	0	298	41	74	67	0	182	53	117	8	0	178	1024
Total Volume	264	865	138	0	1267	69	851	180	0	1100	173	365	299	0	837	243	448	53	0	744	3948
% App. Total	20.8	68.3	10.9	0		6.3	77.4	16.4	0		20.7	43.6	35.7	0		32.7	60.2	7.1	0		
PHF	.815	.876	.908	.000	.865	.784	.950	.818	.000	.923	.832	.877	.901	.000	.906	.821	.911	.736	.000	.935	.964



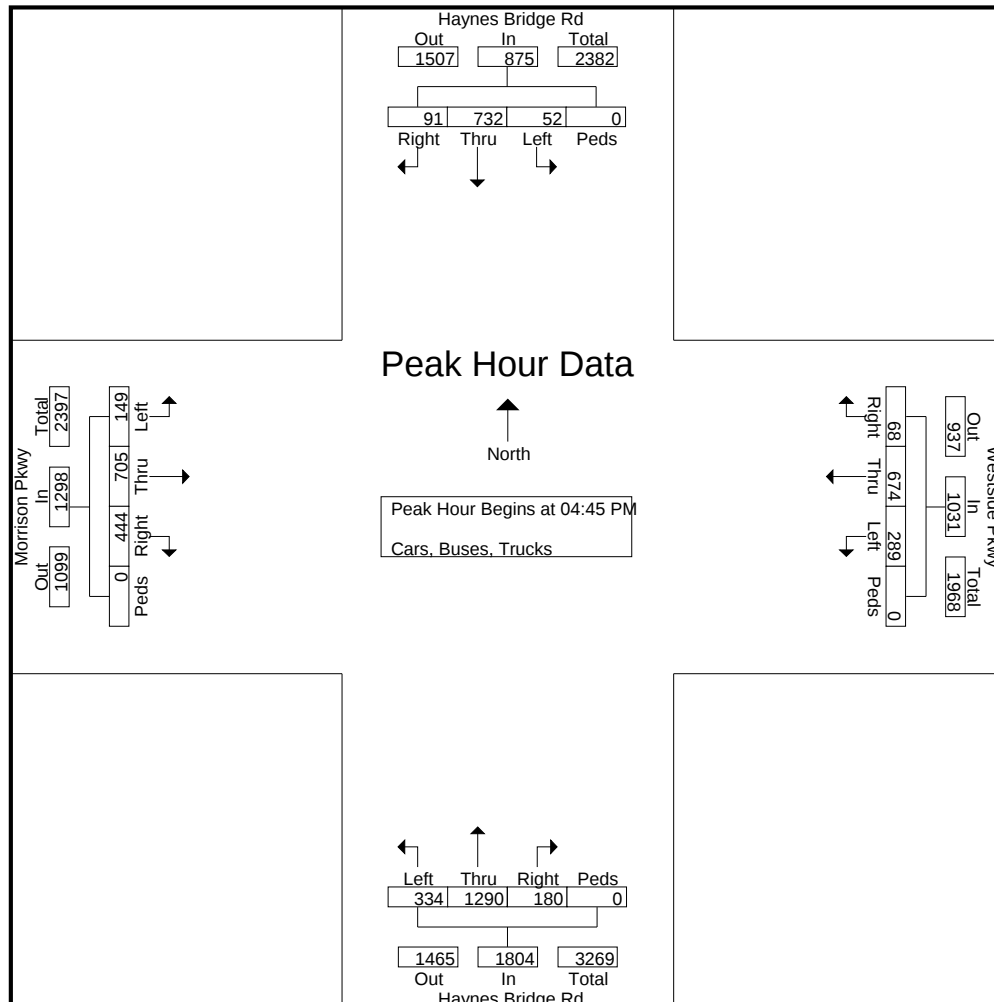
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TMC Data
Haynes Bridge Rd @ Morrison Pkwy/
Westside Pkwy
7-9am | 12-2pm | 4-6pm

File Name : 39800004
Site Code : 39800004
Start Date : 1/18/2017
Page No : 4

	Haynes Bridge Rd Northbound					Haynes Bridge Rd Southbound					Morrison Pkwy Eastbound					Westside Pkwy 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	88	327	37	0	452	15	198	22	0	235	32	176	111	0	319	45	157	19	0	221	1227
05:00 PM	71	292	37	0	400	10	197	19	0	226	43	182	129	0	354	91	180	22	0	293	1273
05:15 PM	91	316	41	0	448	11	175	18	0	204	34	186	102	0	322	97	181	12	0	290	1264
05:30 PM	84	355	65	0	504	16	162	32	0	210	40	161	102	0	303	56	156	15	0	227	1244
Total Volume	334	1290	180	0	1804	52	732	91	0	875	149	705	444	0	1298	289	674	68	0	1031	5008
% App. Total	18.5	71.5	10	0		5.9	83.7	10.4	0		11.5	54.3	34.2	0		28	65.4	6.6	0		
PHF	.918	.908	.692	.000	.895	.813	.924	.711	.000	.931	.866	.948	.860	.000	.917	.745	.931	.773	.000	.880	.984



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TMC Data

Kimball Bridge Rd @ Northwinds Pkwy

7-9am | 12-2pm | 4-6pm

File Name : 39800005

Site Code : 39800005

Start Date : 1/18/2017

Page No : 1

Groups Printed- Cars, Buses, Trucks

	Northwinds Pkwy Northbound					Northwinds Pkwy Southbound					Kimball Bridge Rd Eastbound					Kimball Bridge 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	2	0	13	0	15	0	0	0	0	0	2	60	14	0	76	36	43	0	0	79	170
07:15 AM	2	0	22	0	24	0	0	2	0	2	1	83	12	0	96	59	62	0	0	121	243
07:30 AM	1	0	31	0	32	0	0	0	0	0	0	116	29	0	145	52	50	0	0	102	279
07:45 AM	1	0	31	0	32	0	0	0	0	0	1	147	42	0	190	62	53	0	0	115	337
Total	6	0	97	0	103	0	0	2	0	2	4	406	97	0	507	209	208	0	0	417	1029
08:00 AM	4	0	36	0	40	0	1	0	0	1	1	150	35	0	186	65	74	0	0	139	366
08:15 AM	1	0	22	0	23	0	0	1	0	1	0	139	28	0	167	52	63	0	0	115	306
08:30 AM	2	0	24	0	26	0	0	0	0	0	2	152	27	0	181	62	75	0	0	137	344
08:45 AM	1	0	24	0	25	0	0	0	0	0	1	142	25	0	168	62	66	0	0	128	321
Total	8	0	106	0	114	0	1	1	0	2	4	583	115	0	702	241	278	0	0	519	1337
*** BREAK ***																					
12:00 PM	18	1	28	0	47	0	0	0	0	0	3	60	6	0	69	38	80	1	0	119	235
12:15 PM	8	0	26	0	34	1	0	1	0	2	0	71	9	0	80	41	79	1	0	121	237
12:30 PM	13	0	19	0	32	0	0	0	0	0	0	76	11	0	87	34	79	0	0	113	232
12:45 PM	7	0	29	0	36	0	0	0	0	0	1	87	16	0	104	28	90	0	0	118	258
Total	46	1	102	0	149	1	0	1	0	2	4	294	42	0	340	141	328	2	0	471	962
01:00 PM	8	1	31	0	40	1	0	0	0	1	0	79	12	0	91	45	68	0	0	113	245
01:15 PM	10	0	24	0	34	0	0	0	0	0	0	113	11	0	124	29	53	0	0	82	240
01:30 PM	2	0	14	0	16	0	0	0	0	0	0	70	12	0	82	28	63	0	0	91	189
01:45 PM	12	0	16	0	28	0	0	0	0	0	0	66	5	0	71	20	56	0	0	76	175
Total	32	1	85	0	118	1	0	0	0	1	0	328	40	0	368	122	240	0	0	362	849
*** BREAK ***																					
04:00 PM	12	0	49	0	61	0	0	3	0	3	1	79	7	0	87	62	111	0	0	173	324
04:15 PM	15	0	30	0	45	0	0	0	0	0	1	55	2	0	58	59	86	0	0	145	248
04:30 PM	19	0	50	0	69	0	0	0	0	0	0	59	3	0	62	64	99	0	0	163	294
04:45 PM	19	0	42	0	61	0	0	2	0	2	0	67	9	0	76	63	108	0	0	171	310
Total	65	0	171	0	236	0	0	5	0	5	2	260	21	0	283	248	404	0	0	652	1176
05:00 PM	28	0	33	0	61	0	0	1	0	1	0	52	4	0	56	73	144	1	0	218	336
05:15 PM	32	0	25	0	57	0	0	1	0	1	0	47	6	0	53	56	115	0	0	171	282
05:30 PM	31	0	25	0	56	0	0	0	0	0	0	43	7	0	50	65	128	0	0	193	299
05:45 PM	18	0	12	0	30	0	1	0	0	1	0	31	4	0	35	26	86	0	0	112	178
Total	109	0	95	0	204	0	1	2	0	3	0	173	21	0	194	220	473	1	0	694	1095
Grand Total	266	2	656	0	924	2	2	11	0	15	14	2044	336	0	2394	1181	1931	3	0	3115	6448
Apprch %	28.8	0.2	71	0		13.3	13.3	73.3	0		0.6	85.4	14	0		37.9	62	0.1	0		
Total %	4.1	0	10.2	0	14.3	0	0	0.2	0	0.2	0.2	31.7	5.2	0	37.1	18.3	29.9	0	0	48.3	

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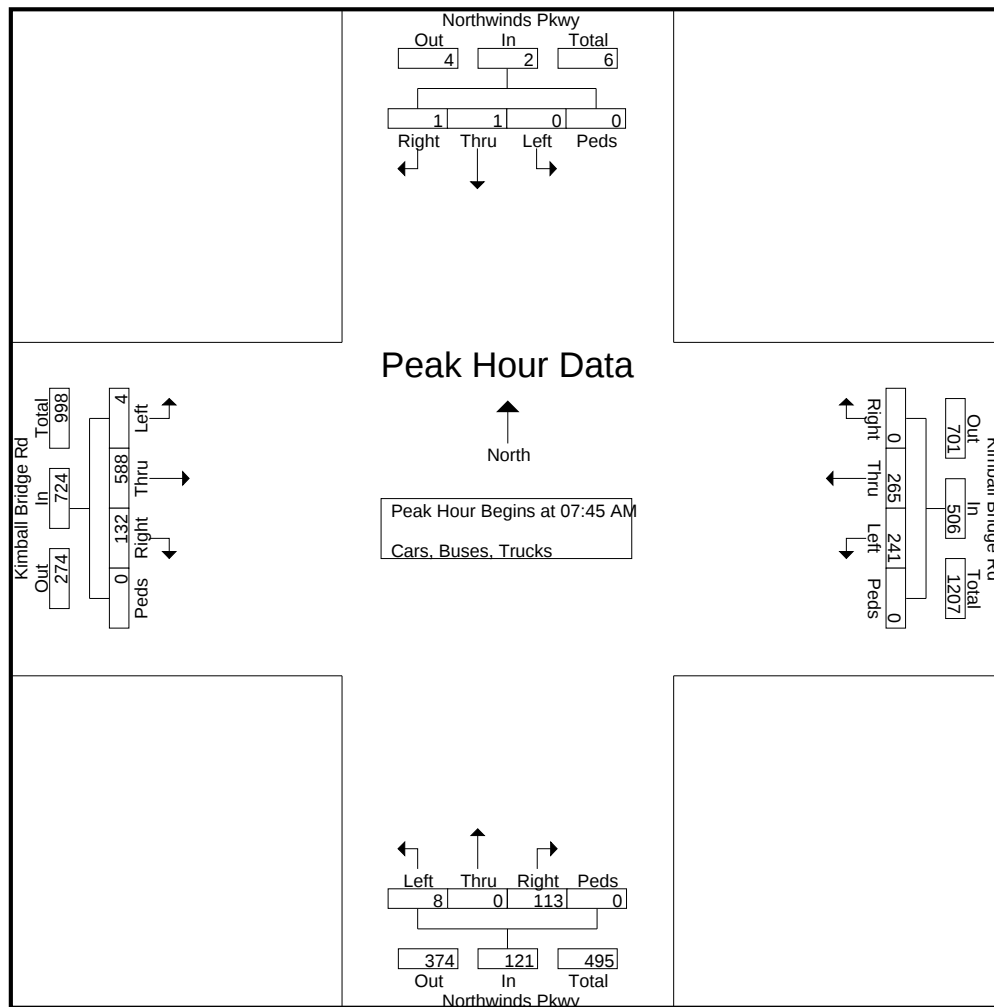
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TMC Data
Kimball Bridge Rd @ Northwinds Pkwy

7-9am | 12-2pm | 4-6pm

File Name : 39800005
Site Code : 39800005
Start Date : 1/18/2017
Page No : 2

	Northwinds Pkwy Northbound					Northwinds Pkwy Southbound					Kimball Bridge Rd Eastbound					Kimball Bridge 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 07:45 AM																					
07:45 AM	1	0	31	0	32	0	0	0	0	0	1	147	42	0	190	62	53	0	0	115	337
08:00 AM	4	0	36	0	40	0	1	0	0	1	1	150	35	0	186	65	74	0	0	139	366
08:15 AM	1	0	22	0	23	0	0	1	0	1	0	139	28	0	167	52	63	0	0	115	306
08:30 AM	2	0	24	0	26	0	0	0	0	0	2	152	27	0	181	62	75	0	0	137	344
Total Volume	8	0	113	0	121	0	1	1	0	2	4	588	132	0	724	241	265	0	0	506	1353
% App. Total	6.6	0	93.4	0		0	50	50	0		0.6	81.2	18.2	0		47.6	52.4	0	0		
PHF	.500	.000	.785	.000	.756	.000	.250	.250	.000	.500	.500	.967	.786	.000	.953	.927	.883	.000	.000	.910	.924



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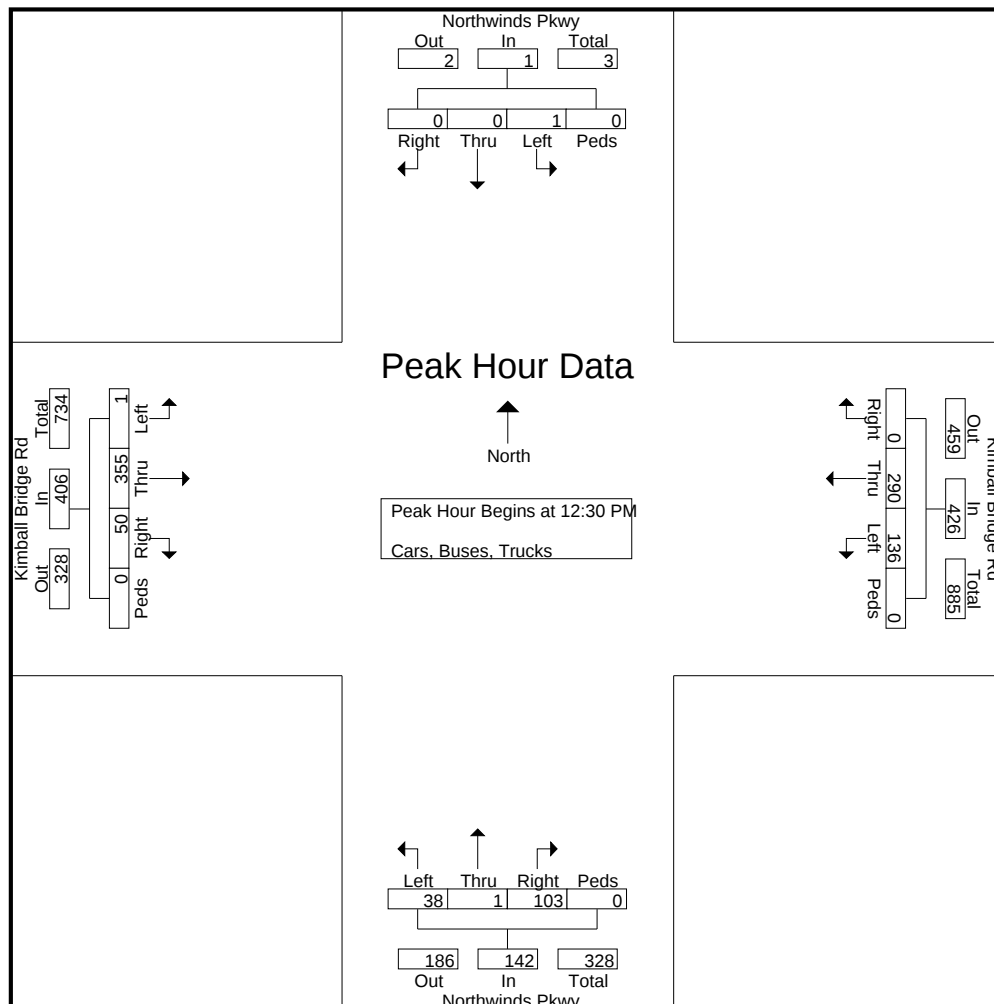
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TMC Data
Kimball Bridge Rd @ Northwinds Pkwy

7-9am | 12-2pm | 4-6pm

File Name : 39800005
Site Code : 39800005
Start Date : 1/18/2017
Page No : 3

	Northwinds Pkwy Northbound					Northwinds Pkwy Southbound					Kimball Bridge Rd Eastbound					Kimball Bridge 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 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:30 PM																					
12:30 PM	13	0	19	0	32	0	0	0	0	0	0	76	11	0	87	34	79	0	0	113	232
12:45 PM	7	0	29	0	36	0	0	0	0	0	1	87	16	0	104	28	90	0	0	118	258
01:00 PM	8	1	31	0	40	1	0	0	0	1	0	79	12	0	91	45	68	0	0	113	245
01:15 PM	10	0	24	0	34	0	0	0	0	0	0	113	11	0	124	29	53	0	0	82	240
Total Volume	38	1	103	0	142	1	0	0	0	1	1	355	50	0	406	136	290	0	0	426	975
% App. Total	26.8	0.7	72.5	0		100	0	0	0		0.2	87.4	12.3	0		31.9	68.1	0	0		
PHF	.731	.250	.831	.000	.888	.250	.000	.000	.000	.250	.250	.785	.781	.000	.819	.756	.806	.000	.000	.903	.945



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TMC Data

Kimball Bridge Rd @ Northwinds Pkwy

7-9am | 12-2pm | 4-6pm

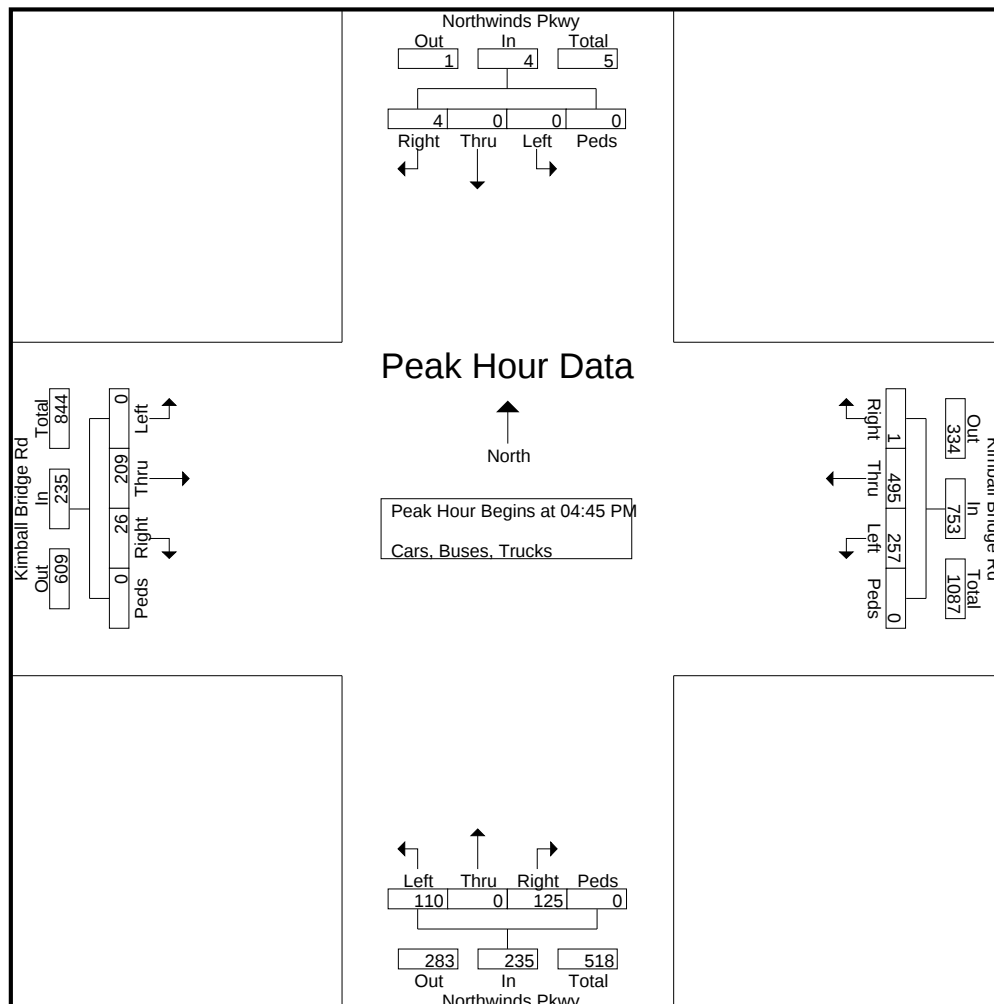
File Name : 39800005

Site Code : 39800005

Start Date : 1/18/2017

Page No : 4

	Northwinds Pkwy Northbound					Northwinds Pkwy Southbound					Kimball Bridge Rd Eastbound					Kimball Bridge 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 04:45 PM																					
04:45 PM	19	0	42	0	61	0	0	2	0	2	0	67	9	0	76	63	108	0	0	171	310
05:00 PM	28	0	33	0	61	0	0	1	0	1	0	52	4	0	56	73	144	1	0	218	336
05:15 PM	32	0	25	0	57	0	0	1	0	1	0	47	6	0	53	56	115	0	0	171	282
05:30 PM	31	0	25	0	56	0	0	0	0	0	0	43	7	0	50	65	128	0	0	193	299
Total Volume	110	0	125	0	235	0	0	4	0	4	0	209	26	0	235	257	495	1	0	753	1227
% App. Total	46.8	0	53.2	0		0	0	100	0		0	88.9	11.1	0		34.1	65.7	0.1	0		
PHF	.859	.000	.744	.000	.963	.000	.000	.500	.000	.500	.000	.780	.722	.000	.773	.880	.859	.250	.000	.864	.913



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TMC Data
Old Milton Pkwy @ Northwinds Pkwy

7-9am | 12-2pm | 4-6pm

File Name : 39800006
Site Code : 39800006
Start Date : 1/18/2017
Page No : 1

Groups Printed- Cars, Buses, Trucks

	Northwinds Pkwy Northbound					Avalon Comm Drwy Southbound					Old Milton Pkwy Eastbound					Old Milton Pkwy 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	1	0	0	0	1	5	0	3	0	8	15	229	1	0	245	7	512	5	0	524	778
07:15 AM	2	0	0	0	2	3	1	10	0	14	6	261	4	0	271	4	559	8	0	571	858
07:30 AM	1	0	0	0	1	5	0	9	0	14	10	228	4	0	242	8	536	7	0	551	808
07:45 AM	1	0	1	0	2	6	1	2	0	9	8	263	2	0	273	14	467	3	0	484	768
Total	5	0	1	0	6	19	2	24	0	45	39	981	11	0	1031	33	2074	23	0	2130	3212
08:00 AM	4	1	0	0	5	4	0	7	0	11	14	343	5	0	362	46	499	14	0	559	937
08:15 AM	2	0	1	0	3	6	0	13	0	19	15	365	5	0	385	58	493	21	0	572	979
08:30 AM	2	1	3	0	6	6	0	3	0	9	11	324	3	0	338	30	534	16	0	580	933
08:45 AM	1	0	0	0	1	6	0	2	0	8	2	126	0	0	128	13	161	5	0	179	316
Total	9	2	4	0	15	22	0	25	0	47	42	1158	13	0	1213	147	1687	56	0	1890	3165
*** BREAK ***																					
12:00 PM	13	1	6	0	20	42	2	29	0	73	28	322	2	0	352	37	395	74	0	506	951
12:15 PM	9	2	5	0	16	84	2	29	0	115	29	270	1	0	300	40	332	71	0	443	874
12:30 PM	5	0	0	0	5	72	2	39	0	113	25	359	4	0	388	68	323	63	0	454	960
12:45 PM	15	1	19	0	35	92	3	35	0	130	35	371	5	0	411	68	298	59	0	425	1001
Total	42	4	30	0	76	290	9	132	0	431	117	1322	12	0	1451	213	1348	267	0	1828	3786
01:00 PM	7	0	3	0	10	77	2	45	0	124	21	336	2	0	359	38	294	54	0	386	879
01:15 PM	3	1	1	0	5	86	0	33	0	119	15	338	2	0	355	33	287	45	0	365	844
01:30 PM	3	2	1	0	6	76	1	50	0	127	4	309	3	0	316	25	256	29	0	310	759
01:45 PM	2	0	3	0	5	80	3	35	0	118	15	351	2	0	368	35	358	37	0	430	921
Total	15	3	8	0	26	319	6	163	0	488	55	1334	9	0	1398	131	1195	165	0	1491	3403
*** BREAK ***																					
04:00 PM	7	0	2	0	9	55	0	27	0	82	11	361	1	0	373	22	386	41	0	449	913
04:15 PM	6	0	0	0	6	80	0	31	0	111	14	372	1	0	387	17	425	53	0	495	999
04:30 PM	1	0	2	0	3	34	0	21	0	55	10	384	0	0	394	37	423	45	0	505	957
04:45 PM	3	0	3	0	6	60	0	29	0	89	13	404	1	0	418	30	426	45	0	501	1014
Total	17	0	7	0	24	229	0	108	0	337	48	1521	3	0	1572	106	1660	184	0	1950	3883
05:00 PM	1	0	3	0	4	51	0	25	0	76	13	407	4	0	424	46	410	36	0	492	996
05:15 PM	3	0	4	0	7	47	0	22	0	69	13	363	3	0	379	61	479	43	0	583	1038
05:30 PM	3	1	3	0	7	48	1	28	0	77	18	367	3	0	388	73	497	39	0	609	1081
05:45 PM	4	1	2	0	7	33	0	28	0	61	13	335	7	0	355	89	475	48	0	612	1035
Total	11	2	12	0	25	179	1	103	0	283	57	1472	17	0	1546	269	1861	166	0	2296	4150
Grand Total	99	11	62	0	172	1058	18	555	0	1631	358	7788	65	0	8211	899	9825	861	0	11585	21599
Apprch %	57.6	6.4	36	0		64.9	1.1	34	0		4.4	94.8	0.8	0		7.8	84.8	7.4	0		
Total %	0.5	0.1	0.3	0	0.8	4.9	0.1	2.6	0	7.6	1.7	36.1	0.3	0	38	4.2	45.5	4	0	53.6	

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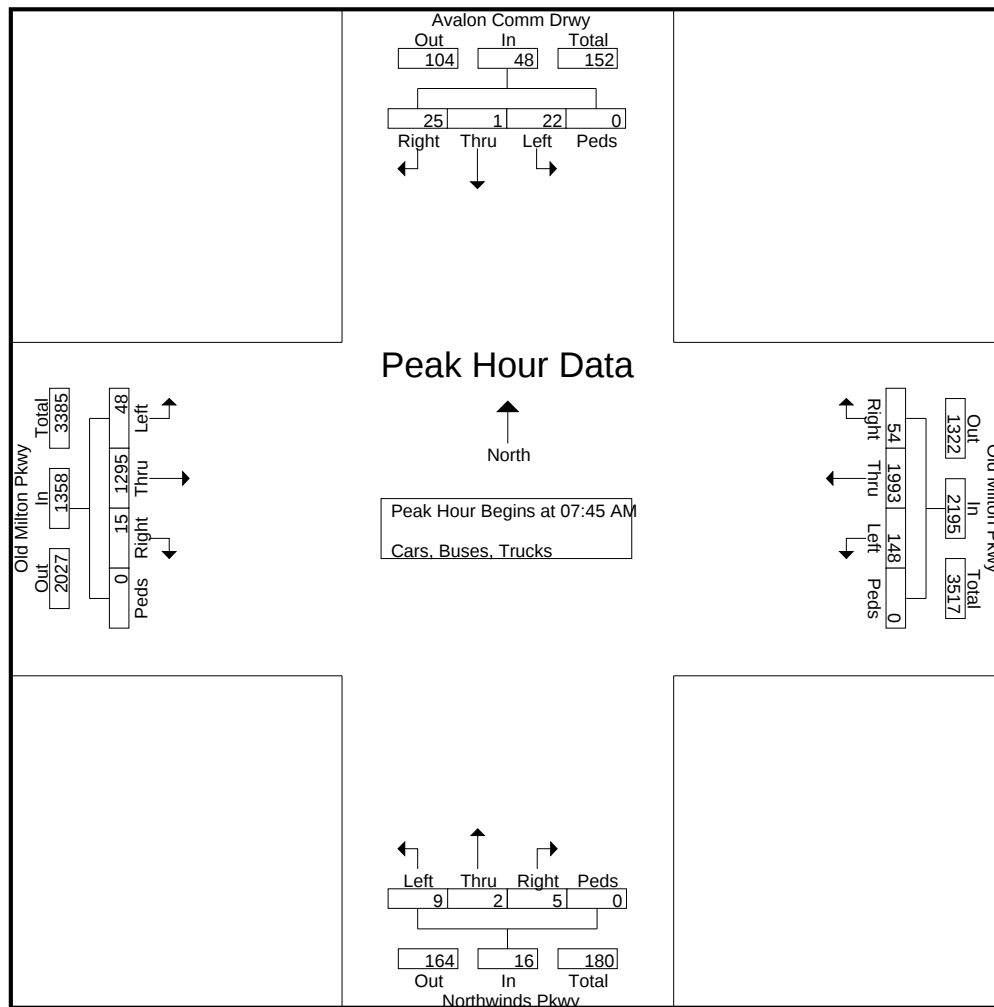
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TMC Data
Old Milton Pkwy @ Northwinds Pkwy

7-9am | 12-2pm | 4-6pm

File Name : 39800006
Site Code : 39800006
Start Date : 1/18/2017
Page No : 2

	Northwinds Pkwy Northbound					Avalon Comm Drwy Southbound					Old Milton Pkwy Eastbound					Old Milton Pkwy 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 07:45 AM																					
07:45 AM	1	0	1	0	2	6	1	2	0	9	8	263	2	0	273	14	467	3	0	484	768
08:00 AM	4	1	0	0	5	4	0	7	0	11	14	343	5	0	362	46	499	14	0	559	937
08:15 AM	2	0	1	0	3	6	0	13	0	19	15	365	5	0	385	58	493	21	0	572	979
08:30 AM	2	1	3	0	6	6	0	3	0	9	11	324	3	0	338	30	534	16	0	580	933
Total Volume	9	2	5	0	16	22	1	25	0	48	48	1295	15	0	1358	148	1993	54	0	2195	3617
% App. Total	56.2	12.5	31.2	0		45.8	2.1	52.1	0		3.5	95.4	1.1	0		6.7	90.8	2.5	0		
PHF	.563	.500	.417	.000	.667	.917	.250	.481	.000	.632	.800	.887	.750	.000	.882	.638	.933	.643	.000	.946	.924



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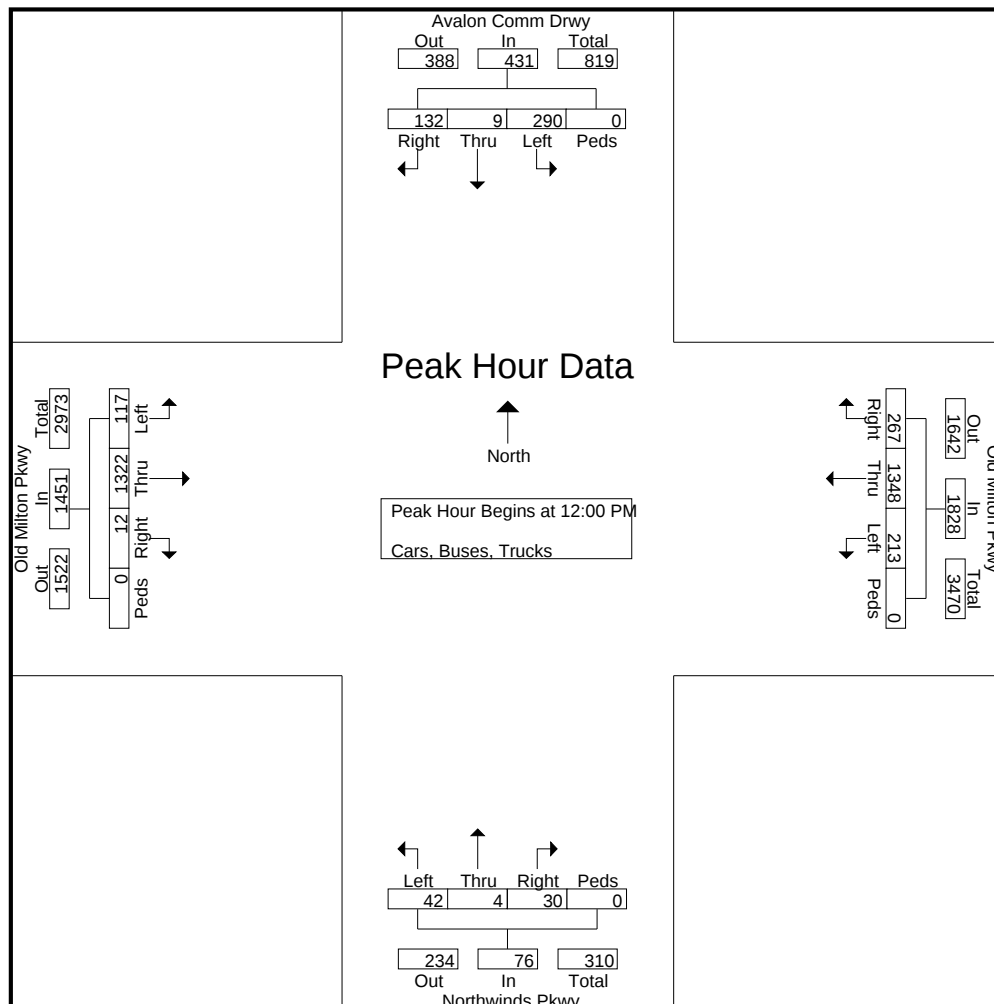
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TMC Data
Old Milton Pkwy @ Northwinds Pkwy

7-9am | 12-2pm | 4-6pm

File Name : 39800006
Site Code : 39800006
Start Date : 1/18/2017
Page No : 3

	Northwinds Pkwy Northbound					Avalon Comm Drwy Southbound					Old Milton Pkwy Eastbound					Old Milton Pkwy 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 12:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	13	1	6	0	20	42	2	29	0	73	28	322	2	0	352	37	395	74	0	506	951
12:15 PM	9	2	5	0	16	84	2	29	0	115	29	270	1	0	300	40	332	71	0	443	874
12:30 PM	5	0	0	0	5	72	2	39	0	113	25	359	4	0	388	68	323	63	0	454	960
12:45 PM	15	1	19	0	35	92	3	35	0	130	35	371	5	0	411	68	298	59	0	425	1001
Total Volume	42	4	30	0	76	290	9	132	0	431	117	1322	12	0	1451	213	1348	267	0	1828	3786
% App. Total	55.3	5.3	39.5	0		67.3	2.1	30.6	0		8.1	91.1	0.8	0		11.7	73.7	14.6	0		
PHF	.700	.500	.395	.000	.543	.788	.750	.846	.000	.829	.836	.891	.600	.000	.883	.783	.853	.902	.000	.903	.946



Reliable Traffic Data Services, LLC

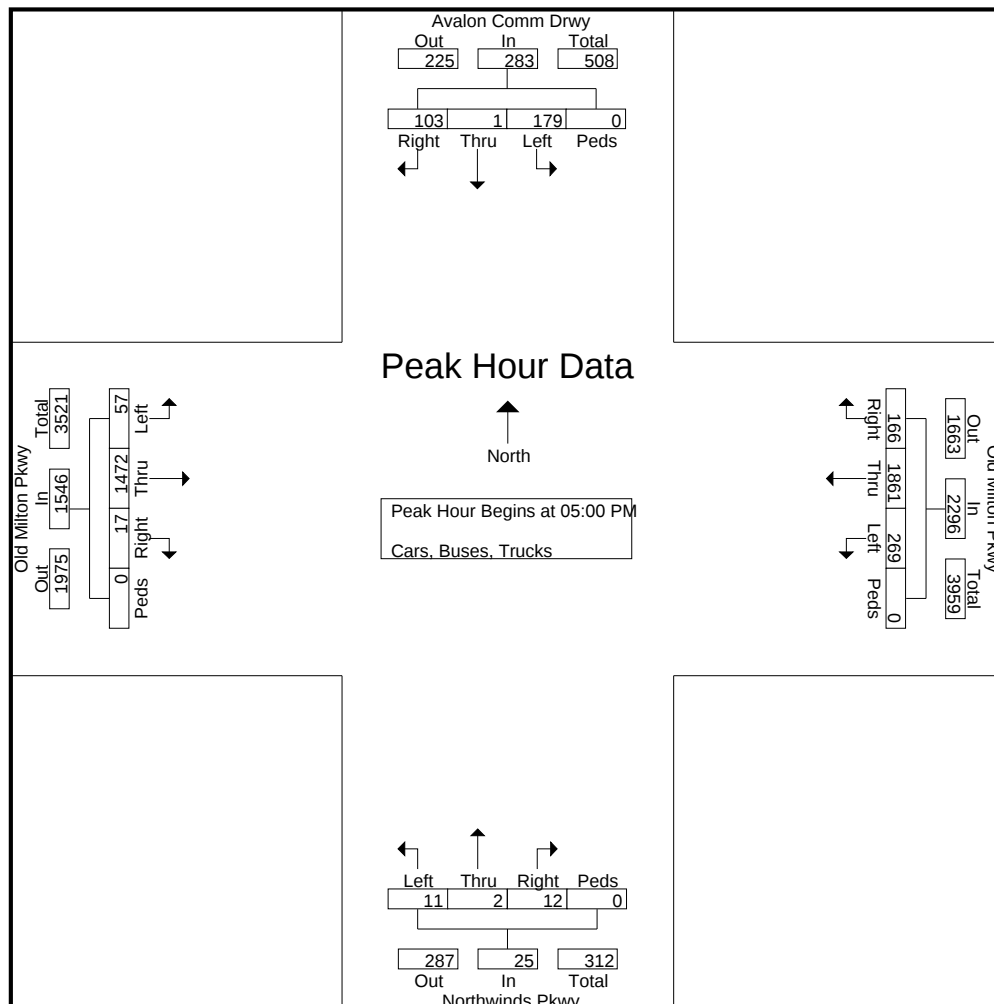
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TMC Data
Old Milton Pkwy @ Northwinds Pkwy

7-9am | 12-2pm | 4-6pm

File Name : 39800006
Site Code : 39800006
Start Date : 1/18/2017
Page No : 4

	Northwinds Pkwy Northbound					Avalon Comm Drwy Southbound					Old Milton Pkwy Eastbound					Old Milton Pkwy 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	1	0	3	0	4	51	0	25	0	76	13	407	4	0	424	46	410	36	0	492	996
05:15 PM	3	0	4	0	7	47	0	22	0	69	13	363	3	0	379	61	479	43	0	583	1038
05:30 PM	3	1	3	0	7	48	1	28	0	77	18	367	3	0	388	73	497	39	0	609	1081
05:45 PM	4	1	2	0	7	33	0	28	0	61	13	335	7	0	355	89	475	48	0	612	1035
Total Volume	11	2	12	0	25	179	1	103	0	283	57	1472	17	0	1546	269	1861	166	0	2296	4150
% App. Total	44	8	48	0		63.3	0.4	36.4	0		3.7	95.2	1.1	0		11.7	81.1	7.2	0		
PHF	.688	.500	.750	.000	.893	.877	.250	.920	.000	.919	.792	.904	.607	.000	.912	.756	.936	.865	.000	.938	.960



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Page 1

ADT Data

Site Code: 39800101
Northwinds Pkwy East of
Haynes Bridge Rd past the Median Break

Start Time	18-Jan-17 Wed	Eastbound		Hour Totals		Westbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	53			3	61				
12:15		2	50			1	50				
12:30		1	49			0	55				
12:45		0	56	3	208	3	45	7	211	10	419
01:00		0	50			1	58				
01:15		1	41			0	34				
01:30		0	40			0	35				
01:45		1	49	2	180	0	38	1	165	3	345
02:00		1	31			2	43				
02:15		2	38			0	48				
02:30		1	30			0	42				
02:45		0	40	4	139	1	38	3	171	7	310
03:00		1	37			0	55				
03:15		0	31			0	51				
03:30		0	46			1	60				
03:45		0	50	1	164	0	40	1	206	2	370
04:00		0	68			3	84				
04:15		0	35			2	72				
04:30		0	53			0	102				
04:45		1	55	1	211	9	95	14	353	15	564
05:00		1	38			3	124				
05:15		1	56			6	105				
05:30		4	19			22	133				
05:45		8	24	14	137	10	100	41	462	55	599
06:00		7	22			29	78				
06:15		14	30			29	62				
06:30		25	25			29	51				
06:45		30	22	76	99	40	51	127	242	203	341
07:00		34	16			41	46				
07:15		46	19			62	30				
07:30		58	28			54	27				
07:45		91	20	229	83	80	13	237	116	466	199
08:00		112	20			63	20				
08:15		115	17			55	13				
08:30		111	16			51	25				
08:45		84	11	422	64	62	16	231	74	653	138
09:00		70	10			58	9				
09:15		61	9			51	11				
09:30		28	13			55	9				
09:45		30	6	189	38	60	10	224	39	413	77
10:00		19	7			29	2				
10:15		13	6			32	7				
10:30		30	1			22	1				
10:45		25	0	87	14	27	3	110	13	197	27
11:00		29	4			24	4				
11:15		26	4			53	1				
11:30		32	1			65	0				
11:45		40	1	127	10	56	1	198	6	325	16
Total		1155	1347			1194	2058			2349	3405
Percent		46.2%	53.8%			36.7%	63.3%			40.8%	59.2%
Grand Total		1155	1347			1194	2058			2349	3405
Percent		46.2%	53.8%			36.7%	63.3%			40.8%	59.2%

ADT

ADT 5,754

AADT 5,754

Appendix B:
GRTA Letter of Understanding



LETTER OF UNDERSTANDING

March 20, 2017

Kerry Armstrong
Pope and Land Real Estate
3330 Cumberland Boulevard SE
Suite 300
Atlanta, Georgia 30339

RE: **DRI #2669 Northwinds Summit**

Dear Mr. Armstrong:

The purpose of this letter is to inform you of staff's recommendation regarding your request for expedited review of **DRI #2669 Northwinds Summit** Development of Regional Impact (DRI). Based on the information presented during the Pre Review and Methodology meeting held at the Atlanta Regional Commission (ARC) on March 13, 2017, the DRI meets the criteria for expedited review under the DRI *Procedures and Principles for GRTA Development of Regional Impact Review* Section 3-102.F., Livable Centers Initiative (LCI), which requires the proposed DRI project to be located within an LCI, consistent with the LCI plan, and that the LCI implementation is in good standing with the Atlanta Regional Commission (ARC) and the City of Alpharetta. A Trip Generation and Access Analysis is required as part of the review under these criteria. Some of the following items were discussed in the meeting above and should assist you and your consultant team in preparing the DRI Review Package. Additional information may be required for submittal in conjunction with DRI Review Package. Please see the notes below for this basic information.

PROJECT OVERVIEW

- The proposed development is located within the City of Alpharetta on approximately 20 acres on Haynes Bridge Road between Northwinds Parkway and US 19/GA 400.
- The DRI trigger for this development is a Rezoning and Variance request.
- The proposed development consists of 1,230,000 sq. ft. of office space, 30,000 sq. ft. of retail/restaurant space, 140 apartment units, 32 condominium units and a 140-room hotel.
- The estimated vehicular trip generation is 14,038 gross daily trips based on the ITE Trip Generation Manual, 9th Edition, 2012.
- The project will be built in one phase, and build-out is projected for 2019.
- The applicant is applying for approval under GRTA's expedited review process under Section 3-102.F., Livable Centers Initiative.
- The site is located in the North Point Activity Center Livable Centers Initiative (LCI) Study Area.

METHODOLOGY FOR ANALYSIS

- The development site plan proposes two (2) full-movement access points: one on Northwinds Parkway and one on Haynes Bridge Road.
- Mixed-use and pass-by reductions are allowed per the ITE Trip Generation Manual.
- The DRI Access Analysis study network includes:
 1. Haynes Bridge Road at GA 400 Northbound Ramps
 2. Haynes Bridge Road at GA 400 Southbound Ramps
 3. Haynes Bridge Road at Lakeview Parkway/Northwinds Parkway

4. Haynes Bridge Road at Morrison Parkway/Westside Parkway
5. Kimball Bridge Road at Northwinds Parkway Extension
6. SR 120 (Old Milton Parkway) at Northwinds Parkway Extension

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 and (3) future "build" conditions. The LOS standard is D, except as described under "Additional Information" below.

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, not during spring break.

A 1% background traffic growth rate shall be used for all roadways. Traffic generation information for major developments currently underway and located in the study area shall be taken into consideration.

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 and modeling scenarios.

Default values should not be assumed in the traffic modeling. Existing conditions shall be taken into account.

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., AM peak period, PM 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 City'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 GRTA's DRI Review Package Checklist to help you prepare your 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 or .sy7 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 and CD) to the GDOT District Office, one copy of each to the Regional Commission, and one copy of each to the local government(s) Planning and Development and/or Transportation group (contact information provided below).

GDOT District 7	Atlanta Regional Commission	City of Alpharetta
Paul DeNard 5025 New Peachtree Road, NE Chamblee, GA 30341	Andrew Smith 40 Courtland Street, NE Atlanta, GA 30303	Eric Graves 2 Park Plaza Alpharetta, GA 30009

EXPEDITED REVIEW RECOMMENDATION

Once the DRI Review Package has been submitted and determined complete, and ARC and the City have both confirmed the LCI qualification, ARC staff on behalf of GRTA will make a recommendation regarding your request for expedited review under Section 2-202.B of the *Procedures and Principles for GRTA Development of Regional Impact Review*. 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 404-463-5581.

Sincerely,

Andrew Smith, Senior Planner, Community Development, ARC (on behalf of GRTA¹)

Cc:

Jon West, DCA
Andrew Smith, ARC
Marquitrice Mangham, ARC
Paul DeNard, GDOT District 7
Eric Graves, City of Alpharetta

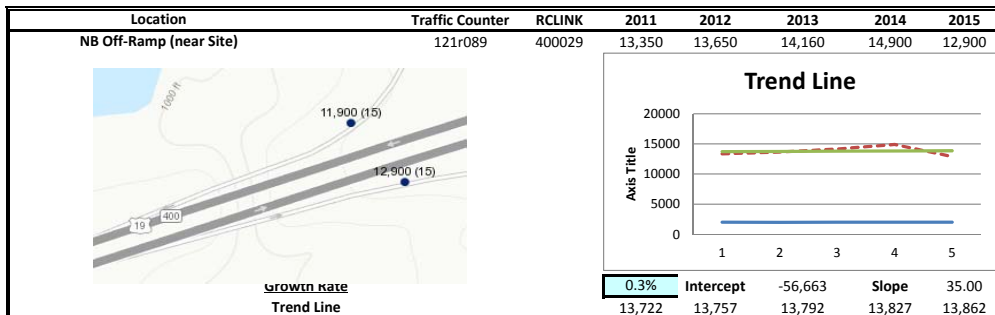
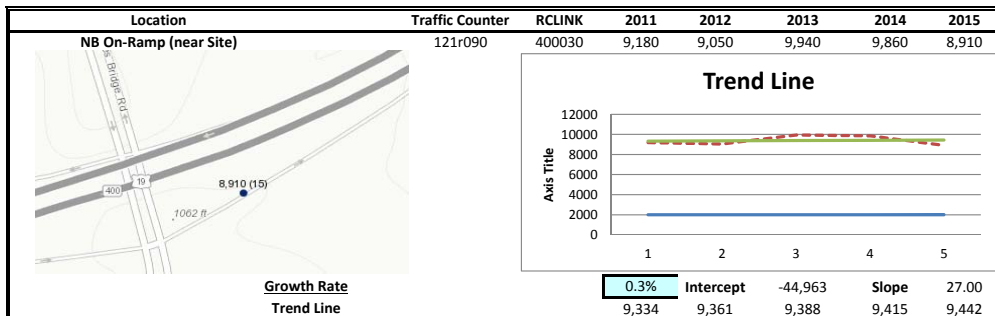
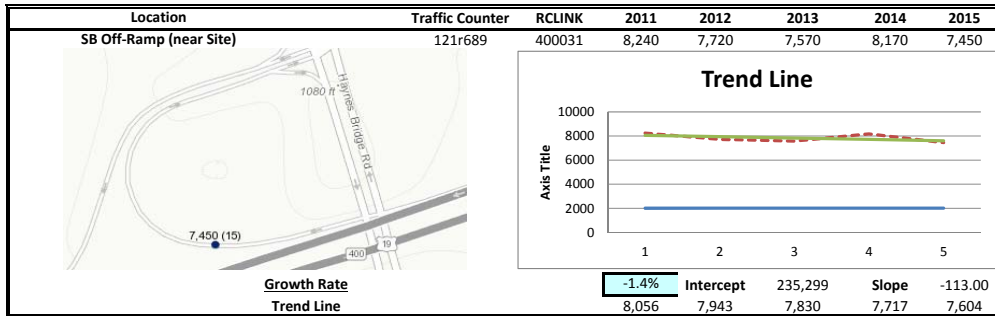
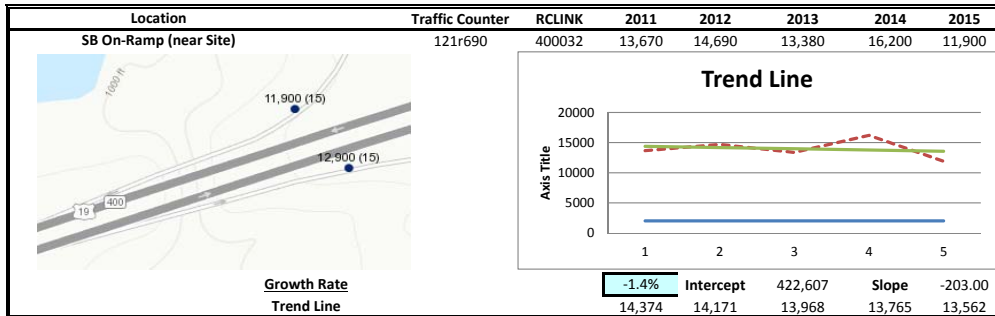
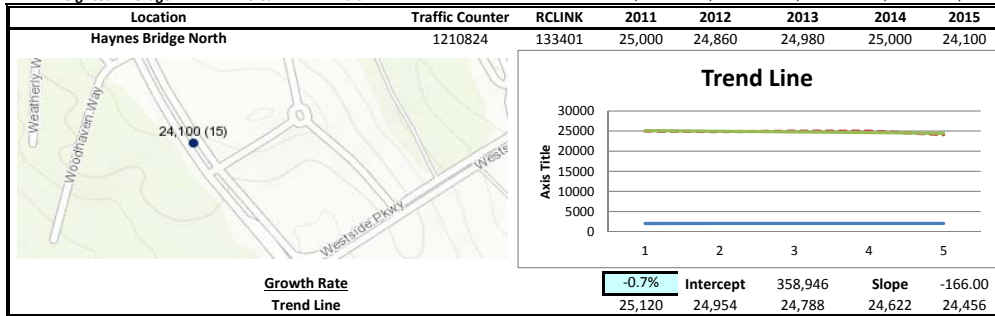
Kerry Armstrong, Pope & Land Realty
Clay Lewis, Haines Gipson
Donnie Kim, Cooper Carry
Ben Clone, HGOR
Abdul Amer, A&R Engineering

¹ GRTA has contracted with ARC to administer the GRTA DRI review process. Any questions related to this agreement should be directed to Annie Gillespie at agillespie@georgiatolls.com.

Appendix C:

Linear Regression of Daily Traffic

Location	Growth Rate	R Squared	Station ID	Route	2011	2012	2013	2014	2015
Haynes Bridge North	-0.7%	0.46	1210824	133401	25,000	24,860	24,980	25,000	24,100
SB On-Ramp (near Site)	-1.4%	0.04	121r690	400032	13,670	14,690	13,380	16,200	11,900
SB Off-Ramp (near Site)	-1.4%	0.25	121r689	400031	8,240	7,720	7,570	8,170	7,450
NB On-Ramp (near Site)	0.3%	0.01	121r090	400030	9,180	9,050	9,940	9,860	8,910
NB Off-Ramp (near Site)	0.3%	0.01	121r089	400029	13,350	13,650	14,160	14,900	12,900
Weighted Average	-0.6%	0.04	Sum of Count Stations =						
					69,440	69,970	70,030	74,130	65,260



Appendix D:
Fact Sheets for Planned and Programmed
Improvements

[Projects](#)[Current Projects](#)**Browse By RELATED CONTENT**

Projects	Current
Planned	Completed
Maps	Photos & Videos

Start Date: Oct. 29, 2012**Total CID Investment:** \$2,000,000.00**Partner:** Georgia Department of Transportation, City of Alpharetta

The Northwinds Parkway extension was envisioned in the CID's Blueprint North Fulton master plan, and was included in the North Fulton Comprehensive Transportation Plan completed in 2010.

The first phase of the project was completed in early Fall 2016. The second phase or southern section of the project will be completed in 2017 by a private developer. Once the full connection is complete, the project will span from Kimball Bridge Road to Old Milton Parkway on the west side of GA 400.

**Overview**

The CID is working to be a catalyst for positive change in North Fulton. Watch the video...

**Photos**[Home](#)[About](#)[Projects](#)[News & Events](#)[Resources](#)[Contact](#)**North Fulton CID**

11605 Haynes Bridge Rd., Ste. 100

Alpharetta, GA 30009

P (678) 397-0570

Kimball Bridge Road: Bike/Ped/Operational Improvements

ALP-009

Project Description

Pedestrian, bike and operational improvements to Kimball Bridge Road, connecting residential neighborhoods to Downtown Alpharetta, Avalon, schools, and parks.

Project Details

TYPE	Roadway Corridor (Multimodal)
MAIN ROUTE	Kimball Bridge Road
EXTENTS	From Westside Parkway to North Point Parkway
LOCATION	
LENGTH (miles)	1.1
GDOT/ ARC ID	

Project Cost Estimate

ENGINEERING COST	\$100,000
RIGHT-OF-WAY COST	\$500,000
CONSTRUCTION COST	\$4,306,529
OTHER COSTS	
TOTAL CAPITAL COST	\$4,906,529
CITY TSPLOST FUNDS	Alpharetta \$4,906,529

Project Implementation

LOCAL LEAD	Alpharetta
------------	------------

Funding Partners

DESIGN	
RIGHT-OF-WAY	
CONSTRUCTION	

Project Status

DESIGN	
ROW	
CONSTRUCTION	
ENVIRONMENTAL	Not started

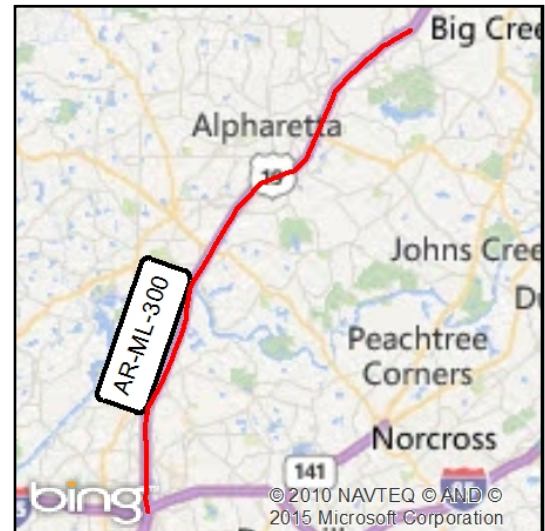
Project Timeline

READY FOR CONSTRUCTION	24 mo.
ANTICIPATED LENGTH OF CONSTRUCTION	12 mo.

Notes:



Short Title	SR 400 MANAGED LANES FROM I-285 NORTH TO MCFARLAND ROAD
GDOT Project No.	0001757/0008445
Federal ID No.	MSL00-0001-00(757)
Status	Long Range
Service Type	Roadway / Managed Lanes
Sponsor	GDOT
Jurisdiction	Regional - North
Analysis Level	In the Region's Air Quality Conformity Analysis



Existing Thru Lane	0	LCI	☐	Network Year	2040
Planned Thru Lane	4	Flex	☐	Corridor Length	16.5 miles

Detailed Description and Justification

Project includes preliminary design of managed lanes along SR 400 between I-285 and SR 20. In this case, managed lanes means high occupancy toll lanes. Passenger vehicles not meeting an occupancy requirement use these lanes by paying a variable toll. Meanwhile, transit vehicles and passenger vehicles meeting the occupancy requirement can use the lanes for free. Two managed lanes in each direction (four total) are proposed between I-285 and Holcomb Bridge Road and one managed lane in each direction (two total) between Holcomb Bridge Road and McFarland Parkway. Managed lanes are designed to provide a reliable trip option for those that carpool, use a vanpool, take transit, or wish to pay to use the lane.

Phase Status & Funding Information		Status	FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
					FEDERAL	STATE	BONDS	LOCAL/PRIVATE
PE	SRTA - Toll Revenue	AUTH	2011	\$8,000,000	\$0,000	\$0,000	\$0,000	\$8,000,000
ALL	General Federal Aid 2022-2040		LR 2031-2040	\$429,000,000	\$343,200,000	\$85,800,000	\$0,000	\$0,000
ALL	Toll Revenue Bonds		LR 2031-2040	\$351,000,000	\$0,000	\$0,000	\$351,000,000	\$0,000
				\$788,000,000	\$343,200,000	\$85,800,000	\$351,000,000	\$8,000,000

SCP: Scoping PE: Preliminary engineering / engineering / design / planning PE-OV: GDOT oversight services for engineering ROW: Right-of-way Acquisition
 UTL: Utility relocation CST: Construction / Implementation ALL: Total estimated cost, inclusive of all phases



For additional information about this project, please call (404) 463-3100 or email transportation@atlantaregional.com.



PRECONSTRUCTION STATUS REPORT

PROJ ID	COUNTY	DESCRIPTION			
0001757	Fulton	SR 400 FM I-285/FULTON TO MCFARLAND RD/FORSYTH-EXPRESS LANES			
Mgmt Let Date:		Major Mobility Investment (MMIP); Design-Build-Finance delivery SR 400 is one of the most congested facilities in metro Atlanta. The addition of Express Lanes to this corridor will provide additional reliable capacity from I-285 to McFarland Road. The proposed Express Lanes will be constructed to the inside of the general purpose lanes and will directly connect to the Revive 285 project. This mobility enhancing project would consist of: ¿ Two Express Lanes in each direction along SR 400 between I-285N and McGinnis Ferry Road. ¿ One Express Lane in each direction from McGinnis Ferry Road to McFarland Road. Intermediate access points will be determined as additional coordination, environmental documentation and design activities are completed on the corridor. Estimated Costs*: \$2.4 Billion			
PROJ NO:	MSL00-0001-00(757)	SPONSOR:	GDOT	Phase	FY
MPO TIP#:	AR-ML-300	PROJ MGR:	Lewis, Robert	Approved	Approved FY
MPO:	Atlanta TMA	DOT DIST:	1, 7	Estimate*	Fund
PROJ LENGTH (MI):	17.06	CONG DIST:	006, 007		Phase Status
TYPE WORK:	Managed Lanes	HOUSE DIST:	047, 048, 049, 051, 080	Construction 2025	\$105,000,000.00 Z001 PRECST
LET	GDOT Let	SENATE DIST:	006, 021, 032, 040, 056	Construction 2033	\$120,000,000.00 Z001 PRECST
RESPONSIBILITY:				Construction 2027	\$110,000,000.00 Z001 PRECST
BIKE PROVISIONS INCLUDED?	N			Construction 2040	\$135,000,000.00 Z001 PRECST
				Construction 2059	\$180,000,000.00 Z001 PRECST
				Construction 2050	\$155,000,000.00 Z001 PRECST
				Right of Way 2022	\$22,300,000.00 Z001 PRECST
				Engineering 2017	\$5,000,000.00 HB170 AUTHORIZED
				Construction 2038	\$130,000,000.00 Z001 PRECST
				Construction 2035	\$125,000,000.00 Z001 PRECST
				Construction 2028	\$110,000,000.00 Z001 PRECST
				Engineering 2005	\$461,217.80 Q05 AUTHORIZED
				Construction 2043	\$140,000,000.00 Z001 PRECST
				Construction 2046	\$145,000,000.00 Z001 PRECST
				Engineering 2020	\$15,900,000.00 Z001 PRECST
				Construction 2054	\$165,000,000.00 Z001 PRECST
				Construction 2048	\$150,000,000.00 Z001 PRECST
				Construction 2058	\$175,000,000.00 Z001 PRECST
				Right of Way 2017	\$4,000,000.00 Z001 PRECST
				Construction 2056	\$170,000,000.00 Z001 PRECST
				Right of Way	\$23,400,000.00 Z001 PRECST
				Construction 2049	\$155,000,000.00 Z001 PRECST
				Construction 2052	\$160,000,000.00 Z001 PRECST
				Construction 2037	\$130,000,000.00 Z001 PRECST
				Construction 2044	\$140,000,000.00 Z001 PRECST
				Engineering 2011	\$2,060,253.01 44220 AUTHORIZED
				Engineering 2010	\$728,806.25 LY10S AUTHORIZED
				Engineering 2010	\$171,095.00 HY10 AUTHORIZED
				Construction 2039	\$130,000,000.00 Z001 PRECST
				Construction 2057	\$175,000,000.00 Z001 PRECST
				Construction 2030	\$115,000,000.00 Z001 PRECST
				Engineering 2019	\$40,400,000.00 Z001 PRECST
				Construction 2042	\$140,000,000.00 Z001 PRECST
				Construction 2022	\$55,000,000.00 Z001 PRECST
				Construction 2047	\$150,000,000.00 Z001 PRECST
				Engineering 2005	\$8,538,782.20 L010 AUTHORIZED
				Construction 2032	\$120,000,000.00 Z001 PRECST
				Construction 2045	\$145,000,000.00 Z001 PRECST
				Construction 2041	\$135,000,000.00 Z001 PRECST
				Construction 2053	\$165,000,000.00 Z001 PRECST
				Construction 2021	\$65,000,000.00 HB170 PRECST
				Construction 2055	\$170,000,000.00 Z001 PRECST
				Construction 2051	\$160,000,000.00 Z001 PRECST
				Construction 2029	\$115,000,000.00 Z001 PRECST
				Construction 2034	\$125,000,000.00 Z001 PRECST
				Right of Way 2021	\$4,000,000.00 Z001 PRECST
				Construction 2026	\$110,000,000.00 Z001 PRECST
				Construction 2031	\$115,000,000.00 Z001 PRECST
				Construction 2024	\$37,800,000.00 Z001 PRECST

Appendix E:
Existing Intersection Analysis

HCM Signalized Intersection Capacity Analysis

1: Haynes Bridge Rd & GA 400 NB Ramps

Existing AM
04/05/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	938	0	448	0	0	0	0	916	607	187	1292	0
Future Volume (vph)	938	0	448	0	0	0	0	916	607	187	1292	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1		6.1					6.8	6.8	6.0	6.8	
Lane Util. Factor	0.97		0.88					0.91	1.00	1.00	0.91	
Frt	1.00		0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433		2787					5085	1583	1770	5085	
Flt Permitted	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433		2787					5085	1583	1770	5085	
Peak-hour factor, PHF	0.83	0.25	0.93	0.92	0.92	0.92	0.92	0.86	0.95	0.79	0.90	0.92
Adj. Flow (vph)	1130	0	482	0	0	0	0	1065	639	237	1436	0
RTOR Reduction (vph)	0	0	44	0	0	0	0	0	337	0	0	0
Lane Group Flow (vph)	1130	0	438	0	0	0	0	1065	302	237	1436	0
Turn Type	Prot		Perm					NA	Perm	Prot	NA	
Protected Phases	4							6		5	2	
Permitted Phases			4						6			
Actuated Green, G (s)	55.4		55.4					58.5	58.5	27.2	91.7	
Effective Green, g (s)	55.4		55.4					58.5	58.5	27.2	91.7	
Actuated g/C Ratio	0.35		0.35					0.37	0.37	0.17	0.57	
Clearance Time (s)	6.1		6.1					6.8	6.8	6.0	6.8	
Vehicle Extension (s)	3.0		3.0					5.1	5.1	4.1	5.1	
Lane Grp Cap (vph)	1188		964					1859	578	300	2914	
v/s Ratio Prot	c0.33							c0.21		c0.13	0.28	
v/s Ratio Perm			0.16						0.19			
v/c Ratio	0.95		0.45					0.57	0.52	0.79	0.49	
Uniform Delay, d1	51.0		40.6					40.7	39.8	63.7	20.3	
Progression Factor	1.00		1.00					1.00	1.00	1.24	0.64	
Incremental Delay, d2	15.8		0.3					1.3	3.4	13.0	0.6	
Delay (s)	66.8		40.9					42.0	43.2	92.0	13.6	
Level of Service	E		D					D	D	F	B	
Approach Delay (s)		59.0			0.0			42.4			24.7	
Approach LOS		E			A			D			C	
Intersection Summary												
HCM 2000 Control Delay			41.9		HCM 2000 Level of Service				D			
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			160.0		Sum of lost time (s)				18.9			
Intersection Capacity Utilization			68.8%		ICU Level of Service				C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Haynes Bridge Rd & GA 400 SB Ramps

Existing AM
04/05/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	408	1	537	0	1	1	147	1580	1	4	868	439
Future Volume (vph)	408	1	537	0	1	1	147	1580	1	4	868	439
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0		6.4	6.4	5.8	6.1	6.1	5.9	6.1	6.1
Lane Util. Factor	0.95	0.95	0.88		0.91	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1686	2787		3390	1583	3433	5085	1583	1770	5085	1583
Flt Permitted	0.95	0.95	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1686	2787		3390	1583	3433	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.74	0.25	0.90	0.92	0.25	0.25	0.88	0.91	0.25	0.33	0.99	0.80
Adj. Flow (vph)	551	4	597	0	4	4	167	1736	4	12	877	549
RTOR Reduction (vph)	0	0	0	0	0	4	0	0	2	0	0	241
Lane Group Flow (vph)	275	280	597	0	4	0	167	1736	2	12	877	308
Turn Type	Split	NA	pt+ov	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3	3 1	4	4		1	6		5	2	
Permitted Phases						4			6			2
Actuated Green, G (s)	33.2	33.2	42.4		2.4	2.4	9.2	95.9	95.9	3.1	89.9	89.9
Effective Green, g (s)	33.2	33.2	42.4		2.4	2.4	9.2	95.9	95.9	3.1	89.9	89.9
Actuated g/C Ratio	0.21	0.21	0.26		0.01	0.01	0.06	0.60	0.60	0.02	0.56	0.56
Clearance Time (s)	7.0	7.0			6.4	6.4	5.8	6.1	6.1	5.9	6.1	6.1
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	348	349	738		50	23	197	3047	948	34	2857	889
v/s Ratio Prot	0.16	0.17	c0.21		c0.00		c0.05	c0.34		0.01	0.17	
v/s Ratio Perm						0.00			0.00			0.19
v/c Ratio	0.79	0.80	0.81		0.08	0.00	0.85	0.57	0.00	0.35	0.31	0.35
Uniform Delay, d1	60.1	60.3	55.0		77.7	77.6	74.7	19.5	12.9	77.5	18.6	19.1
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.07	1.60	1.00	0.94	0.73	5.48
Incremental Delay, d2	11.6	12.5	6.5		0.7	0.0	18.6	0.5	0.0	5.7	0.3	1.0
Delay (s)	71.7	72.8	61.5		78.4	77.7	98.6	31.7	12.9	78.2	13.9	105.4
Level of Service	E	E	E		E	E	F	C	B	E	B	F
Approach Delay (s)		66.7			78.0			37.5			49.4	
Approach LOS		E			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			48.8				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			25.4		
Intersection Capacity Utilization			69.4%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Haynes Bridge Rd & Lakeview Pkwy/Northwinds Pkwy

Existing AM
04/05/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	133	130	40	109	48	446	1222	315	86	1047	42
Future Volume (vph)	3	133	130	40	109	48	446	1222	315	86	1047	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.4	7.4	6.2	7.4	7.4	6.0	6.7		6.4	6.7	6.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	4921		1770	5085	1583
Flt Permitted	0.95	1.00	1.00	0.41	1.00	1.00	0.15	1.00		0.11	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	760	1863	1583	286	4921		203	5085	1583
Peak-hour factor, PHF	0.75	0.90	0.85	0.56	0.78	0.80	0.89	0.85	0.80	0.90	0.94	0.81
Adj. Flow (vph)	4	148	153	71	140	60	501	1438	394	96	1114	52
RTOR Reduction (vph)	0	0	132	0	0	49	0	31	0	0	0	30
Lane Group Flow (vph)	4	148	21	71	140	11	501	1801	0	96	1114	22
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases			8	4		4	2			6		6
Actuated Green, G (s)	1.2	22.4	22.4	36.6	28.4	28.4	109.1	95.4		73.7	66.4	66.4
Effective Green, g (s)	1.2	22.4	22.4	36.6	28.4	28.4	109.1	95.4		73.7	66.4	66.4
Actuated g/C Ratio	0.01	0.14	0.14	0.23	0.18	0.18	0.68	0.60		0.46	0.42	0.42
Clearance Time (s)	7.2	7.4	7.4	6.2	7.4	7.4	6.0	6.7		6.4	6.7	6.7
Vehicle Extension (s)	2.0	2.5	2.5	2.0	2.5	2.5	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	13	260	221	225	330	280	535	2934		165	2110	656
v/s Ratio Prot	0.00	c0.08		c0.02	c0.08		c0.21	0.37		0.03	0.22	
v/s Ratio Perm			0.01	0.06		0.01	c0.42			0.24		0.01
v/c Ratio	0.31	0.57	0.10	0.32	0.42	0.04	0.94	0.61		0.58	0.53	0.03
Uniform Delay, d1	79.0	64.3	60.0	50.0	58.5	54.5	36.7	20.6		24.7	35.1	27.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.04	0.91		1.11	0.46	1.00
Incremental Delay, d2	4.8	2.3	0.1	0.3	0.6	0.0	20.7	0.8		2.8	0.8	0.1
Delay (s)	83.8	66.6	60.1	50.3	59.2	54.5	58.7	19.5		30.2	17.0	27.8
Level of Service	F	E	E	D	E	D	E	B		C	B	C
Approach Delay (s)		63.6			55.8			27.9			18.5	
Approach LOS		E			E			C			B	
Intersection Summary												
HCM 2000 Control Delay			29.5									
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			160.0									
Intersection Capacity Utilization			78.0%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Haynes Bridge Rd & Morrison Pkwy/Westside Pkwy

Existing AM
04/05/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	  			  	
Traffic Volume (vph)	65	493	180	203	1141	44	522	736	122	58	772	164
Future Volume (vph)	65	493	180	203	1141	44	522	736	122	58	772	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	1.00	0.91	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)	1770	3539	1583	1770	3539	1583	3433	5085	1583	1770	5085	1583
Flt Permitted	0.08	1.00	1.00	0.24	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	154	3539	1583	452	3539	1583	3433	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.81	0.82	0.85	0.89	0.93	0.92	0.81	0.88	0.82	0.85	0.94	0.93
Adj. Flow (vph)	80	601	212	228	1227	48	644	836	149	68	821	176
RTOR Reduction (vph)	0	0	58	0	0	31	0	0	95	0	0	133
Lane Group Flow (vph)	80	601	154	228	1227	17	644	836	54	68	821	43
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8	5	7	4		5	2		1	6	
Permitted Phases	8		8	4		4			2			6
Actuated Green, G (s)	56.3	48.4	77.0	72.7	58.2	58.2	28.6	58.1	58.1	9.7	39.1	39.1
Effective Green, g (s)	56.3	48.4	77.0	72.7	58.2	58.2	28.6	58.1	58.1	9.7	39.1	39.1
Actuated g/C Ratio	0.35	0.30	0.48	0.45	0.36	0.36	0.18	0.36	0.36	0.06	0.24	0.24
Clearance Time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.5
Vehicle Extension (s)	2.5	2.5	3.0	2.5	2.5	2.5	3.0	5.5	5.5	2.0	5.5	5.5
Lane Grp Cap (vph)	133	1070	761	352	1287	575	613	1846	574	107	1242	386
v/s Ratio Prot	0.03	0.17	0.04	c0.07	c0.35		c0.19	0.16		0.04	c0.16	
v/s Ratio Perm	0.18		0.06	0.22		0.01			0.03			0.03
v/c Ratio	0.60	0.56	0.20	0.65	0.95	0.03	1.05	0.45	0.09	0.64	0.66	0.11
Uniform Delay, d1	40.8	46.9	23.8	29.8	49.6	32.7	65.7	38.8	33.6	73.4	54.5	47.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.22	0.37	0.32	1.00	1.00	1.00
Incremental Delay, d2	6.3	0.6	0.1	3.6	15.2	0.0	47.9	0.7	0.3	8.7	2.8	0.6
Delay (s)	47.1	47.4	24.0	33.4	64.8	32.8	128.2	15.0	11.1	82.2	57.3	47.5
Level of Service	D	D	C	C	E	C	F	B	B	F	E	D
Approach Delay (s)		41.8			59.0			59.4			57.2	
Approach LOS		D			E			E			E	
Intersection Summary												
HCM 2000 Control Delay			55.8				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			26.2		
Intersection Capacity Utilization			87.3%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Northwinds Pkwy/Bailey Johnson Ave & Kimball Bridge Rd

Existing AM
04/05/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	588	132	241	265	0	8	0	113	0	1	1
Future Volume (Veh/h)	4	588	132	241	265	0	8	0	113	0	1	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.97	0.79	0.93	0.88	0.92	0.50	0.92	0.79	0.92	0.25	0.25
Hourly flow rate (vph)	8	606	167	259	301	0	16	0	143	0	4	4
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	301			606			1447	1441	606	1441	1441	301
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	301			606			1447	1441	606	1441	1441	301
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			73			81	100	71	100	96	99
cM capacity (veh/h)	1260			972			83	97	497	62	97	739
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	614	167	259	301	16	143	8					
Volume Left	8	0	259	0	16	0	0					
Volume Right	0	167	0	0	0	143	4					
cSH	1260	1700	972	1700	83	497	171					
Volume to Capacity	0.01	0.10	0.27	0.18	0.19	0.29	0.05					
Queue Length 95th (ft)	0	0	27	0	17	30	4					
Control Delay (s)	0.2	0.0	10.0	0.0	58.2	15.1	27.1					
Lane LOS	A		B		F	C	D					
Approach Delay (s)	0.1		4.6		19.5		27.1					
Approach LOS					C		D					
Intersection Summary												
Average Delay			4.0									
Intersection Capacity Utilization			61.8%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

6: Northwinds Pkwy Extension/2nd St & SR 120 (Old Milton Pkwy)

Existing AM
04/05/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  					 		
Traffic Volume (vph)	137	1439	40	417	2020	315	37	31	63	98	5	36
Future Volume (vph)	137	1439	40	417	2020	315	37	31	63	98	5	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.5	6.5	7.0	6.5	6.5	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.97	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)	1770	5085	1583	1770	5085	1583	1770	1863	1583	3433	1863	1583
Flt Permitted	0.05	1.00	1.00	0.11	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	91	5085	1583	210	5085	1583	1386	1863	1583	3433	1863	1583
Peak-hour factor, PHF	0.80	0.89	0.75	0.64	0.93	0.64	0.56	0.50	0.42	0.92	0.25	0.48
Adj. Flow (vph)	171	1617	53	652	2172	492	66	62	150	107	20	75
RTOR Reduction (vph)	0	0	19	0	0	88	0	0	111	0	0	61
Lane Group Flow (vph)	171	1617	34	652	2172	404	66	62	39	107	20	14
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2		2	6		6	8		8			4
Actuated Green, G (s)	110.6	102.6	102.6	110.6	102.6	102.6	11.6	11.6	11.6	10.3	28.9	28.9
Effective Green, g (s)	110.6	102.6	102.6	110.6	102.6	102.6	11.6	11.6	11.6	10.3	28.9	28.9
Actuated g/C Ratio	0.69	0.64	0.64	0.69	0.64	0.64	0.07	0.07	0.07	0.06	0.18	0.18
Clearance Time (s)	7.0	6.5	6.5	7.0	6.5	6.5	7.0	7.0	7.0	7.0	7.0	7.0
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)	146	3260	1015	223	3260	1015	100	135	114	220	336	285
v/s Ratio Prot	0.06	0.32		c0.15	0.43			0.03		c0.03	0.01	
v/s Ratio Perm	0.75		0.02	c1.87		0.25	c0.05		0.02			0.01
v/c Ratio	1.17	0.50	0.03	2.92	0.67	0.40	0.66	0.46	0.34	0.49	0.06	0.05
Uniform Delay, d1	42.0	15.1	10.5	19.2	18.0	13.8	72.3	71.2	70.6	72.3	54.3	54.2
Progression Factor	1.00	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	127.9	0.5	0.1	877.8	1.1	1.2	15.1	2.5	1.8	1.7	0.1	0.1
Delay (s)	169.9	15.6	10.6	897.0	19.1	15.0	87.4	73.7	72.3	74.0	54.4	54.2
Level of Service	F	B	B	F	B	B	F	E	E	E	D	D
Approach Delay (s)		29.8			191.1			76.2			64.7	
Approach LOS		C			F			E			E	
Intersection Summary												
HCM 2000 Control Delay	128.2			HCM 2000 Level of Service			F					
HCM 2000 Volume to Capacity ratio	2.53											
Actuated Cycle Length (s)	160.0			Sum of lost time (s)			27.5					
Intersection Capacity Utilization	77.5%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Existing PM

1: Haynes Bridge Rd & GA 400 NB Ramps

04/03/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 		 					  			  	
Traffic Volume (vph)	869	0	402	0	0	0	0	1715	916	688	1776	0
Future Volume (vph)	869	0	402	0	0	0	0	1715	916	688	1776	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1		6.1					6.8	6.8	6.0	6.8	
Lane Util. Factor	0.97		0.88					0.91	1.00	1.00	0.91	
Frt	1.00		0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433		2787					5085	1583	1770	5085	
Flt Permitted	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433		2787					5085	1583	1770	5085	
Peak-hour factor, PHF	0.88	0.92	0.88	0.92	0.92	0.92	0.92	0.84	0.83	0.90	0.97	0.92
Adj. Flow (vph)	988	0	457	0	0	0	0	2042	1104	764	1831	0
RTOR Reduction (vph)	0	0	52	0	0	0	0	0	325	0	0	0
Lane Group Flow (vph)	988	0	405	0	0	0	0	2042	779	764	1831	0
Turn Type	Prot		Perm					NA	Perm	Prot	NA	
Protected Phases	4							6		5	2	
Permitted Phases			4						6			
Actuated Green, G (s)	36.9		36.9					50.2	50.2	54.0	110.2	
Effective Green, g (s)	36.9		36.9					50.2	50.2	54.0	110.2	
Actuated g/C Ratio	0.23		0.23					0.31	0.31	0.34	0.69	
Clearance Time (s)	6.1		6.1					6.8	6.8	6.0	6.8	
Vehicle Extension (s)	3.0		3.0					5.1	5.1	4.1	5.1	
Lane Grp Cap (vph)	791		642					1595	496	597	3502	
v/s Ratio Prot	c0.29							0.40		c0.43	0.36	
v/s Ratio Perm			0.15						c0.49			
v/c Ratio	1.25		0.63					1.28	1.57	1.28	0.52	
Uniform Delay, d1	61.5		55.4					54.9	54.9	53.0	12.1	
Progression Factor	1.00		1.00					1.00	1.00	0.93	1.08	
Incremental Delay, d2	122.5		2.0					131.1	266.1	134.9	0.4	
Delay (s)	184.1		57.5					186.0	321.0	184.3	13.4	
Level of Service	F		E					F	F	F	B	
Approach Delay (s)		144.0			0.0			233.4			63.7	
Approach LOS		F			A			F			E	
Intersection Summary												
HCM 2000 Control Delay			154.1					HCM 2000 Level of Service			F	
HCM 2000 Volume to Capacity ratio			1.37									
Actuated Cycle Length (s)			160.0					Sum of lost time (s)		18.9		
Intersection Capacity Utilization			110.0%					ICU Level of Service		H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Haynes Bridge Rd & GA 400 SB Ramps

Existing PM
04/03/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	0	638	1	1	2	630	1923	0	0	1776	889
Future Volume (vph)	183	0	638	1	1	2	630	1923	0	0	1776	889
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	6.4	6.4	6.4	5.8	6.1			6.1	6.1
Lane Util. Factor	0.95	0.95	0.88	0.91	0.91	1.00	0.97	0.91			0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected	0.95	0.95	1.00	0.95	0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1681	1681	2787	1610	3357	1583	3433	5085			5085	1583
Flt Permitted	0.95	0.95	1.00	0.95	0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)	1681	1681	2787	1610	3357	1583	3433	5085			5085	1583
Peak-hour factor, PHF	0.71	0.92	0.90	0.25	0.25	0.50	0.92	0.97	0.92	0.92	0.94	0.94
Adj. Flow (vph)	258	0	709	4	4	4	685	1982	0	0	1889	946
RTOR Reduction (vph)	0	0	0	0	0	4	0	0	0	0	0	214
Lane Group Flow (vph)	129	129	709	3	5	0	685	1982	0	0	1889	732
Turn Type	Split	NA	pt+ov	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3	3 1	4	4		1	6		5	2	
Permitted Phases						4			6			2
Actuated Green, G (s)	11.0	11.0	46.4	2.6	2.6	2.6	35.4	126.9			85.7	85.7
Effective Green, g (s)	11.0	11.0	46.4	2.6	2.6	2.6	35.4	126.9			85.7	85.7
Actuated g/C Ratio	0.07	0.07	0.29	0.02	0.02	0.02	0.22	0.79			0.54	0.54
Clearance Time (s)	7.0	7.0		6.4	6.4	6.4	5.8	6.1			6.1	6.1
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	5.0			5.0	5.0
Lane Grp Cap (vph)	115	115	808	26	54	25	759	4033			2723	847
v/s Ratio Prot	c0.08	0.08	0.25	c0.00	0.00		c0.20	0.39			0.37	
v/s Ratio Perm						0.00						c0.46
v/c Ratio	1.12	1.12	0.88	0.12	0.09	0.00	0.90	0.49			0.69	0.86
Uniform Delay, d1	74.5	74.5	54.1	77.6	77.5	77.4	60.6	5.6			27.5	32.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.76	2.03			1.28	1.62
Incremental Delay, d2	120.4	120.4	10.6	2.0	0.7	0.0	1.6	0.0			0.6	4.7
Delay (s)	194.9	194.9	64.7	79.5	78.3	77.5	47.9	11.4			35.7	56.7
Level of Service	F	F	E	E	E	E	D	B			D	E
Approach Delay (s)		99.4			78.3			20.8			42.7	
Approach LOS		F			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			42.2				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			25.4		
Intersection Capacity Utilization			92.4%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Haynes Bridge Rd & Lakeview Pkwy/Northwinds Pkwy

Existing PM
04/03/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	83	596	420	182	107	132	1673	23	27	1457	2
Future Volume (vph)	24	83	596	420	182	107	132	1673	23	27	1457	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.4	7.4	6.2	7.4	7.4	6.0	6.7		6.4	6.7	6.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	5062		1770	5085	1583
Flt Permitted	0.95	1.00	1.00	0.58	1.00	1.00	0.06	1.00		0.07	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1088	1863	1583	118	5062		127	5085	1583
Peak-hour factor, PHF	0.86	0.63	0.88	0.75	0.76	0.69	0.92	0.95	0.41	0.56	0.95	0.25
Adj. Flow (vph)	28	132	677	560	239	155	143	1761	56	48	1534	8
RTOR Reduction (vph)	0	0	91	0	0	96	0	2	0	0	0	5
Lane Group Flow (vph)	28	132	586	560	239	59	143	1815	0	48	1534	3
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases			8	4		4	2			6		6
Actuated Green, G (s)	4.5	50.5	50.5	70.5	58.8	58.8	73.9	63.2		64.5	58.7	58.7
Effective Green, g (s)	4.5	50.5	50.5	70.5	58.8	58.8	73.9	63.2		64.5	58.7	58.7
Actuated g/C Ratio	0.03	0.32	0.32	0.44	0.37	0.37	0.46	0.40		0.40	0.37	0.37
Clearance Time (s)	7.2	7.4	7.4	6.2	7.4	7.4	6.0	6.7		6.4	6.7	6.7
Vehicle Extension (s)	2.0	2.5	2.5	2.0	2.5	2.5	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	49	588	499	538	684	581	164	1999		110	1865	580
v/s Ratio Prot	0.02	0.07		c0.09	0.13		c0.06	c0.36		0.02	0.30	
v/s Ratio Perm			c0.37	0.37		0.04	0.34			0.16		0.00
v/c Ratio	0.57	0.22	1.17	1.04	0.35	0.10	0.87	0.91		0.44	0.82	0.01
Uniform Delay, d1	76.8	40.3	54.8	44.3	36.7	33.2	41.1	45.7		36.4	45.9	32.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.25	1.51		1.18	1.02	1.00
Incremental Delay, d2	9.6	0.1	97.9	49.8	0.2	0.1	31.3	6.5		0.7	2.9	0.0
Delay (s)	86.4	40.5	152.7	94.2	36.9	33.3	82.8	75.6		43.7	49.8	32.1
Level of Service	F	D	F	F	D	C	F	E		D	D	C
Approach Delay (s)		132.7			69.9			76.1			49.6	
Approach LOS		F			E			E			D	
Intersection Summary												
HCM 2000 Control Delay			76.0									
HCM 2000 Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			160.0									
Intersection Capacity Utilization			105.2%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Haynes Bridge Rd & Morrison Pkwy/Westside Pkwy

Existing PM
04/03/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	149	705	444	289	674	68	334	1290	180	52	732	91
Future Volume (vph)	149	705	444	289	674	68	334	1290	180	52	732	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	1.00	0.91	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)	1770	3539	1583	1770	3539	1583	3433	5085	1583	1770	5085	1583
Flt Permitted	0.29	1.00	1.00	0.09	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	540	3539	1583	172	3539	1583	3433	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.87	0.95	0.86	0.74	0.93	0.77	0.92	0.91	0.69	0.81	0.92	0.71
Adj. Flow (vph)	171	742	516	391	725	88	363	1418	261	64	796	128
RTOR Reduction (vph)	0	0	71	0	0	60	0	0	122	0	0	88
Lane Group Flow (vph)	171	742	445	391	725	28	363	1418	139	64	796	40
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8	5	7	4		5	2		1	6	
Permitted Phases	8		8	4		4			2			6
Actuated Green, G (s)	48.0	36.8	58.4	68.8	51.0	51.0	21.6	63.7	63.7	8.0	50.0	50.0
Effective Green, g (s)	48.0	36.8	58.4	68.8	51.0	51.0	21.6	63.7	63.7	8.0	50.0	50.0
Actuated g/C Ratio	0.30	0.23	0.36	0.43	0.32	0.32	0.14	0.40	0.40	0.05	0.31	0.31
Clearance Time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.5
Vehicle Extension (s)	2.5	2.5	3.0	2.5	2.5	2.5	3.0	5.5	5.5	2.0	5.5	5.5
Lane Grp Cap (vph)	248	813	577	329	1128	504	463	2024	630	88	1589	494
v/s Ratio Prot	0.05	0.21	0.10	c0.19	0.20		c0.11	c0.28		0.04	0.16	
v/s Ratio Perm	0.16		0.18	c0.32		0.02			0.09			0.03
v/c Ratio	0.69	0.91	0.77	1.19	0.64	0.06	0.78	0.70	0.22	0.73	0.50	0.08
Uniform Delay, d1	44.2	60.0	44.9	51.8	46.7	37.8	66.9	40.2	31.8	74.9	44.8	38.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.38	0.89	1.57	1.00	1.00	1.00
Incremental Delay, d2	7.1	14.5	6.3	111.1	1.1	0.0	5.5	1.3	0.5	22.2	1.1	0.3
Delay (s)	51.3	74.5	51.2	162.9	47.8	37.8	98.2	37.1	50.3	97.1	46.0	39.1
Level of Service	D	E	D	F	D	D	F	D	D	F	D	D
Approach Delay (s)		63.3			84.5			49.7			48.4	
Approach LOS		E			F			D			D	
Intersection Summary												
HCM 2000 Control Delay			60.3				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			26.2		
Intersection Capacity Utilization			85.3%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Northwinds Pkwy/Bailey Johnson Ave & Kimball Bridge Rd

Existing PM
04/03/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	209	26	257	495	1	110	0	125	0	0	4
Future Volume (Veh/h)	0	209	26	257	495	1	110	0	125	0	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.78	0.72	0.88	0.86	0.25	0.86	0.92	0.74	0.92	0.92	0.50
Hourly flow rate (vph)	0	268	36	292	576	4	128	0	169	0	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	580			268			1436	1432	268	1430	1430	578
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	580			268			1436	1432	268	1430	1430	578
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 %	100			77			0	100	78	100	100	98
cM capacity (veh/h)	994			1296			90	104	771	72	104	516
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	268	36	292	580	128	169	8					
Volume Left	0	0	292	0	128	0	0					
Volume Right	0	36	0	4	0	169	8					
cSH	994	1700	1296	1700	90	771	516					
Volume to Capacity	0.00	0.02	0.23	0.34	1.41	0.22	0.02					
Queue Length 95th (ft)	0	0	22	0	241	21	1					
Control Delay (s)	0.0	0.0	8.6	0.0	322.5	11.0	12.1					
Lane LOS			A		F	B	B					
Approach Delay (s)	0.0		2.9		145.2		12.1					
Approach LOS					F		B					
Intersection Summary												
Average Delay			30.9									
Intersection Capacity Utilization			59.9%		ICU Level of Service			B				
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

6: Northwinds Pkwy Extension/2nd St & SR 120 (Old Milton Pkwy)

Existing PM
04/03/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  					 		
Traffic Volume (vph)	136	2231	25	269	2079	313	107	48	163	393	20	146
Future Volume (vph)	136	2231	25	269	2079	313	107	48	163	393	20	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.5	6.5	7.0	6.5	6.5	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.97	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)	1770	5085	1583	1770	5085	1583	1770	1863	1583	3433	1863	1583
Flt Permitted	0.05	1.00	1.00	0.05	1.00	1.00	0.70	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	87	5085	1583	87	5085	1583	1313	1863	1583	3433	1863	1583
Peak-hour factor, PHF	0.79	0.90	0.61	0.76	0.94	0.86	0.69	0.50	0.75	0.88	0.25	0.92
Adj. Flow (vph)	172	2479	41	354	2212	364	155	96	217	447	80	159
RTOR Reduction (vph)	0	0	19	0	0	63	0	0	109	0	0	73
Lane Group Flow (vph)	172	2479	22	354	2212	301	155	96	108	447	80	86
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2		2	6		6	8		8			4
Actuated Green, G (s)	93.5	85.5	85.5	93.5	85.5	85.5	13.0	13.0	13.0	26.0	46.0	46.0
Effective Green, g (s)	93.5	85.5	85.5	93.5	85.5	85.5	13.0	13.0	13.0	26.0	46.0	46.0
Actuated g/C Ratio	0.58	0.53	0.53	0.58	0.53	0.53	0.08	0.08	0.08	0.16	0.29	0.29
Clearance Time (s)	7.0	6.5	6.5	7.0	6.5	6.5	7.0	7.0	7.0	7.0	7.0	7.0
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)	134	2717	845	134	2717	845	106	151	128	557	535	455
v/s Ratio Prot	0.06	0.49		c0.13	0.43			0.05		c0.13	0.04	
v/s Ratio Perm	0.68		0.01	c1.40		0.19	c0.12		0.07			0.05
v/c Ratio	1.28	0.91	0.03	2.64	0.81	0.36	1.46	0.64	0.84	0.80	0.15	0.19
Uniform Delay, d1	46.1	33.8	17.6	48.7	30.7	21.4	73.5	71.2	72.5	64.5	42.4	42.9
Progression Factor	1.00	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	172.6	6.0	0.1	759.8	2.8	1.2	252.3	8.5	36.6	8.2	0.1	0.2
Delay (s)	218.7	39.8	17.6	808.5	33.5	22.6	325.8	79.7	109.1	72.7	42.6	43.1
Level of Service	F	D	B	F	C	C	F	E	F	E	D	D
Approach Delay (s)		50.9			125.8			174.8			62.3	
Approach LOS		D			F			F			E	
Intersection Summary												
HCM 2000 Control Delay			93.0				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			2.15									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			27.5		
Intersection Capacity Utilization			93.0%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

Appendix F:
Future “No-Build” Intersection Analysis

HCM Signalized Intersection Capacity Analysis

1: Haynes Bridge Rd & GA 400 NB Ramps

Future No-Build AM

04/05/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 		 					  			  	
Traffic Volume (vph)	1216	0	457	0	0	0	0	1220	619	229	1394	0
Future Volume (vph)	1216	0	457	0	0	0	0	1220	619	229	1394	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1		6.1					6.8	6.8	6.0	6.8	
Lane Util. Factor	0.97		0.88					0.91	1.00	1.00	0.91	
Frt	1.00		0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433		2787					5085	1583	1770	5085	
Flt Permitted	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433		2787					5085	1583	1770	5085	
Peak-hour factor, PHF	0.83	0.92	0.93	0.92	0.92	0.92	0.92	0.86	0.95	0.79	0.90	0.92
Adj. Flow (vph)	1465	0	491	0	0	0	0	1419	652	290	1549	0
RTOR Reduction (vph)	0	0	44	0	0	0	0	0	268	0	0	0
Lane Group Flow (vph)	1465	0	447	0	0	0	0	1419	384	290	1549	0
Turn Type	Prot		Perm					NA	Perm	Prot	NA	
Protected Phases	4							6		5	2	
Permitted Phases			4						6			
Actuated Green, G (s)	55.9		55.9					54.6	54.6	30.6	91.2	
Effective Green, g (s)	55.9		55.9					54.6	54.6	30.6	91.2	
Actuated g/C Ratio	0.35		0.35					0.34	0.34	0.19	0.57	
Clearance Time (s)	6.1		6.1					6.8	6.8	6.0	6.8	
Vehicle Extension (s)	3.0		3.0					5.1	5.1	4.1	5.1	
Lane Grp Cap (vph)	1199		973					1735	540	338	2898	
v/s Ratio Prot	c0.43							c0.28		c0.16	0.30	
v/s Ratio Perm			0.16						0.24			
v/c Ratio	1.22		0.46					0.82	0.71	0.86	0.53	
Uniform Delay, d1	52.0		40.3					48.2	45.8	62.6	21.3	
Progression Factor	1.00		1.00					1.00	1.00	1.19	0.77	
Incremental Delay, d2	107.5		0.3					4.4	7.7	18.2	0.7	
Delay (s)	159.6		40.7					52.6	53.6	93.0	17.0	
Level of Service	F		D					D	D	F	B	
Approach Delay (s)		129.7			0.0			52.9			29.0	
Approach LOS		F			A			D			C	
Intersection Summary												
HCM 2000 Control Delay			71.0		HCM 2000 Level of Service					E		
HCM 2000 Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			160.0		Sum of lost time (s)					18.9		
Intersection Capacity Utilization			84.9%		ICU Level of Service					E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Haynes Bridge Rd & GA 400 SB Ramps

Future No-Build AM

04/05/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	554	1	548	0	1	1	150	2158	1	4	998	527
Future Volume (vph)	554	1	548	0	1	1	150	2158	1	4	998	527
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0		6.4	6.4	5.8	6.1	6.1	5.9	6.1	6.1
Lane Util. Factor	0.95	0.95	0.88		0.91	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1686	2787		3390	1583	3433	5085	1583	1770	5085	1583
Flt Permitted	0.95	0.95	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1686	2787		3390	1583	3433	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.74	0.25	0.90	0.92	0.25	0.25	0.88	0.91	0.25	0.33	0.99	0.80
Adj. Flow (vph)	749	4	609	0	4	4	170	2371	4	12	1008	659
RTOR Reduction (vph)	0	0	0	0	0	4	0	0	2	0	0	292
Lane Group Flow (vph)	374	379	609	0	4	0	170	2371	2	12	1008	367
Turn Type	Split	NA	pt+ov	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3	3 1	4	4		1	6		5	2	
Permitted Phases						4			6			2
Actuated Green, G (s)	34.0	34.0	43.2		2.4	2.4	9.2	95.1	95.1	3.1	89.1	89.1
Effective Green, g (s)	34.0	34.0	43.2		2.4	2.4	9.2	95.1	95.1	3.1	89.1	89.1
Actuated g/C Ratio	0.21	0.21	0.27		0.01	0.01	0.06	0.59	0.59	0.02	0.56	0.56
Clearance Time (s)	7.0	7.0			6.4	6.4	5.8	6.1	6.1	5.9	6.1	6.1
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	357	358	752		50	23	197	3022	940	34	2831	881
v/s Ratio Prot	0.22	c0.22	0.22		c0.00		c0.05	c0.47		0.01	0.20	
v/s Ratio Perm						0.00			0.00			0.23
v/c Ratio	1.05	1.06	0.81		0.08	0.00	0.86	0.78	0.00	0.35	0.36	0.42
Uniform Delay, d1	63.0	63.0	54.6		77.7	77.6	74.8	24.7	13.2	77.5	19.6	20.5
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.01	1.55	1.00	0.89	0.97	4.89
Incremental Delay, d2	60.6	63.9	6.4		0.7	0.0	3.8	0.2	0.0	5.5	0.3	1.3
Delay (s)	123.6	126.9	61.0		78.4	77.7	79.4	38.3	13.2	74.1	19.4	101.3
Level of Service	F	F	E		E	E	E	D	B	E	B	F
Approach Delay (s)		96.5			78.0			41.0			51.9	
Approach LOS		F			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			57.9				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			25.4		
Intersection Capacity Utilization			84.6%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Haynes Bridge Rd & Lakeview Pkwy/Northwinds Pkwy

Future No-Build AM

04/05/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	162	300	67	204	68	945	1247	513	224	1068	146
Future Volume (vph)	43	162	300	67	204	68	945	1247	513	224	1068	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.4	6.0	6.2	7.4	7.4	6.0	6.7		6.4	6.7	6.7
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	0.97	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	2787	1770	1863	1583	3433	4853		1770	5085	1583
Flt Permitted	0.95	1.00	1.00	0.35	1.00	1.00	0.95	1.00		0.07	1.00	1.00
Satd. Flow (perm)	1770	1863	2787	654	1863	1583	3433	4853		138	5085	1583
Peak-hour factor, PHF	0.75	0.90	0.85	0.56	0.78	0.80	0.89	0.85	0.80	0.90	0.94	0.81
Adj. Flow (vph)	57	180	353	120	262	85	1062	1467	641	249	1136	180
RTOR Reduction (vph)	0	0	45	0	0	74	0	50	0	0	0	103
Lane Group Flow (vph)	57	180	308	120	262	11	1062	2058	0	249	1136	78
Turn Type	Prot	NA	pm+ov	pm+pt	NA	Perm	Prot	NA		pm+pt	NA	Perm
Protected Phases	3	8	5	7	4		5	2		1	6	
Permitted Phases			8	4		4				6		6
Actuated Green, G (s)	6.2	19.9	64.9	30.3	21.5	21.5	45.0	95.0		69.6	60.0	60.0
Effective Green, g (s)	6.2	19.9	64.9	30.3	21.5	21.5	45.0	95.0		69.6	60.0	60.0
Actuated g/C Ratio	0.04	0.12	0.41	0.19	0.13	0.13	0.28	0.59		0.43	0.38	0.38
Clearance Time (s)	7.2	7.4	6.0	6.2	7.4	7.4	6.0	6.7		6.4	6.7	6.7
Vehicle Extension (s)	2.0	2.5	2.0	2.0	2.5	2.5	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	68	231	1130	185	250	212	965	2881		157	1906	593
v/s Ratio Prot	0.03	0.10	0.08	c0.04	c0.14		c0.31	0.42		c0.09	0.22	
v/s Ratio Perm			0.03	0.09		0.01				c0.59		0.05
v/c Ratio	0.84	0.78	0.27	0.65	1.05	0.05	1.10	0.71		1.59	0.60	0.13
Uniform Delay, d1	76.4	67.9	31.8	57.3	69.2	60.4	57.5	22.9		35.0	40.2	32.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.86		0.98	0.55	0.16
Incremental Delay, d2	54.5	14.7	0.0	5.8	70.1	0.1	55.0	0.9		283.3	0.9	0.3
Delay (s)	130.9	82.6	31.8	63.1	139.3	60.5	112.6	20.5		317.8	23.0	5.5
Level of Service	F	F	C	E	F	E	F	C		F	C	A
Approach Delay (s)		56.9			105.4			51.4			67.9	
Approach LOS		E			F			D			E	
Intersection Summary												
HCM 2000 Control Delay			60.8				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			1.30									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			27.7		
Intersection Capacity Utilization			85.1%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Haynes Bridge Rd & Morrison Pkwy/Westside Pkwy

Future No-Build AM

04/05/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	520	224	268	1213	45	538	786	143	59	926	216
Future Volume (vph)	83	520	224	268	1213	45	538	786	143	59	926	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	1.00	0.91	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)	1770	3539	1583	1770	3539	1583	3433	5085	1583	1770	5085	1583
Flt Permitted	0.09	1.00	1.00	0.21	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	161	3539	1583	394	3539	1583	3433	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.81	0.82	0.85	0.89	0.93	0.92	0.81	0.88	0.82	0.85	0.94	0.93
Adj. Flow (vph)	102	634	264	301	1304	49	664	893	174	69	985	232
RTOR Reduction (vph)	0	0	60	0	0	31	0	0	112	0	0	153
Lane Group Flow (vph)	102	634	204	301	1304	18	664	893	62	69	985	79
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8	5	7	4		5	2		1	6	
Permitted Phases	8		8	4		4			2			6
Actuated Green, G (s)	54.5	46.3	74.9	74.1	59.3	59.3	28.6	56.6	56.6	9.8	37.7	37.7
Effective Green, g (s)	54.5	46.3	74.9	74.1	59.3	59.3	28.6	56.6	56.6	9.8	37.7	37.7
Actuated g/C Ratio	0.34	0.29	0.47	0.46	0.37	0.37	0.18	0.35	0.35	0.06	0.24	0.24
Clearance Time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.5
Vehicle Extension (s)	2.5	2.5	3.0	2.5	2.5	2.5	3.0	5.5	5.5	2.0	5.5	5.5
Lane Grp Cap (vph)	137	1024	741	366	1311	586	613	1798	559	108	1198	372
v/s Ratio Prot	0.04	0.18	0.05	c0.11	c0.37		c0.19	0.18		0.04	c0.19	
v/s Ratio Perm	0.22		0.08	0.27		0.01			0.04			0.05
v/c Ratio	0.74	0.62	0.28	0.82	0.99	0.03	1.08	0.50	0.11	0.64	0.82	0.21
Uniform Delay, d1	42.8	49.2	26.0	31.2	50.2	32.1	65.7	40.5	34.8	73.4	58.0	49.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.24	0.56	0.64	1.00	1.00	1.00
Incremental Delay, d2	18.6	1.0	0.2	13.6	23.4	0.0	56.8	0.8	0.3	8.8	6.4	1.3
Delay (s)	61.4	50.2	26.2	44.7	73.6	32.1	138.3	23.6	22.5	82.2	64.4	50.5
Level of Service	E	D	C	D	E	C	F	C	C	F	E	D
Approach Delay (s)		45.0			67.1			67.5			62.8	
Approach LOS		D			E			E			E	
Intersection Summary												
HCM 2000 Control Delay			62.4			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			26.2			
Intersection Capacity Utilization			93.2%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Northwinds Pkwy/Northwinds Extension & Kimball Bridge Rd

Future No-Build AM

04/05/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	594	165	259	268	0	12	3	116	0	25	1
Future Volume (vph)	4	594	165	259	268	0	12	3	116	0	25	1
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	1.00		1.00	0.95			0.95	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863		1770	3019			3519	
Flt Permitted	0.57	1.00	1.00	0.23	1.00		0.40	1.00			1.00	
Satd. Flow (perm)	1070	1863	1583	426	1863		746	3019			3519	
Peak-hour factor, PHF	0.50	0.97	0.79	0.93	0.88	0.92	0.50	0.92	0.79	0.92	0.25	0.25
Adj. Flow (vph)	8	612	209	278	305	0	24	3	147	0	100	4
RTOR Reduction (vph)	0	0	97	0	0	0	0	123	0	0	3	0
Lane Group Flow (vph)	8	612	112	278	305	0	24	27	0	0	101	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	44.0	43.3	43.3	60.5	53.8		15.9	15.9			8.4	
Effective Green, g (s)	44.0	43.3	43.3	60.5	53.8		15.9	15.9			8.4	
Actuated g/C Ratio	0.50	0.49	0.49	0.68	0.61		0.18	0.18			0.10	
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	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	538	912	775	461	1133		151	543			334	
v/s Ratio Prot	0.00	c0.33		c0.08	0.16		c0.00	0.01			c0.03	
v/s Ratio Perm	0.01		0.07	0.34			0.03					
v/c Ratio	0.01	0.67	0.14	0.60	0.27		0.16	0.05			0.30	
Uniform Delay, d1	11.2	17.1	12.4	9.9	8.1		30.3	30.0			37.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	2.0	0.1	2.2	0.1		0.5	0.0			0.5	
Delay (s)	11.2	19.1	12.5	12.1	8.2		30.8	30.0			37.8	
Level of Service	B	B	B	B	A		C	C			D	
Approach Delay (s)		17.3			10.1			30.1			37.8	
Approach LOS		B			B			C			D	
Intersection Summary												
HCM 2000 Control Delay			17.4			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			88.4			Sum of lost time (s)			24.0			
Intersection Capacity Utilization			67.9%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Northwinds Pkwy Extension/2nd St & SR 120 (Old Milton Pkwy)

Future No-Build AM

04/05/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  					 		
Traffic Volume (vph)	140	1468	41	449	2061	321	38	32	67	100	5	37
Future Volume (vph)	140	1468	41	449	2061	321	38	32	67	100	5	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.5	6.5	7.0	6.5	6.5	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.97	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)	1770	5085	1583	1770	5085	1583	1770	1863	1583	3433	1863	1583
Flt Permitted	0.05	1.00	1.00	0.11	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	84	5085	1583	201	5085	1583	1386	1863	1583	3433	1863	1583
Peak-hour factor, PHF	0.80	0.89	0.75	0.64	0.93	0.64	0.56	0.50	0.42	0.92	0.25	0.48
Adj. Flow (vph)	175	1649	55	702	2216	502	68	64	160	109	20	77
RTOR Reduction (vph)	0	0	20	0	0	88	0	0	110	0	0	63
Lane Group Flow (vph)	175	1649	35	702	2216	414	68	64	50	109	20	14
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2		2	6		6	8		8			4
Actuated Green, G (s)	110.5	102.5	102.5	110.5	102.5	102.5	11.6	11.6	11.6	10.4	29.0	29.0
Effective Green, g (s)	110.5	102.5	102.5	110.5	102.5	102.5	11.6	11.6	11.6	10.4	29.0	29.0
Actuated g/C Ratio	0.69	0.64	0.64	0.69	0.64	0.64	0.07	0.07	0.07	0.07	0.18	0.18
Clearance Time (s)	7.0	6.5	6.5	7.0	6.5	6.5	7.0	7.0	7.0	7.0	7.0	7.0
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)	142	3257	1014	217	3257	1014	100	135	114	223	337	286
v/s Ratio Prot	0.06	0.32		c0.16	0.44			0.03		c0.03	0.01	
v/s Ratio Perm	0.79		0.02	c2.07		0.26	c0.05		0.03			0.01
v/c Ratio	1.23	0.51	0.03	3.24	0.68	0.41	0.68	0.47	0.44	0.49	0.06	0.05
Uniform Delay, d1	44.0	15.3	10.6	20.5	18.3	14.0	72.4	71.3	71.1	72.2	54.2	54.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	151.1	0.6	0.1	1017.6	1.2	1.2	17.3	2.6	2.7	1.7	0.1	0.1
Delay (s)	195.1	15.9	10.6	1038.2	19.5	15.2	89.7	73.9	73.7	73.9	54.3	54.2
Level of Service	F	B	B	F	B	B	F	E	E	E	D	D
Approach Delay (s)		32.4			228.0			77.5			64.6	
Approach LOS		C			F			E			E	
Intersection Summary												
HCM 2000 Control Delay			151.2				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			2.79									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			27.5		
Intersection Capacity Utilization			79.8%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Future No-Build PM

1: Haynes Bridge Rd & GA 400 NB Ramps

04/05/2017

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	983	0	410	0	0	0	0	1846	934	821	2060	0	
Future Volume (vph)	983	0	410	0	0	0	0	1846	934	821	2060	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	6.1		6.1					6.8	6.8	6.0	6.8		
Lane Util. Factor	0.97		0.88					0.91	1.00	1.00	0.91		
Frt	1.00		0.85					1.00	0.85	1.00	1.00		
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)	3433		2787					5085	1583	1770	5085		
Flt Permitted	0.95		1.00					1.00	1.00	0.95	1.00		
Satd. Flow (perm)	3433		2787					5085	1583	1770	5085		
Peak-hour factor, PHF	0.88	0.92	0.88	0.92	0.92	0.92	0.92	0.84	0.83	0.90	0.97	0.92	
Adj. Flow (vph)	1117	0	466	0	0	0	0	2198	1125	912	2124	0	
RTOR Reduction (vph)	0	0	52	0	0	0	0	0	308	0	0	0	
Lane Group Flow (vph)	1117	0	414	0	0	0	0	2198	817	912	2124	0	
Turn Type	Prot		Perm					NA	Perm	Prot	NA		
Protected Phases	4							6		5	2		
Permitted Phases			4						6				
Actuated Green, G (s)	36.9		36.9					50.2	50.2	54.0	110.2		
Effective Green, g (s)	36.9		36.9					50.2	50.2	54.0	110.2		
Actuated g/C Ratio	0.23		0.23					0.31	0.31	0.34	0.69		
Clearance Time (s)	6.1		6.1					6.8	6.8	6.0	6.8		
Vehicle Extension (s)	3.0		3.0					5.1	5.1	4.1	5.1		
Lane Grp Cap (vph)	791		642					1595	496	597	3502		
v/s Ratio Prot	c0.33							0.43		c0.52	0.42		
v/s Ratio Perm			0.15						c0.52				
v/c Ratio	1.41		0.65					1.38	1.65	1.53	0.61		
Uniform Delay, d1	61.5		55.6					54.9	54.9	53.0	13.3		
Progression Factor	1.00		1.00					1.00	1.00	0.80	0.87		
Incremental Delay, d2	193.0		2.2					174.1	300.1	242.1	0.4		
Delay (s)	254.5		57.9					229.0	355.0	284.3	12.1		
Level of Service	F		E					F	F	F	B		
Approach Delay (s)		196.6			0.0			271.7			93.8		
Approach LOS		F			A			F			F		
Intersection Summary													
HCM 2000 Control Delay			188.7									HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			1.54										
Actuated Cycle Length (s)			160.0								18.9		Sum of lost time (s)
Intersection Capacity Utilization			123.2%								H		ICU Level of Service
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis

2: Haynes Bridge Rd & GA 400 SB Ramps

Future No-Build PM

04/05/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	235	0	651	1	1	2	643	2156	0	0	2189	1133
Future Volume (vph)	235	0	651	1	1	2	643	2156	0	0	2189	1133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	6.4	6.4	6.4	5.8	6.1			6.1	6.1
Lane Util. Factor	0.95	0.95	0.88	0.91	0.91	1.00	0.97	0.91			0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected	0.95	0.95	1.00	0.95	0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1681	1681	2787	1610	3357	1583	3433	5085			5085	1583
Flt Permitted	0.95	0.95	1.00	0.95	0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)	1681	1681	2787	1610	3357	1583	3433	5085			5085	1583
Peak-hour factor, PHF	0.71	0.92	0.90	0.25	0.25	0.50	0.92	0.97	0.92	0.92	0.94	0.92
Adj. Flow (vph)	331	0	723	4	4	4	699	2223	0	0	2329	1232
RTOR Reduction (vph)	0	0	0	0	0	4	0	0	0	0	0	214
Lane Group Flow (vph)	165	166	723	3	5	0	699	2223	0	0	2329	1018
Turn Type	Split	NA	pt+ov	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3	3 1	4	4		1	6		5	2	
Permitted Phases						4			6			2
Actuated Green, G (s)	11.0	11.0	46.6	2.6	2.6	2.6	35.6	126.9			85.5	85.5
Effective Green, g (s)	11.0	11.0	46.6	2.6	2.6	2.6	35.6	126.9			85.5	85.5
Actuated g/C Ratio	0.07	0.07	0.29	0.02	0.02	0.02	0.22	0.79			0.53	0.53
Clearance Time (s)	7.0	7.0		6.4	6.4	6.4	5.8	6.1			6.1	6.1
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	5.0			5.0	5.0
Lane Grp Cap (vph)	115	115	811	26	54	25	763	4033			2717	845
v/s Ratio Prot	0.10	c0.10	0.26	c0.00	0.00		c0.20	0.44			0.46	
v/s Ratio Perm						0.00						c0.64
v/c Ratio	1.43	1.44	0.89	0.12	0.09	0.00	0.92	0.55			0.86	1.21
Uniform Delay, d1	74.5	74.5	54.3	77.6	77.5	77.4	60.7	6.1			32.0	37.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.78	2.27			0.74	0.61
Incremental Delay, d2	238.1	241.6	12.1	2.0	0.7	0.0	1.9	0.0			0.4	93.4
Delay (s)	312.6	316.1	66.3	79.5	78.3	77.5	49.2	13.9			24.0	116.3
Level of Service	F	F	E	E	E	E	D	B			C	F
Approach Delay (s)		144.2			78.3			22.3			55.9	
Approach LOS		F			E			C			E	
Intersection Summary												
HCM 2000 Control Delay			55.3				HCM 2000 Level of Service				E	
HCM 2000 Volume to Capacity ratio			1.13									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			25.4		
Intersection Capacity Utilization			107.9%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Haynes Bridge Rd & Lakeview Pkwy/Northwinds Pkwy

Future No-Build PM

04/05/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	166	1046	591	222	224	345	1707	56	51	1486	55
Future Volume (vph)	113	166	1046	591	222	224	345	1707	56	51	1486	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.4	6.0	6.2	7.4	7.4	6.0	6.7		6.4	6.7	6.7
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	0.97	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	2787	1770	1863	1583	3433	5031		1770	5085	1583
Flt Permitted	0.95	1.00	1.00	0.23	1.00	1.00	0.95	1.00		0.05	1.00	1.00
Satd. Flow (perm)	1770	1863	2787	424	1863	1583	3433	5031		97	5085	1583
Peak-hour factor, PHF	0.86	0.63	0.88	0.75	0.76	0.69	0.92	0.95	0.41	0.56	0.95	0.25
Adj. Flow (vph)	131	263	1189	788	292	325	375	1797	137	91	1564	220
RTOR Reduction (vph)	0	0	56	0	0	99	0	4	0	0	0	61
Lane Group Flow (vph)	131	263	1133	788	292	226	375	1930	0	91	1564	159
Turn Type	Prot	NA	pm+ov	pm+pt	NA	Perm	Prot	NA		pm+pt	NA	Perm
Protected Phases	3	8	5	7	4		5	2		1	6	
Permitted Phases			8	4		4				6		6
Actuated Green, G (s)	7.8	27.7	38.7	46.5	32.7	32.7	11.0	84.2		88.8	81.2	81.2
Effective Green, g (s)	7.8	27.7	38.7	46.5	32.7	32.7	11.0	84.2		88.8	81.2	81.2
Actuated g/C Ratio	0.05	0.17	0.24	0.29	0.20	0.20	0.07	0.53		0.55	0.51	0.51
Clearance Time (s)	7.2	7.4	6.0	6.2	7.4	7.4	6.0	6.7		6.4	6.7	6.7
Vehicle Extension (s)	2.0	2.5	2.0	2.0	2.5	2.5	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	86	322	674	239	380	323	236	2647		133	2580	803
v/s Ratio Prot	0.07	0.14	c0.12	c0.28	0.16		0.11	c0.38		0.03	0.31	
v/s Ratio Perm			0.29	c0.67		0.14				0.35		0.10
v/c Ratio	1.52	0.82	1.68	3.30	0.77	0.70	1.59	0.73		0.68	0.61	0.20
Uniform Delay, d1	76.1	63.7	60.6	52.5	60.1	59.1	74.5	29.1		26.1	28.0	21.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.75	1.59		1.36	0.96	1.07
Incremental Delay, d2	285.7	14.4	312.8	1044.4	8.6	6.0	279.8	1.4		7.0	0.7	0.3
Delay (s)	361.8	78.1	373.5	1096.8	68.7	65.0	335.4	47.8		42.6	27.5	23.5
Level of Service	F	E	F	F	E	E	F	D		D	C	C
Approach Delay (s)		323.4			644.5			94.5			27.8	
Approach LOS		F			F			F			C	
Intersection Summary												
HCM 2000 Control Delay			235.3				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.71									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			27.7		
Intersection Capacity Utilization			113.8%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Haynes Bridge Rd & Morrison Pkwy/Westside Pkwy

Future No-Build PM

04/05/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	194	761	460	319	710	69	375	1433	236	53	788	115
Future Volume (vph)	194	761	460	319	710	69	375	1433	236	53	788	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	1.00	0.91	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)	1770	3539	1583	1770	3539	1583	3433	5085	1583	1770	5085	1583
Flt Permitted	0.27	1.00	1.00	0.09	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	496	3539	1583	166	3539	1583	3433	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.87	0.95	0.86	0.74	0.93	0.77	0.92	0.91	0.69	0.81	0.92	0.71
Adj. Flow (vph)	223	801	535	431	763	90	408	1575	342	65	857	162
RTOR Reduction (vph)	0	0	69	0	0	61	0	0	147	0	0	114
Lane Group Flow (vph)	223	801	466	431	763	29	408	1575	195	65	857	48
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8	5	7	4		5	2		1	6	
Permitted Phases	8		8	4		4			2			6
Actuated Green, G (s)	49.8	38.4	60.9	70.4	52.4	52.4	22.5	62.1	62.1	8.0	47.5	47.5
Effective Green, g (s)	49.8	38.4	60.9	70.4	52.4	52.4	22.5	62.1	62.1	8.0	47.5	47.5
Actuated g/C Ratio	0.31	0.24	0.38	0.44	0.33	0.33	0.14	0.39	0.39	0.05	0.30	0.30
Clearance Time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.5
Vehicle Extension (s)	2.5	2.5	3.0	2.5	2.5	2.5	3.0	5.5	5.5	2.0	5.5	5.5
Lane Grp Cap (vph)	245	849	602	329	1159	518	482	1973	614	88	1509	469
v/s Ratio Prot	0.06	0.23	0.11	c0.21	0.22		c0.12	c0.31		0.04	0.17	
v/s Ratio Perm	0.22		0.19	c0.37		0.02			0.12			0.03
v/c Ratio	0.91	0.94	0.77	1.31	0.66	0.06	0.85	0.80	0.32	0.74	0.57	0.10
Uniform Delay, d1	47.9	59.7	43.5	52.1	46.1	36.9	67.1	43.4	34.2	75.0	47.6	40.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.42	0.62	0.59	1.00	1.00	1.00
Incremental Delay, d2	34.4	18.5	6.1	159.7	1.2	0.0	9.1	2.4	0.9	24.0	1.6	0.4
Delay (s)	82.4	78.2	49.6	211.8	47.3	36.9	104.4	29.2	21.2	99.0	49.1	41.2
Level of Service	F	E	D	F	D	D	F	C	C	F	D	D
Approach Delay (s)		69.0			101.8			41.2			50.9	
Approach LOS		E			F			D			D	
Intersection Summary												
HCM 2000 Control Delay			62.3				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			1.10									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			26.2		
Intersection Capacity Utilization			91.3%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Northwinds Pkwy/Bailey Johnson Ave & Kimball Bridge Rd

Future No-Build PM

04/05/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	211	32	263	500	1	138	20	140	0	4	4
Future Volume (vph)	0	211	32	263	500	1	138	20	140	0	4	4
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	1.00	1.00	0.95			0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.87			0.90	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		1863	1583	1770	1863	1583	1770	3064			3185	
Flt Permitted		1.00	1.00	0.35	1.00	1.00	0.37	1.00			1.00	
Satd. Flow (perm)		1863	1583	643	1863	1583	680	3064			3185	
Peak-hour factor, PHF	0.92	0.78	0.72	0.88	0.86	0.25	0.86	0.92	0.74	0.92	0.92	0.50
Adj. Flow (vph)	0	271	44	299	581	4	160	22	189	0	4	8
RTOR Reduction (vph)	0	0	34	0	0	2	0	129	0	0	11	0
Lane Group Flow (vph)	0	271	10	299	581	2	160	82	0	0	1	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)		16.3	16.3	34.9	34.9	34.9	21.9	21.9			5.7	
Effective Green, g (s)		16.3	16.3	34.9	34.9	34.9	21.9	21.9			5.7	
Actuated g/C Ratio		0.24	0.24	0.51	0.51	0.51	0.32	0.32			0.08	
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	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)		441	375	532	945	803	378	975			263	
v/s Ratio Prot		0.15		0.10	c0.31		c0.06	0.03			0.00	
v/s Ratio Perm			0.01	0.18		0.00	c0.07					
v/c Ratio		0.61	0.03	0.56	0.61	0.00	0.42	0.08			0.00	
Uniform Delay, d1		23.4	20.2	10.9	12.1	8.4	17.9	16.4			28.9	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2		2.5	0.0	1.4	1.2	0.0	0.8	0.0			0.0	
Delay (s)		26.0	20.2	12.3	13.3	8.4	18.6	16.5			29.0	
Level of Service		C	C	B	B	A	B	B			C	
Approach Delay (s)		25.2			13.0			17.4			29.0	
Approach LOS		C			B			B			C	
Intersection Summary												
HCM 2000 Control Delay			16.6									
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			68.8									
Intersection Capacity Utilization			59.8%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Northwinds Pkwy Extension/2nd St & SR 120 (Old Milton Pkwy)

Future No-Build PM

04/05/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	2276	26	278	2121	319	109	49	186	401	20	149
Future Volume (vph)	139	2276	26	278	2121	319	109	49	186	401	20	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.5	6.5	7.0	6.5	6.5	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.97	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)	1770	5085	1583	1770	5085	1583	1770	1863	1583	3433	1863	1583
Flt Permitted	0.05	1.00	1.00	0.05	1.00	1.00	0.70	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	88	5085	1583	88	5085	1583	1313	1863	1583	3433	1863	1583
Peak-hour factor, PHF	0.79	0.90	0.61	0.76	0.94	0.86	0.69	0.50	0.75	0.88	0.25	0.92
Adj. Flow (vph)	176	2529	43	366	2256	371	158	98	248	456	80	162
RTOR Reduction (vph)	0	0	20	0	0	63	0	0	109	0	0	72
Lane Group Flow (vph)	176	2529	23	366	2256	308	158	98	139	456	80	90
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2		2	6		6	8		8			4
Actuated Green, G (s)	93.1	85.1	85.1	93.1	85.1	85.1	13.0	13.0	13.0	26.4	46.4	46.4
Effective Green, g (s)	93.1	85.1	85.1	93.1	85.1	85.1	13.0	13.0	13.0	26.4	46.4	46.4
Actuated g/C Ratio	0.58	0.53	0.53	0.58	0.53	0.53	0.08	0.08	0.08	0.16	0.29	0.29
Clearance Time (s)	7.0	6.5	6.5	7.0	6.5	6.5	7.0	7.0	7.0	7.0	7.0	7.0
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)	135	2704	841	135	2704	841	106	151	128	566	540	459
v/s Ratio Prot	0.07	0.50		c0.14	0.44			0.05		c0.13	0.04	
v/s Ratio Perm	0.70		0.01	c1.45		0.19	c0.12		0.09			0.06
v/c Ratio	1.30	0.94	0.03	2.71	0.83	0.37	1.49	0.65	1.08	0.81	0.15	0.20
Uniform Delay, d1	46.7	34.9	17.8	49.4	31.5	21.8	73.5	71.3	73.5	64.3	42.1	42.7
Progression Factor	1.00	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	180.1	7.6	0.1	790.6	3.2	1.2	263.9	9.2	103.6	8.2	0.1	0.2
Delay (s)	226.8	42.5	17.8	840.0	34.7	23.0	337.4	80.5	177.1	72.5	42.3	43.0
Level of Service	F	D	B	F	C	C	F	F	F	E	D	D
Approach Delay (s)		53.9			131.8			208.6			62.2	
Approach LOS		D			F			F			E	
Intersection Summary												
HCM 2000 Control Delay			99.5			HCM 2000 Level of Service				F		
HCM 2000 Volume to Capacity ratio			2.21									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			27.5			
Intersection Capacity Utilization			94.6%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

Appendix G:
Future “No-Build” Improved Intersection
Analysis

HCM Signalized Intersection Capacity Analysis

1: Haynes Bridge Rd & GA 400 NB Ramps

Future No-Build AM - Improved

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1216	0	457	0	0	0	0	1220	619	229	1394	0
Future Volume (vph)	1216	0	457	0	0	0	0	1220	619	229	1394	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1		6.1					6.8	6.8	6.0	6.8	
Lane Util. Factor	0.97		0.88					0.91	0.88	0.97	0.91	
Frt	1.00		0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433		2787					5085	2787	3433	5085	
Flt Permitted	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433		2787					5085	2787	3433	5085	
Peak-hour factor, PHF	0.83	0.92	0.93	0.92	0.92	0.92	0.92	0.86	0.95	0.79	0.90	0.92
Adj. Flow (vph)	1465	0	491	0	0	0	0	1419	652	290	1549	0
RTOR Reduction (vph)	0	0	36	0	0	0	0	0	273	0	0	0
Lane Group Flow (vph)	1465	0	455	0	0	0	0	1419	379	290	1549	0
Turn Type	Prot		Perm					NA	Perm	Prot	NA	
Protected Phases	4							6		5	2	
Permitted Phases			4						6			
Actuated Green, G (s)	73.7		73.7					51.5	51.5	15.9	73.4	
Effective Green, g (s)	73.7		73.7					51.5	51.5	15.9	73.4	
Actuated g/C Ratio	0.46		0.46					0.32	0.32	0.10	0.46	
Clearance Time (s)	6.1		6.1					6.8	6.8	6.0	6.8	
Vehicle Extension (s)	3.0		3.0					5.1	5.1	4.1	5.1	
Lane Grp Cap (vph)	1581		1283					1636	897	341	2332	
v/s Ratio Prot	c0.43							c0.28		c0.08	0.30	
v/s Ratio Perm			0.16						0.14			
v/c Ratio	0.93		0.35					0.87	0.42	0.85	0.66	
Uniform Delay, d1	40.6		27.8					51.0	42.6	70.9	33.7	
Progression Factor	1.00		1.00					1.00	1.00	0.93	0.77	
Incremental Delay, d2	9.7		0.2					6.5	1.5	17.6	1.4	
Delay (s)	50.3		28.0					57.5	44.0	83.4	27.5	
Level of Service	D		C					E	D	F	C	
Approach Delay (s)		44.7			0.0			53.3			36.3	
Approach LOS		D			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			45.1		HCM 2000 Level of Service				D			
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			160.0		Sum of lost time (s)				18.9			
Intersection Capacity Utilization			78.8%		ICU Level of Service				D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Haynes Bridge Rd & GA 400 SB Ramps

Future No-Build AM - Improved

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	554	1	548	0	1	1	150	2158	1	4	998	527
Future Volume (vph)	554	1	548	0	1	1	150	2158	1	4	998	527
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0		6.4	6.4	5.8	6.1	6.1	5.9	6.1	7.0
Lane Util. Factor	0.95	0.95	0.88		0.91	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1686	2787		3390	1583	3433	5085	1583	1770	5085	1583
Flt Permitted	0.95	0.95	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1686	2787		3390	1583	3433	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.74	0.25	0.90	0.92	0.25	0.25	0.88	0.91	0.25	0.33	0.99	0.80
Adj. Flow (vph)	749	4	609	0	4	4	170	2371	4	12	1008	659
RTOR Reduction (vph)	0	0	0	0	0	4	0	0	2	0	0	133
Lane Group Flow (vph)	374	379	609	0	4	0	170	2371	2	12	1008	526
Turn Type	Split	NA	pt+ov	Split	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	3	3	3 1	4	4		1	6		5	2	3
Permitted Phases						4			6			2
Actuated Green, G (s)	42.1	42.1	54.9		2.4	2.4	12.8	87.0	87.0	3.1	77.4	119.5
Effective Green, g (s)	42.1	42.1	54.9		2.4	2.4	12.8	87.0	87.0	3.1	77.4	119.5
Actuated g/C Ratio	0.26	0.26	0.34		0.01	0.01	0.08	0.54	0.54	0.02	0.48	0.75
Clearance Time (s)	7.0	7.0			6.4	6.4	5.8	6.1	6.1	5.9	6.1	7.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	5.0	5.0	3.0	5.0	3.0
Lane Grp Cap (vph)	442	443	956		50	23	274	2764	860	34	2459	1182
v/s Ratio Prot	0.22	c0.22	c0.22		c0.00		0.05	c0.47		0.01	0.20	0.12
v/s Ratio Perm						0.00			0.00			0.22
v/c Ratio	0.85	0.86	0.64		0.08	0.00	0.62	0.86	0.00	0.35	0.41	0.44
Uniform Delay, d1	55.9	56.1	44.2		77.7	77.6	71.2	31.2	16.7	77.5	26.6	7.7
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.91	0.78	1.00	1.03	0.74	5.07
Incremental Delay, d2	13.9	14.9	1.4		0.7	0.0	1.9	1.7	0.0	4.8	0.4	0.2
Delay (s)	69.8	70.9	45.6		78.4	77.7	67.0	26.0	16.7	84.7	20.0	39.1
Level of Service	E	E	D		E	E	E	C	B	F	C	D
Approach Delay (s)		59.3			78.0			28.7			28.0	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			36.0				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			25.4		
Intersection Capacity Utilization			84.6%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Haynes Bridge Rd & Lakeview Pkwy/Northwinds Pkwy

Future No-Build AM - Improved

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	162	300	67	204	68	945	1247	513	224	1068	146
Future Volume (vph)	43	162	300	67	204	68	945	1247	513	224	1068	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.4	7.4	6.2	7.4		6.0	6.7		6.4	6.7	6.7
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		0.97	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	2787	3433	1794		3433	4853		1770	5085	1583
Flt Permitted	0.21	1.00	1.00	0.95	1.00		0.95	1.00		0.09	1.00	1.00
Satd. Flow (perm)	392	1863	2787	3433	1794		3433	4853		159	5085	1583
Peak-hour factor, PHF	0.75	0.90	0.85	0.56	0.78	0.80	0.89	0.85	0.80	0.90	0.94	0.81
Adj. Flow (vph)	57	180	353	120	262	85	1062	1467	641	249	1136	180
RTOR Reduction (vph)	0	0	281	0	8	0	0	44	0	0	0	116
Lane Group Flow (vph)	57	180	72	120	339	0	1062	2064	0	249	1136	64
Turn Type	pm+pt	NA	Perm	Prot	NA		Prot	NA		pm+pt	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8							6		6
Actuated Green, G (s)	35.6	32.6	32.6	6.3	34.9		48.0	76.0		65.2	46.8	46.8
Effective Green, g (s)	35.6	32.6	32.6	6.3	34.9		48.0	76.0		65.2	46.8	46.8
Actuated g/C Ratio	0.22	0.20	0.20	0.04	0.22		0.30	0.48		0.41	0.29	0.29
Clearance Time (s)	7.2	7.4	7.4	6.2	7.4		6.0	6.7		6.4	6.7	6.7
Vehicle Extension (s)	2.0	2.5	2.5	2.0	2.5		2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	113	379	567	135	391		1029	2305		250	1487	463
v/s Ratio Prot	0.01	0.10		c0.03	c0.19		c0.31	0.43		0.11	0.22	
v/s Ratio Perm	0.10		0.03							c0.29		0.04
v/c Ratio	0.50	0.47	0.13	0.89	0.87		1.03	0.90		1.00	0.76	0.14
Uniform Delay, d1	56.0	56.2	52.1	76.5	60.3		56.0	38.4		49.5	51.6	41.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.14	0.78		1.23	0.49	0.13
Incremental Delay, d2	1.3	0.7	0.1	44.3	17.8		30.4	3.7		44.2	2.5	0.4
Delay (s)	57.3	56.8	52.1	120.8	78.1		94.3	33.8		104.9	27.9	6.0
Level of Service	E	E	D	F	E		F	C		F	C	A
Approach Delay (s)		54.1			89.1			54.0			37.7	
Approach LOS		D			F			D			D	
Intersection Summary												
HCM 2000 Control Delay			52.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				27.7		
Intersection Capacity Utilization			89.3%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Haynes Bridge Rd & Morrison Pkwy/Westside Pkwy

Future No-Build AM - Improved

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	  			  	
Traffic Volume (vph)	83	520	224	268	1213	45	538	786	143	59	926	216
Future Volume (vph)	83	520	224	268	1213	45	538	786	143	59	926	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.6
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	1.00	0.91	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)	1770	3539	1583	1770	3539	1583	3433	5085	1583	1770	5085	1583
Flt Permitted	0.09	1.00	1.00	0.21	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	161	3539	1583	394	3539	1583	3433	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.81	0.82	0.85	0.89	0.93	0.92	0.81	0.88	0.82	0.85	0.94	0.93
Adj. Flow (vph)	102	634	264	301	1304	49	664	893	174	69	985	232
RTOR Reduction (vph)	0	0	81	0	0	31	0	0	113	0	0	82
Lane Group Flow (vph)	102	634	183	301	1304	18	664	893	61	69	985	150
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	3	8	5	7	4		5	2		1	6	3
Permitted Phases	8		8	4		4			2			6
Actuated Green, G (s)	54.5	46.3	76.9	74.1	59.3	59.3	30.6	56.1	56.1	10.3	35.7	43.9
Effective Green, g (s)	54.5	46.3	76.9	74.1	59.3	59.3	30.6	56.1	56.1	10.3	35.7	43.9
Actuated g/C Ratio	0.34	0.29	0.48	0.46	0.37	0.37	0.19	0.35	0.35	0.06	0.22	0.27
Clearance Time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.6
Vehicle Extension (s)	2.5	2.5	3.0	2.5	2.5	2.5	3.0	5.5	5.5	2.0	5.5	2.5
Lane Grp Cap (vph)	137	1024	760	366	1311	586	656	1782	555	113	1134	434
v/s Ratio Prot	0.04	0.18	0.05	c0.11	c0.37		c0.19	0.18		0.04	c0.19	0.02
v/s Ratio Perm	0.22		0.07	0.27		0.01			0.04			0.08
v/c Ratio	0.74	0.62	0.24	0.82	0.99	0.03	1.01	0.50	0.11	0.61	0.87	0.35
Uniform Delay, d1	42.8	49.2	24.4	31.2	50.2	32.1	64.7	40.9	35.1	72.9	59.9	46.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.63	0.44	0.36	1.00	1.00	1.00
Incremental Delay, d2	18.6	1.0	0.2	13.6	23.4	0.0	29.7	0.6	0.2	6.7	9.1	0.4
Delay (s)	61.4	50.2	24.6	44.7	73.6	32.1	70.5	18.4	12.9	79.6	69.0	46.9
Level of Service	E	D	C	D	E	C	E	B	B	E	E	D
Approach Delay (s)		44.6			67.1			37.8			65.6	
Approach LOS		D			E			D			E	
Intersection Summary												
HCM 2000 Control Delay			53.8				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			26.2		
Intersection Capacity Utilization			93.2%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Northwinds Pkwy/Northwinds Extension & Kimball Bridge Rd

Future No-Build AM - Improved

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	594	165	259	268	0	12	3	116	0	25	1
Future Volume (vph)	4	594	165	259	268	0	12	3	116	0	25	1
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	1.00		1.00	0.95			0.95	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863		1770	3019			3519	
Flt Permitted	0.57	1.00	1.00	0.23	1.00		0.40	1.00			1.00	
Satd. Flow (perm)	1070	1863	1583	426	1863		746	3019			3519	
Peak-hour factor, PHF	0.50	0.97	0.79	0.93	0.88	0.92	0.50	0.92	0.79	0.92	0.25	0.25
Adj. Flow (vph)	8	612	209	278	305	0	24	3	147	0	100	4
RTOR Reduction (vph)	0	0	97	0	0	0	0	123	0	0	3	0
Lane Group Flow (vph)	8	612	112	278	305	0	24	27	0	0	101	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	44.0	43.3	43.3	60.5	53.8		15.9	15.9			8.4	
Effective Green, g (s)	44.0	43.3	43.3	60.5	53.8		15.9	15.9			8.4	
Actuated g/C Ratio	0.50	0.49	0.49	0.68	0.61		0.18	0.18			0.10	
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	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	538	912	775	461	1133		151	543			334	
v/s Ratio Prot	0.00	c0.33		c0.08	0.16		c0.00	0.01			c0.03	
v/s Ratio Perm	0.01		0.07	0.34			0.03					
v/c Ratio	0.01	0.67	0.14	0.60	0.27		0.16	0.05			0.30	
Uniform Delay, d1	11.2	17.1	12.4	9.9	8.1		30.3	30.0			37.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	2.0	0.1	2.2	0.1		0.5	0.0			0.5	
Delay (s)	11.2	19.1	12.5	12.1	8.2		30.8	30.0			37.8	
Level of Service	B	B	B	B	A		C	C			D	
Approach Delay (s)		17.3			10.1			30.1			37.8	
Approach LOS		B			B			C			D	
Intersection Summary												
HCM 2000 Control Delay			17.4			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			88.4			Sum of lost time (s)			24.0			
Intersection Capacity Utilization			67.9%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Future No-Build AM - Improved

6: Northwinds Pkwy Extension/2nd St & SR 120 (Old Milton Pkwy)

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  					 		
Traffic Volume (vph)	140	1468	41	449	2061	321	38	32	67	100	5	37
Future Volume (vph)	140	1468	41	449	2061	321	38	32	67	100	5	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.5	6.5	7.0	6.5	6.5	6.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.97	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)	1770	5085	1583	1770	5085	1583	1770	1863	1583	3433	1863	1583
Flt Permitted	0.07	1.00	1.00	0.06	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	127	5085	1583	109	5085	1583	1386	1863	1583	3433	1863	1583
Peak-hour factor, PHF	0.80	0.89	0.75	0.64	0.93	0.64	0.56	0.50	0.42	0.92	0.25	0.48
Adj. Flow (vph)	175	1649	55	702	2216	502	68	64	160	109	20	77
RTOR Reduction (vph)	0	0	30	0	0	65	0	0	149	0	0	71
Lane Group Flow (vph)	175	1649	25	702	2216	437	68	64	11	109	20	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8			4
Actuated Green, G (s)	82.3	71.3	71.3	122.3	104.3	104.3	16.2	11.2	11.2	6.0	13.2	13.2
Effective Green, g (s)	82.3	71.3	71.3	122.3	104.3	104.3	16.2	11.2	11.2	6.0	13.2	13.2
Actuated g/C Ratio	0.51	0.45	0.45	0.76	0.65	0.65	0.10	0.07	0.07	0.04	0.08	0.08
Clearance Time (s)	7.0	6.5	6.5	7.0	6.5	6.5	6.0	7.0	7.0	7.0	7.0	7.0
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)	178	2266	705	540	3314	1031	152	130	110	128	153	130
v/s Ratio Prot	0.07	0.32		c0.36	0.44		0.01	c0.03		c0.03	0.01	
v/s Ratio Perm	0.44		0.02	c0.64		0.28	0.03		0.01			0.00
v/c Ratio	0.98	0.73	0.03	1.30	0.67	0.42	0.45	0.49	0.10	0.85	0.13	0.05
Uniform Delay, d1	42.5	36.4	25.0	50.5	17.2	13.4	67.2	71.7	69.7	76.6	68.1	67.6
Progression Factor	1.00	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	62.1	2.1	0.1	148.2	1.1	1.3	2.1	2.9	0.4	38.8	0.4	0.2
Delay (s)	104.7	38.5	25.1	198.7	18.3	14.7	69.3	74.6	70.1	115.3	68.5	67.8
Level of Service	F	D	C	F	B	B	E	E	E	F	E	E
Approach Delay (s)		44.2			54.8			70.9			93.0	
Approach LOS		D			D			E			F	
Intersection Summary												
HCM 2000 Control Delay	53.5			HCM 2000 Level of Service			D					
HCM 2000 Volume to Capacity ratio	1.24											
Actuated Cycle Length (s)	160.0			Sum of lost time (s)			27.5					
Intersection Capacity Utilization	79.8%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Haynes Bridge Rd & GA 400 NB Ramps

Future No-Build PM - Improved

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	983	0	410	0	0	0	0	1846	934	821	2060	0
Future Volume (vph)	983	0	410	0	0	0	0	1846	934	821	2060	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1		6.1					6.8	6.8	6.0	6.8	
Lane Util. Factor	0.97		0.88					0.91	0.88	0.97	0.91	
Frt	1.00		0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433		2787					5085	2787	3433	5085	
Flt Permitted	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433		2787					5085	2787	3433	5085	
Peak-hour factor, PHF	0.91	0.92	0.91	0.92	0.92	0.92	0.92	0.96	0.96	0.90	0.97	0.92
Adj. Flow (vph)	1080	0	451	0	0	0	0	1923	973	912	2124	0
RTOR Reduction (vph)	0	0	48	0	0	0	0	0	305	0	0	0
Lane Group Flow (vph)	1080	0	403	0	0	0	0	1923	668	912	2124	0
Turn Type	Prot		Perm					NA	Perm	Prot	NA	
Protected Phases	4							6		5	2	
Permitted Phases			4						6			
Actuated Green, G (s)	45.9		45.9					56.2	56.2	39.0	101.2	
Effective Green, g (s)	45.9		45.9					56.2	56.2	39.0	101.2	
Actuated g/C Ratio	0.29		0.29					0.35	0.35	0.24	0.63	
Clearance Time (s)	6.1		6.1					6.8	6.8	6.0	6.8	
Vehicle Extension (s)	3.0		3.0					5.1	5.1	4.1	5.1	
Lane Grp Cap (vph)	984		799					1786	978	836	3216	
v/s Ratio Prot	c0.31							c0.38		c0.27	0.42	
v/s Ratio Perm			0.14						0.24			
v/c Ratio	1.10		0.50					1.08	0.68	1.09	0.66	
Uniform Delay, d1	57.0		47.6					51.9	44.3	60.5	18.6	
Progression Factor	1.00		1.00					1.00	1.00	0.89	1.05	
Incremental Delay, d2	59.2		0.5					45.3	3.9	51.7	0.6	
Delay (s)	116.2		48.1					97.2	48.2	105.7	20.1	
Level of Service	F		D					F	D	F	C	
Approach Delay (s)		96.1			0.0			80.7			45.8	
Approach LOS		F			A			F			D	
Intersection Summary												
HCM 2000 Control Delay			69.7		HCM 2000 Level of Service					E		
HCM 2000 Volume to Capacity ratio			1.09									
Actuated Cycle Length (s)			160.0		Sum of lost time (s)					18.9		
Intersection Capacity Utilization			101.1%		ICU Level of Service					G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Haynes Bridge Rd & GA 400 SB Ramps

Future No-Build PM - Improved

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	235	0	651	1	1	2	643	2156	0	0	2189	1133
Future Volume (vph)	235	0	651	1	1	2	643	2156	0	0	2189	1133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	6.4	6.4	6.4	5.8	6.1			6.1	7.0
Lane Util. Factor	0.95	0.95	0.88	0.91	0.91	1.00	0.97	0.91			0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1681	1681	2787	1610	3390	1583	3433	5085			5085	1583
Flt Permitted	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)	1681	1681	2787	1610	3390	1583	3433	5085			5085	1583
Peak-hour factor, PHF	0.80	0.80	0.80	0.88	0.88	0.88	0.97	0.97	0.97	0.94	0.94	0.94
Adj. Flow (vph)	294	0	814	1	1	2	663	2223	0	0	2329	1205
RTOR Reduction (vph)	0	0	0	0	0	2	0	0	0	0	0	84
Lane Group Flow (vph)	147	147	814	1	1	0	663	2223	0	0	2329	1121
Turn Type	Split	NA	pt+ov	Split	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	3	3	3 1	4	4		1	6		5	2	3
Permitted Phases						4			6			2
Actuated Green, G (s)	20.0	20.0	48.2	1.2	1.2	1.2	28.2	119.3			85.3	105.3
Effective Green, g (s)	20.0	20.0	48.2	1.2	1.2	1.2	28.2	119.3			85.3	105.3
Actuated g/C Ratio	0.12	0.12	0.30	0.01	0.01	0.01	0.18	0.75			0.53	0.66
Clearance Time (s)	7.0	7.0		6.4	6.4	6.4	5.8	6.1			6.1	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	5.0			5.0	3.0
Lane Grp Cap (vph)	210	210	839	12	25	11	605	3791			2710	1041
v/s Ratio Prot	0.09	0.09	0.29	c0.00	0.00		c0.19	0.44			0.46	c0.13
v/s Ratio Perm						0.00						0.57
v/c Ratio	0.70	0.70	0.97	0.08	0.04	0.00	1.10	0.59			0.86	1.08
Uniform Delay, d1	67.1	67.1	55.2	78.9	78.8	78.8	65.9	9.2			32.2	27.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.87	1.39			0.81	0.73
Incremental Delay, d2	9.8	9.8	23.9	3.0	0.7	0.0	46.0	0.1			0.4	36.6
Delay (s)	76.9	76.9	79.1	81.8	79.5	78.9	103.2	12.8			26.5	56.5
Level of Service	E	E	E	F	E	E	F	B			C	E
Approach Delay (s)		78.5			79.8			33.6			36.8	
Approach LOS		E			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			41.7				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			25.4		
Intersection Capacity Utilization			108.7%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Haynes Bridge Rd & Lakeview Pkwy/Northwinds Pkwy

Future No-Build PM - Improved

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	166	1046	591	222	224	345	1707	56	51	1486	55
Future Volume (vph)	113	166	1046	591	222	224	345	1707	56	51	1486	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.4	6.0	6.2	7.4		6.0	6.7		6.4	6.7	6.7
Lane Util. Factor	1.00	1.00	0.88	0.97	1.00		0.97	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.92		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	2787	3433	1723		3433	5061		1770	5085	1583
Flt Permitted	0.20	1.00	1.00	0.95	1.00		0.95	1.00		0.09	1.00	1.00
Satd. Flow (perm)	380	1863	2787	3433	1723		3433	5061		167	5085	1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.80	0.80	0.80	0.90	0.92	0.90	0.88	0.92	0.88
Adj. Flow (vph)	124	182	1149	739	278	280	383	1855	62	58	1615	62
RTOR Reduction (vph)	0	0	112	0	23	0	0	2	0	0	0	43
Lane Group Flow (vph)	124	182	1037	739	535	0	383	1915	0	58	1615	20
Turn Type	pm+pt	NA	pm+ov	Prot	NA		Prot	NA		pm+pt	NA	Perm
Protected Phases	3	8	5	7	4		5	2		1	6	
Permitted Phases	8		8							6		6
Actuated Green, G (s)	26.4	19.6	49.6	33.8	45.6		30.0	73.8		50.6	50.3	50.3
Effective Green, g (s)	26.4	19.6	49.6	33.8	45.6		30.0	73.8		50.6	50.3	50.3
Actuated g/C Ratio	0.16	0.12	0.31	0.21	0.29		0.19	0.46		0.32	0.31	0.31
Clearance Time (s)	7.2	7.4	6.0	6.2	7.4		6.0	6.7		6.4	6.7	6.7
Vehicle Extension (s)	2.0	2.5	2.0	2.0	2.5		2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	121	228	863	725	491		643	2334		113	1598	497
v/s Ratio Prot	0.04	0.10	c0.23	c0.22	c0.31		0.11	0.38		0.02	c0.32	
v/s Ratio Perm	0.12		0.15							0.14		0.01
v/c Ratio	1.02	0.80	1.20	1.02	1.09		0.60	0.82		0.51	1.01	0.04
Uniform Delay, d1	64.9	68.3	55.2	63.1	57.2		59.5	37.4		58.8	54.9	38.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.81	0.44		0.76	0.74	1.00
Incremental Delay, d2	88.6	17.0	101.9	38.4	67.2		0.8	2.8		1.1	21.1	0.1
Delay (s)	153.5	85.2	157.1	101.5	124.4		49.2	19.2		46.0	61.8	38.2
Level of Service	F	F	F	F	F		D	B		D	E	D
Approach Delay (s)		147.8			111.3			24.2			60.4	
Approach LOS		F			F			C			E	
Intersection Summary												
HCM 2000 Control Delay			76.6			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			1.12									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				27.7		
Intersection Capacity Utilization			97.9%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Haynes Bridge Rd & Morrison Pkwy/Westside Pkwy

Future No-Build PM - Improved

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	194	761	460	319	710	69	375	1433	236	53	788	115
Future Volume (vph)	194	761	460	319	710	69	375	1433	236	53	788	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.6
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	1.00	0.91	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)	1770	3539	1583	1770	3539	1583	3433	5085	1583	1770	5085	1583
Flt Permitted	0.27	1.00	1.00	0.09	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	504	3539	1583	165	3539	1583	3433	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.87	0.95	0.86	0.88	0.93	0.88	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	223	801	535	362	763	78	408	1558	257	58	857	125
RTOR Reduction (vph)	0	0	68	0	0	52	0	0	112	0	0	80
Lane Group Flow (vph)	223	801	467	363	763	26	408	1558	145	58	857	45
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	3	8	5	7	4		5	2		1	6	3
Permitted Phases	8		8	4		4			2			6
Actuated Green, G (s)	55.9	38.8	62.3	76.7	53.0	53.0	23.5	56.4	56.4	7.4	40.2	57.3
Effective Green, g (s)	55.9	38.8	62.3	76.7	53.0	53.0	23.5	56.4	56.4	7.4	40.2	57.3
Actuated g/C Ratio	0.35	0.24	0.39	0.48	0.33	0.33	0.15	0.35	0.35	0.05	0.25	0.36
Clearance Time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.6
Vehicle Extension (s)	2.5	2.5	3.0	2.5	2.5	2.5	3.0	5.5	5.5	2.0	5.5	2.5
Lane Grp Cap (vph)	311	858	616	395	1172	524	504	1792	558	81	1277	566
v/s Ratio Prot	0.08	0.23	0.11	c0.18	0.22		c0.12	c0.31		0.03	0.17	0.01
v/s Ratio Perm	0.17		0.18	c0.26		0.02			0.09			0.02
v/c Ratio	0.72	0.93	0.76	0.92	0.65	0.05	0.81	0.87	0.26	0.72	0.67	0.08
Uniform Delay, d1	39.2	59.3	42.3	49.8	45.6	36.4	66.1	48.4	36.9	75.3	53.9	33.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.04	0.44	0.16	1.00	1.00	1.00
Incremental Delay, d2	7.2	16.8	5.3	25.9	1.2	0.0	4.8	3.1	0.6	22.0	2.8	0.0
Delay (s)	46.4	76.1	47.6	75.7	46.8	36.4	73.4	24.5	6.4	97.3	56.8	34.0
Level of Service	D	E	D	E	D	D	E	C	A	F	E	C
Approach Delay (s)		62.1			54.8			31.4			56.3	
Approach LOS		E			D			C			E	
Intersection Summary												
HCM 2000 Control Delay			48.3				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			26.2		
Intersection Capacity Utilization			91.3%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Northwinds Pkwy/Northwinds Extension & Kimball Bridge Rd

Future No-Build PM - Improved

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	211	32	263	500	1	138	20	140	0	4	4
Future Volume (vph)	0	211	32	263	500	1	138	20	140	0	4	4
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	1.00	1.00	0.95			0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.87			0.95	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		1863	1583	1770	1863	1583	1770	3064			3362	
Flt Permitted		1.00	1.00	0.34	1.00	1.00	0.38	1.00			1.00	
Satd. Flow (perm)		1863	1583	642	1863	1583	701	3064			3362	
Peak-hour factor, PHF	0.50	0.78	0.72	0.88	0.86	0.25	0.86	0.92	0.74	0.92	0.25	0.50
Adj. Flow (vph)	0	271	44	299	581	4	160	22	189	0	16	8
RTOR Reduction (vph)	0	0	34	0	0	2	0	128	0	0	7	0
Lane Group Flow (vph)	0	271	10	299	581	2	160	83	0	0	17	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)		16.5	16.5	35.2	35.2	35.2	22.4	22.4			6.2	
Effective Green, g (s)		16.5	16.5	35.2	35.2	35.2	22.4	22.4			6.2	
Actuated g/C Ratio		0.24	0.24	0.51	0.51	0.51	0.32	0.32			0.09	
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	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)		441	375	530	942	800	382	986			299	
v/s Ratio Prot		0.15		0.10	c0.31		c0.06	0.03			0.00	
v/s Ratio Perm			0.01	0.18		0.00	c0.07					
v/c Ratio		0.61	0.03	0.56	0.62	0.00	0.42	0.08			0.06	
Uniform Delay, d1		23.7	20.4	11.1	12.4	8.5	17.9	16.4			29.0	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2		2.5	0.0	1.4	1.2	0.0	0.7	0.0			0.1	
Delay (s)		26.2	20.4	12.5	13.6	8.5	18.6	16.5			29.1	
Level of Service		C	C	B	B	A	B	B			C	
Approach Delay (s)		25.4			13.2			17.4			29.1	
Approach LOS		C			B			B			C	
Intersection Summary												
HCM 2000 Control Delay			16.8									
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			69.6									
Intersection Capacity Utilization			59.8%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Future No-Build PM - Improved

6: Northwinds Pkwy Extension/2nd St & SR 120 (Old Milton Pkwy)

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	2276	26	278	2121	319	109	49	186	401	20	149
Future Volume (vph)	139	2276	26	278	2121	319	109	49	186	401	20	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.5	6.5	7.0	6.5	6.5	6.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.97	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)	1770	5085	1583	1770	5085	1583	1770	1863	1583	3433	1863	1583
Flt Permitted	0.05	1.00	1.00	0.04	1.00	1.00	0.70	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	87	5085	1583	81	5085	1583	1313	1863	1583	3433	1863	1583
Peak-hour factor, PHF	0.79	0.90	0.61	0.76	0.94	0.86	0.69	0.50	0.75	0.88	0.25	0.92
Adj. Flow (vph)	176	2529	43	366	2256	371	158	98	248	456	80	162
RTOR Reduction (vph)	0	0	20	0	0	68	0	0	190	0	0	140
Lane Group Flow (vph)	176	2529	23	366	2256	303	158	98	58	456	80	22
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8			4
Actuated Green, G (s)	94.3	85.3	85.3	109.3	93.3	93.3	23.2	14.2	14.2	16.0	22.2	22.2
Effective Green, g (s)	94.3	85.3	85.3	109.3	93.3	93.3	23.2	14.2	14.2	16.0	22.2	22.2
Actuated g/C Ratio	0.59	0.53	0.53	0.68	0.58	0.58	0.14	0.09	0.09	0.10	0.14	0.14
Clearance Time (s)	7.0	6.5	6.5	7.0	6.5	6.5	6.0	7.0	7.0	7.0	7.0	7.0
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)	145	2710	843	234	2965	923	216	165	140	343	258	219
v/s Ratio Prot	0.07	0.50		c0.17	0.44		0.04	0.05		c0.13	0.04	
v/s Ratio Perm	0.64		0.01	c0.90		0.19	c0.06		0.04			0.01
v/c Ratio	1.21	0.93	0.03	1.56	0.76	0.33	0.73	0.59	0.42	1.33	0.31	0.10
Uniform Delay, d1	46.0	34.7	17.7	58.4	25.0	17.2	64.5	70.1	69.0	72.0	62.0	60.2
Progression Factor	1.00	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	143.5	7.4	0.1	273.6	1.9	0.9	12.0	5.6	2.0	167.0	0.7	0.2
Delay (s)	189.5	42.1	17.8	332.1	26.9	18.1	76.5	75.8	71.0	239.0	62.7	60.4
Level of Service	F	D	B	F	C	B	E	E	E	F	E	E
Approach Delay (s)		51.2			63.1			73.6			177.4	
Approach LOS		D			E			E			F	
Intersection Summary												
HCM 2000 Control Delay			70.7		HCM 2000 Level of Service					E		
HCM 2000 Volume to Capacity ratio			1.47									
Actuated Cycle Length (s)			160.0		Sum of lost time (s)					27.5		
Intersection Capacity Utilization			94.6%		ICU Level of Service					F		
Analysis Period (min)			15									
c Critical Lane Group												

Appendix H:
Future “Build” Intersection Analysis

HCM Signalized Intersection Capacity Analysis

1: Haynes Bridge Rd & GA 400 NB Ramps

Future Build AM

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 		 					  			  	
Traffic Volume (vph)	1419	0	457	0	0	0	0	1531	619	259	1462	0
Future Volume (vph)	1419	0	457	0	0	0	0	1531	619	259	1462	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1		6.1					6.8	6.8	6.0	6.8	
Lane Util. Factor	0.97		0.88					0.91	1.00	1.00	0.91	
Frt	1.00		0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433		2787					5085	1583	1770	5085	
Flt Permitted	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433		2787					5085	1583	1770	5085	
Peak-hour factor, PHF	0.92	0.92	0.93	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.92
Adj. Flow (vph)	1542	0	491	0	0	0	0	1664	652	282	1589	0
RTOR Reduction (vph)	0	0	44	0	0	0	0	0	228	0	0	0
Lane Group Flow (vph)	1542	0	447	0	0	0	0	1664	424	282	1589	0
Turn Type	Prot		Perm					NA	Perm	Prot	NA	
Protected Phases	4							6		5	2	
Permitted Phases			4						6			
Actuated Green, G (s)	55.9		55.9					55.1	55.1	30.1	91.2	
Effective Green, g (s)	55.9		55.9					55.1	55.1	30.1	91.2	
Actuated g/C Ratio	0.35		0.35					0.34	0.34	0.19	0.57	
Clearance Time (s)	6.1		6.1					6.8	6.8	6.0	6.8	
Vehicle Extension (s)	3.0		3.0					5.1	5.1	4.1	5.1	
Lane Grp Cap (vph)	1199		973					1751	545	332	2898	
v/s Ratio Prot	c0.45							c0.33		c0.16	0.31	
v/s Ratio Perm			0.16						0.27			
v/c Ratio	1.29		0.46					0.95	0.78	0.85	0.55	
Uniform Delay, d1	52.0		40.3					51.1	47.0	62.8	21.5	
Progression Factor	1.00		1.00					1.00	1.00	1.10	1.48	
Incremental Delay, d2	135.2		0.3					12.6	10.5	16.2	0.6	
Delay (s)	187.2		40.7					63.7	57.5	85.0	32.5	
Level of Service	F		D					E	E	F	C	
Approach Delay (s)		151.8			0.0			62.0			40.4	
Approach LOS		F			A			E			D	
Intersection Summary												
HCM 2000 Control Delay			84.9					HCM 2000 Level of Service		F		
HCM 2000 Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			160.0					Sum of lost time (s)		18.9		
Intersection Capacity Utilization			98.4%					ICU Level of Service		F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Haynes Bridge Rd & GA 400 SB Ramps

Future Build AM

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	554	136	548	97	45	48	150	2158	515	234	998	527
Future Volume (vph)	554	136	548	97	45	48	150	2158	515	234	998	527
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	6.4	6.4	6.4	5.8	6.1	6.1	5.9	6.1	6.1
Lane Util. Factor	0.95	0.95	0.88	0.91	0.91	1.00	0.97	0.91	1.00	1.00	0.91	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	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1717	2787	1610	3379	1583	3433	5085	1583	1770	5085	1583
Flt Permitted	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1717	2787	1610	3379	1583	3433	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.25	0.25	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	602	148	596	105	180	192	167	2398	572	260	1109	586
RTOR Reduction (vph)	0	0	0	0	0	101	0	0	147	0	0	293
Lane Group Flow (vph)	373	377	596	92	193	91	167	2398	426	260	1109	293
Turn Type	Split	NA	pt+ov	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3	3 1	4	4		1	6		5	2	
Permitted Phases						4			6			2
Actuated Green, G (s)	34.0	34.0	43.2	11.5	11.5	11.5	9.2	80.0	80.0	9.1	80.0	80.0
Effective Green, g (s)	34.0	34.0	43.2	11.5	11.5	11.5	9.2	80.0	80.0	9.1	80.0	80.0
Actuated g/C Ratio	0.21	0.21	0.27	0.07	0.07	0.07	0.06	0.50	0.50	0.06	0.50	0.50
Clearance Time (s)	7.0	7.0		6.4	6.4	6.4	5.8	6.1	6.1	5.9	6.1	6.1
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	357	364	752	115	242	113	197	2542	791	100	2542	791
v/s Ratio Prot	c0.22	0.22	0.21	0.06	0.06		0.05	c0.47		c0.15	0.22	
v/s Ratio Perm						c0.06			0.27			0.19
v/c Ratio	1.04	1.04	0.79	0.80	0.80	0.80	0.85	0.94	0.54	2.60	0.44	0.37
Uniform Delay, d1	63.0	63.0	54.2	73.1	73.1	73.1	74.7	37.9	27.4	75.5	25.6	24.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.06	0.52	0.67	1.32	0.39	2.07
Incremental Delay, d2	59.8	56.7	5.7	31.5	16.5	32.5	3.3	1.0	0.2	743.2	0.4	1.1
Delay (s)	122.8	119.7	60.0	104.6	89.6	105.6	82.4	20.6	18.5	842.8	10.5	51.9
Level of Service	F	F	E	F	F	F	F	C	B	F	B	D
Approach Delay (s)		94.1			98.9			23.5			133.6	
Approach LOS		F			F			C			F	
Intersection Summary												
HCM 2000 Control Delay			73.6				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			25.4		
Intersection Capacity Utilization			98.9%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Haynes Bridge Rd & Lakeview Pkwy/Northwinds Pkwy

Future Build AM

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	162	300	67	204	117	945	1294	513	454	1298	146
Future Volume (vph)	43	162	300	67	204	117	945	1294	513	454	1298	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.4	6.0	6.2	7.4	7.4	6.0	6.7		6.4	6.7	6.7
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	0.97	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	2787	1770	1863	1583	3433	4865		1770	5085	1583
Flt Permitted	0.95	1.00	1.00	0.35	1.00	1.00	0.95	1.00		0.09	1.00	1.00
Satd. Flow (perm)	1770	1863	2787	654	1863	1583	3433	4865		175	5085	1583
Peak-hour factor, PHF	0.75	0.90	0.92	0.56	0.80	0.80	0.92	0.92	0.90	0.90	0.94	0.90
Adj. Flow (vph)	57	180	326	120	255	146	1027	1407	570	504	1381	162
RTOR Reduction (vph)	0	0	44	0	0	126	0	46	0	0	0	101
Lane Group Flow (vph)	57	180	282	120	255	20	1027	1931	0	504	1381	61
Turn Type	Prot	NA	pm+ov	pm+pt	NA	Perm	Prot	NA		pm+pt	NA	Perm
Protected Phases	3	8	5	7	4		5	2		1	6	
Permitted Phases			8	4		4				6		6
Actuated Green, G (s)	6.2	19.9	64.9	30.3	21.5	21.5	45.0	95.0		69.6	60.0	60.0
Effective Green, g (s)	6.2	19.9	64.9	30.3	21.5	21.5	45.0	95.0		69.6	60.0	60.0
Actuated g/C Ratio	0.04	0.12	0.41	0.19	0.13	0.13	0.28	0.59		0.43	0.38	0.38
Clearance Time (s)	7.2	7.4	6.0	6.2	7.4	7.4	6.0	6.7		6.4	6.7	6.7
Vehicle Extension (s)	2.0	2.5	2.0	2.0	2.5	2.5	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	68	231	1130	185	250	212	965	2888		171	1906	593
v/s Ratio Prot	0.03	0.10	0.07	c0.04	c0.14		c0.30	0.40		c0.18	0.27	
v/s Ratio Perm			0.03	0.09		0.01				c1.10		0.04
v/c Ratio	0.84	0.78	0.25	0.65	1.02	0.09	1.06	0.67		2.95	0.72	0.10
Uniform Delay, d1	76.4	67.9	31.4	57.3	69.2	60.7	57.5	21.9		28.7	42.9	32.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.81	1.73		0.87	0.54	0.14
Incremental Delay, d2	54.5	14.7	0.0	5.8	62.2	0.1	36.5	0.4		884.8	1.3	0.2
Delay (s)	130.9	82.6	31.5	63.1	131.4	60.8	82.9	38.4		909.8	24.6	4.7
Level of Service	F	F	C	E	F	E	F	D		F	C	A
Approach Delay (s)		57.9			95.9			53.6			241.0	
Approach LOS		E			F			D			F	
Intersection Summary												
HCM 2000 Control Delay			120.1				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			2.00									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			27.7		
Intersection Capacity Utilization			98.8%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Haynes Bridge Rd & Morrison Pkwy/Westside Pkwy

Future Build AM
04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	520	359	309	1213	45	568	848	147	59	1210	216
Future Volume (vph)	83	520	359	309	1213	45	568	848	147	59	1210	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	1.00	0.91	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)	1770	3539	1583	1770	3539	1583	3433	5085	1583	1770	5085	1583
Flt Permitted	0.09	1.00	1.00	0.24	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	165	3539	1583	447	3539	1583	3433	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.81	0.90	0.90	0.90	0.93	0.92	0.92	0.92	0.90	0.85	0.94	0.93
Adj. Flow (vph)	102	578	399	343	1304	49	617	922	163	69	1287	232
RTOR Reduction (vph)	0	0	62	0	0	32	0	0	99	0	0	143
Lane Group Flow (vph)	102	578	337	343	1304	17	617	922	64	69	1287	90
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8	5	7	4		5	2		1	6	
Permitted Phases	8		8	4		4			2			6
Actuated Green, G (s)	50.7	45.1	72.0	67.5	55.3	55.3	26.9	62.9	62.9	10.1	46.0	46.0
Effective Green, g (s)	50.7	45.1	72.0	67.5	55.3	55.3	26.9	62.9	62.9	10.1	46.0	46.0
Actuated g/C Ratio	0.32	0.28	0.45	0.42	0.35	0.35	0.17	0.39	0.39	0.06	0.29	0.29
Clearance Time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.5
Vehicle Extension (s)	2.5	2.5	3.0	2.5	2.5	2.5	3.0	5.5	5.5	2.0	5.5	5.5
Lane Grp Cap (vph)	108	997	712	320	1223	547	577	1999	622	111	1461	455
v/s Ratio Prot	0.03	0.16	0.08	c0.11	c0.37		c0.18	0.18		0.04	c0.25	
v/s Ratio Perm	0.26		0.13	c0.34		0.01			0.04			0.06
v/c Ratio	0.94	0.58	0.47	1.07	1.07	0.03	1.07	0.46	0.10	0.62	0.88	0.20
Uniform Delay, d1	50.0	49.3	30.8	40.7	52.4	34.6	66.5	36.0	30.7	73.1	54.4	43.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.14	0.66	0.39	1.00	1.00	1.00
Incremental Delay, d2	68.5	0.7	0.5	70.7	45.4	0.0	53.5	0.6	0.3	7.6	7.9	1.0
Delay (s)	118.5	50.0	31.3	111.4	97.7	34.6	129.4	24.5	12.3	80.6	62.3	44.0
Level of Service	F	D	C	F	F	C	F	C	B	F	E	D
Approach Delay (s)		49.5			98.7			61.4			60.4	
Approach LOS		D			F			E			E	
Intersection Summary												
HCM 2000 Control Delay			69.5			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			26.2			
Intersection Capacity Utilization			99.5%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Northwinds Pkwy/Northwinds Extension & Kimball Bridge Rd

Future Build AM

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	594	273	313	268	0	40	21	128	0	106	1
Future Volume (vph)	4	594	273	313	268	0	40	21	128	0	106	1
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	1.00		1.00	0.95			0.95	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.87			1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863		1770	3082			3522	
Flt Permitted	0.58	1.00	1.00	0.21	1.00		0.40	1.00			1.00	
Satd. Flow (perm)	1077	1863	1583	398	1863		754	3082			3522	
Peak-hour factor, PHF	0.50	0.97	0.90	0.93	0.90	0.92	0.50	0.92	0.90	0.92	0.90	0.25
Adj. Flow (vph)	8	612	303	337	298	0	80	23	142	0	118	4
RTOR Reduction (vph)	0	0	102	0	0	0	0	115	0	0	2	0
Lane Group Flow (vph)	8	612	201	337	298	0	80	50	0	0	120	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	46.6	45.8	45.8	66.0	59.2		18.7	18.7			9.0	
Effective Green, g (s)	46.6	45.8	45.8	66.0	59.2		18.7	18.7			9.0	
Actuated g/C Ratio	0.48	0.47	0.47	0.68	0.61		0.19	0.19			0.09	
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	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	524	882	749	473	1140		184	596			327	
v/s Ratio Prot	0.00	0.33		c0.10	0.16		c0.02	0.02			0.03	
v/s Ratio Perm	0.01		0.13	c0.38			c0.07					
v/c Ratio	0.02	0.69	0.27	0.71	0.26		0.43	0.08			0.37	
Uniform Delay, d1	13.0	20.0	15.3	12.1	8.7		33.1	32.0			41.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	2.4	0.2	5.0	0.1		1.6	0.1			0.7	
Delay (s)	13.0	22.3	15.5	17.2	8.8		34.8	32.0			41.9	
Level of Service	B	C	B	B	A		C	C			D	
Approach Delay (s)		20.0			13.2			32.9			41.9	
Approach LOS		C			B			C			D	
Intersection Summary												
HCM 2000 Control Delay			20.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			96.7			Sum of lost time (s)			24.0			
Intersection Capacity Utilization			72.5%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Northwinds Pkwy Extension/2nd St & SR 120 (Old Milton Pkwy)

Future Build AM

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  					 		
Traffic Volume (vph)	140	1468	41	530	2061	321	38	32	85	100	5	37
Future Volume (vph)	140	1468	41	530	2061	321	38	32	85	100	5	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.5	6.5	7.0	6.5	6.5	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.97	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)	1770	5085	1583	1770	5085	1583	1770	1863	1583	3433	1863	1583
Flt Permitted	0.04	1.00	1.00	0.12	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	84	5085	1583	216	5085	1583	1386	1863	1583	3433	1863	1583
Peak-hour factor, PHF	0.80	0.92	0.75	0.92	0.93	0.90	0.56	0.50	0.42	0.92	0.25	0.48
Adj. Flow (vph)	175	1596	55	576	2216	357	68	64	202	109	20	77
RTOR Reduction (vph)	0	0	20	0	0	63	0	0	111	0	0	63
Lane Group Flow (vph)	175	1596	35	576	2216	294	68	64	91	109	20	14
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2		2	6		6	8		8			4
Actuated Green, G (s)	110.2	102.2	102.2	110.2	102.2	102.2	11.9	11.9	11.9	10.4	29.3	29.3
Effective Green, g (s)	110.2	102.2	102.2	110.2	102.2	102.2	11.9	11.9	11.9	10.4	29.3	29.3
Actuated g/C Ratio	0.69	0.64	0.64	0.69	0.64	0.64	0.07	0.07	0.07	0.07	0.18	0.18
Clearance Time (s)	7.0	6.5	6.5	7.0	6.5	6.5	7.0	7.0	7.0	7.0	7.0	7.0
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)	142	3248	1011	226	3248	1011	103	138	117	223	341	289
v/s Ratio Prot	0.06	0.31		c0.13	0.44			0.03		c0.03	0.01	
v/s Ratio Perm	0.79		0.02	c1.63		0.19	0.05		c0.06			0.01
v/c Ratio	1.23	0.49	0.03	2.55	0.68	0.29	0.66	0.46	0.78	0.49	0.06	0.05
Uniform Delay, d1	44.3	15.2	10.7	18.5	18.5	12.8	72.1	71.0	72.7	72.2	54.0	53.9
Progression Factor	1.00	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	151.1	0.5	0.1	709.8	1.2	0.7	14.7	2.5	27.0	1.7	0.1	0.1
Delay (s)	195.4	15.8	10.7	728.3	19.7	13.5	86.8	73.4	99.7	73.9	54.0	53.9
Level of Service	F	B	B	F	B	B	F	E	F	E	D	D
Approach Delay (s)		32.8			148.6			92.1			64.5	
Approach LOS		C			F			F			E	
Intersection Summary												
HCM 2000 Control Delay			103.7				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			2.22									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			27.5		
Intersection Capacity Utilization			84.3%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Northwinds Pkwy

Future Build AM
04/06/2017

							
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	↑↑	↑	↓	↑↑	↓	↑	
Traffic Volume (veh/h)	765	230	243	299	49	58	
Future Volume (Veh/h)	765	230	243	299	49	58	
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	832	250	264	325	53	63	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)						8	
Median type	None			None			
Median storage veh							
Upstream signal (ft)	1214						
pX, platoon unblocked							
vC, conflicting volume			1082		1522	416	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			1082		1522	416	
tC, single (s)			4.1		6.8	6.9	
tC, 2 stage (s)							
tF (s)			2.2		3.5	3.3	
p0 queue free %			59		17	89	
cM capacity (veh/h)			640		64	585	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	416	416	250	264	162	162	116
Volume Left	0	0	0	264	0	0	53
Volume Right	0	0	250	0	0	0	63
cSH	1700	1700	1700	640	1700	1700	140
Volume to Capacity	0.24	0.24	0.15	0.41	0.10	0.10	0.83
Queue Length 95th (ft)	0	0	0	50	0	0	131
Control Delay (s)	0.0	0.0	0.0	14.5	0.0	0.0	85.1
Lane LOS				B			F
Approach Delay (s)	0.0			6.5			85.1
Approach LOS							F
Intersection Summary							
Average Delay			7.7				
Intersection Capacity Utilization			47.9%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

Future Build PM

1: Haynes Bridge Rd & GA 400 NB Ramps

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 		 					  			  	
Traffic Volume (vph)	1046	0	410	0	0	0	0	1943	934	956	2371	0
Future Volume (vph)	1046	0	410	0	0	0	0	1943	934	956	2371	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1		6.1					6.8	6.8	6.0	6.8	
Lane Util. Factor	0.97		0.88					0.91	1.00	1.00	0.91	
Frt	1.00		0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433		2787					5085	1583	1770	5085	
Flt Permitted	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433		2787					5085	1583	1770	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.92
Adj. Flow (vph)	1137	0	446	0	0	0	0	2112	1015	1039	2444	0
RTOR Reduction (vph)	0	0	52	0	0	0	0	0	289	0	0	0
Lane Group Flow (vph)	1137	0	394	0	0	0	0	2112	726	1039	2444	0
Turn Type	Prot		Perm					NA	Perm	Prot	NA	
Protected Phases	4							6		5	2	
Permitted Phases			4						6			
Actuated Green, G (s)	36.9		36.9					50.2	50.2	54.0	110.2	
Effective Green, g (s)	36.9		36.9					50.2	50.2	54.0	110.2	
Actuated g/C Ratio	0.23		0.23					0.31	0.31	0.34	0.69	
Clearance Time (s)	6.1		6.1					6.8	6.8	6.0	6.8	
Vehicle Extension (s)	3.0		3.0					5.1	5.1	4.1	5.1	
Lane Grp Cap (vph)	791		642					1595	496	597	3502	
v/s Ratio Prot	c0.33							0.42		c0.59	0.48	
v/s Ratio Perm			0.14						c0.46			
v/c Ratio	1.44		0.61					1.32	1.46	1.74	0.70	
Uniform Delay, d1	61.5		55.2					54.9	54.9	53.0	14.9	
Progression Factor	1.00		1.00					1.00	1.00	0.85	0.54	
Incremental Delay, d2	204.1		1.8					150.3	219.6	333.8	0.1	
Delay (s)	265.6		56.9					205.2	274.5	378.6	8.2	
Level of Service	F		E					F	F	F	A	
Approach Delay (s)		206.8			0.0			227.7			118.7	
Approach LOS		F			A			F			F	
Intersection Summary												
HCM 2000 Control Delay			177.3		HCM 2000 Level of Service				F			
HCM 2000 Volume to Capacity ratio			1.56									
Actuated Cycle Length (s)			160.0		Sum of lost time (s)				18.9			
Intersection Capacity Utilization			134.3%		ICU Level of Service				H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Haynes Bridge Rd & GA 400 SB Ramps

Future Build PM

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	235	42	651	465	204	233	643	2139	177	89	2172	1133
Future Volume (vph)	235	42	651	465	204	233	643	2139	177	89	2172	1133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	6.4	6.4	6.4	5.8	6.1	6.1	5.9	6.1	6.1
Lane Util. Factor	0.95	0.95	0.88	0.91	0.91	1.00	0.97	0.91	1.00	1.00	0.91	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	0.97	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1708	2787	1610	3302	1583	3433	5085	1583	1770	5085	1583
Flt Permitted	0.95	0.97	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1708	2787	1610	3302	1583	3433	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.82	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.90	0.92	0.94	0.92
Adj. Flow (vph)	287	46	708	505	222	253	663	2205	197	97	2311	1232
RTOR Reduction (vph)	0	0	0	0	0	138	0	0	55	0	0	126
Lane Group Flow (vph)	166	167	708	252	475	115	663	2205	142	97	2311	1106
Turn Type	Split	NA	pt+ov	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3	3 1	4	4		1	6		5	2	
Permitted Phases						4			6			2
Actuated Green, G (s)	11.0	11.0	46.1	11.6	11.6	11.6	35.1	102.9	102.9	9.1	77.0	77.0
Effective Green, g (s)	11.0	11.0	46.1	11.6	11.6	11.6	35.1	102.9	102.9	9.1	77.0	77.0
Actuated g/C Ratio	0.07	0.07	0.29	0.07	0.07	0.07	0.22	0.64	0.64	0.06	0.48	0.48
Clearance Time (s)	7.0	7.0		6.4	6.4	6.4	5.8	6.1	6.1	5.9	6.1	6.1
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	115	117	803	116	239	114	753	3270	1018	100	2447	761
v/s Ratio Prot	c0.10	0.10	c0.25	c0.16	0.14		0.19	0.43		0.05	0.45	
v/s Ratio Perm						0.07			0.09			c0.70
v/c Ratio	1.44	1.43	0.88	2.17	2.09dl	1.01	0.88	0.67	0.14	0.97	0.94	1.45
Uniform Delay, d1	74.5	74.5	54.3	74.2	74.2	74.2	60.4	18.0	11.2	75.3	39.5	41.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.77	2.02	3.53	1.05	0.92	0.86
Incremental Delay, d2	241.6	234.5	11.2	554.9	459.0	86.2	1.3	0.1	0.0	19.8	1.1	205.0
Delay (s)	316.1	309.0	65.5	629.1	533.2	160.4	48.0	36.5	39.5	98.8	37.3	240.8
Level of Service	F	F	E	F	F	F	D	D	D	F	D	F
Approach Delay (s)		144.5			461.6			39.2			107.8	
Approach LOS		F			F			D			F	
Intersection Summary												
HCM 2000 Control Delay			127.8	HCM 2000 Level of Service					F			
HCM 2000 Volume to Capacity ratio			1.36									
Actuated Cycle Length (s)			160.0	Sum of lost time (s)					25.4			
Intersection Capacity Utilization			116.6%	ICU Level of Service					H			
Analysis Period (min)			15									
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Haynes Bridge Rd & Lakeview Pkwy/Northwinds Pkwy

Future Build PM

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	166	1046	591	222	449	345	1920	56	123	1558	55
Future Volume (vph)	113	166	1046	591	222	449	345	1920	56	123	1558	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.4	6.0	6.2	7.4	7.4	6.0	6.7		6.4	6.7	6.7
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	0.97	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	2787	1770	1863	1583	3433	5037		1770	5085	1583
Flt Permitted	0.95	1.00	1.00	0.35	1.00	1.00	0.95	1.00		0.06	1.00	1.00
Satd. Flow (perm)	1770	1863	2787	651	1863	1583	3433	5037		107	5085	1583
Peak-hour factor, PHF	0.86	0.63	0.92	0.92	0.92	0.92	0.92	0.95	0.41	0.56	0.95	0.92
Adj. Flow (vph)	131	263	1137	642	241	488	375	2021	137	220	1640	60
RTOR Reduction (vph)	0	0	51	0	0	90	0	4	0	0	0	34
Lane Group Flow (vph)	131	263	1086	642	241	398	375	2154	0	220	1640	26
Turn Type	Prot	NA	pm+ov	pm+pt	NA	Perm	Prot	NA		pm+pt	NA	Perm
Protected Phases	3	8	5	7	4		5	2		1	6	
Permitted Phases			8	4		4				6		6
Actuated Green, G (s)	7.8	39.1	50.1	57.9	44.1	44.1	11.0	71.8		78.4	69.8	69.8
Effective Green, g (s)	7.8	39.1	50.1	57.9	44.1	44.1	11.0	71.8		78.4	69.8	69.8
Actuated g/C Ratio	0.05	0.24	0.31	0.36	0.28	0.28	0.07	0.45		0.49	0.44	0.44
Clearance Time (s)	7.2	7.4	6.0	6.2	7.4	7.4	6.0	6.7		6.4	6.7	6.7
Vehicle Extension (s)	2.0	2.5	2.0	2.0	2.5	2.5	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	86	455	872	332	513	436	236	2260		141	2218	690
v/s Ratio Prot	0.07	0.14	0.09	c0.17	0.13		c0.11	0.43		0.08	0.32	
v/s Ratio Perm			0.30	c0.53		0.25				c0.68		0.02
v/c Ratio	1.52	0.58	1.25	1.93	0.47	0.91	1.59	0.95		1.56	0.74	0.04
Uniform Delay, d1	76.1	53.2	55.0	49.6	48.2	56.1	74.5	42.5		45.8	37.5	25.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.93	0.99		1.38	0.85	1.00
Incremental Delay, d2	285.7	1.5	120.2	431.1	0.5	23.3	276.8	7.2		273.8	1.5	0.1
Delay (s)	361.8	54.7	175.1	480.7	48.7	79.4	346.1	49.3		336.7	33.5	25.9
Level of Service	F	D	F	F	D	E	F	D		F	C	C
Approach Delay (s)		170.4			261.9			93.2			68.1	
Approach LOS		F			F			F			E	
Intersection Summary												
HCM 2000 Control Delay			134.2									
HCM 2000 Volume to Capacity ratio			1.77									
Actuated Cycle Length (s)			160.0									
Intersection Capacity Utilization			115.2%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Haynes Bridge Rd & Morrison Pkwy/Westside Pkwy

Future Build PM

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	194	761	502	332	710	69	510	1717	256	53	876	115
Future Volume (vph)	194	761	502	332	710	69	510	1717	256	53	876	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	1.00	0.91	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)	1770	3539	1583	1770	3539	1583	3433	5085	1583	1770	5085	1583
Flt Permitted	0.27	1.00	1.00	0.09	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	496	3539	1583	166	3539	1583	3433	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.87	0.95	0.92	0.92	0.93	0.77	0.92	0.92	0.92	0.81	0.92	0.92
Adj. Flow (vph)	223	801	546	361	763	90	554	1866	278	65	952	125
RTOR Reduction (vph)	0	0	69	0	0	61	0	0	100	0	0	89
Lane Group Flow (vph)	223	801	477	361	763	29	554	1866	178	65	952	36
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8	5	7	4		5	2		1	6	
Permitted Phases	8		8	4		4			2			6
Actuated Green, G (s)	49.8	38.4	62.0	70.4	52.4	52.4	23.6	62.1	62.1	8.0	46.4	46.4
Effective Green, g (s)	49.8	38.4	62.0	70.4	52.4	52.4	23.6	62.1	62.1	8.0	46.4	46.4
Actuated g/C Ratio	0.31	0.24	0.39	0.44	0.33	0.33	0.15	0.39	0.39	0.05	0.29	0.29
Clearance Time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.5
Vehicle Extension (s)	2.5	2.5	3.0	2.5	2.5	2.5	3.0	5.5	5.5	2.0	5.5	5.5
Lane Grp Cap (vph)	245	849	613	329	1159	518	506	1973	614	88	1474	459
v/s Ratio Prot	0.06	0.23	0.11	c0.18	0.22		c0.16	c0.37		0.04	0.19	
v/s Ratio Perm	0.22		0.19	c0.31		0.02			0.11			0.02
v/c Ratio	0.91	0.94	0.78	1.10	0.66	0.06	1.09	0.95	0.29	0.74	0.65	0.08
Uniform Delay, d1	47.9	59.7	43.0	52.1	46.1	36.9	68.2	47.3	33.7	75.0	49.6	41.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.28	0.89	1.23	1.00	1.00	1.00
Incremental Delay, d2	34.4	18.5	6.2	78.3	1.2	0.0	54.1	4.7	0.4	24.0	2.2	0.3
Delay (s)	82.4	78.2	49.2	130.4	47.3	36.9	141.7	46.8	42.0	99.0	51.8	41.6
Level of Service	F	E	D	F	D	D	F	D	D	F	D	D
Approach Delay (s)		68.7			71.3			65.8			53.4	
Approach LOS		E			E			E			D	
Intersection Summary												
HCM 2000 Control Delay			65.3				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			1.09									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			26.2		
Intersection Capacity Utilization			97.5%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Northwinds Pkwy/Bailey Johnson Ave & Kimball Bridge Rd

Future Build PM

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	211	66	280	500	1	266	101	194	0	29	4
Future Volume (vph)	0	211	66	280	500	1	266	101	194	0	29	4
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	1.00	1.00	0.95			0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.89			0.97	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		1863	1583	1770	1863	1583	1770	3165			3433	
Flt Permitted		1.00	1.00	0.33	1.00	1.00	0.38	1.00			1.00	
Satd. Flow (perm)		1863	1583	613	1863	1583	712	3165			3433	
Peak-hour factor, PHF	0.92	0.78	0.72	0.88	0.86	0.25	0.86	0.92	0.74	0.92	0.92	0.50
Adj. Flow (vph)	0	271	92	318	581	4	309	110	262	0	32	8
RTOR Reduction (vph)	0	0	71	0	0	2	0	168	0	0	7	0
Lane Group Flow (vph)	0	271	21	318	581	2	309	204	0	0	33	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)		18.1	18.1	38.3	38.3	38.3	28.2	28.2			6.6	
Effective Green, g (s)		18.1	18.1	38.3	38.3	38.3	28.2	28.2			6.6	
Actuated g/C Ratio		0.23	0.23	0.49	0.49	0.49	0.36	0.36			0.08	
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	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)		429	364	508	908	772	466	1136			288	
v/s Ratio Prot		0.15		0.11	c0.31		c0.13	0.06			0.01	
v/s Ratio Perm			0.01	0.19		0.00	c0.11					
v/c Ratio		0.63	0.06	0.63	0.64	0.00	0.66	0.18			0.11	
Uniform Delay, d1		27.2	23.6	13.6	15.0	10.3	19.8	17.2			33.2	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2		3.0	0.1	2.4	1.5	0.0	3.5	0.1			0.2	
Delay (s)		30.2	23.6	16.0	16.5	10.3	23.4	17.3			33.4	
Level of Service		C	C	B	B	B	C	B			C	
Approach Delay (s)		28.5			16.3			20.1			33.4	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			20.2									
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			78.5									
Intersection Capacity Utilization			66.9%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Northwinds Pkwy Extension/2nd St & SR 120 (Old Milton Pkwy)

Future Build PM

04/06/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  					 		
Traffic Volume (vph)	139	2276	26	303	2121	319	109	49	267	401	20	149
Future Volume (vph)	139	2276	26	303	2121	319	109	49	267	401	20	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.5	6.5	7.0	6.5	6.5	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.97	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)	1770	5085	1583	1770	5085	1583	1770	1863	1583	3433	1863	1583
Flt Permitted	0.05	1.00	1.00	0.05	1.00	1.00	0.70	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	87	5085	1583	87	5085	1583	1313	1863	1583	3433	1863	1583
Peak-hour factor, PHF	0.79	0.92	0.61	0.90	0.94	0.90	0.69	0.50	0.90	0.90	0.25	0.92
Adj. Flow (vph)	176	2474	43	337	2256	354	158	98	297	446	80	162
RTOR Reduction (vph)	0	0	20	0	0	60	0	0	109	0	0	73
Lane Group Flow (vph)	176	2474	23	337	2256	294	158	98	188	446	80	89
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2		2	6		6	8		8			4
Actuated Green, G (s)	93.5	85.5	85.5	93.5	85.5	85.5	13.0	13.0	13.0	26.0	46.0	46.0
Effective Green, g (s)	93.5	85.5	85.5	93.5	85.5	85.5	13.0	13.0	13.0	26.0	46.0	46.0
Actuated g/C Ratio	0.58	0.53	0.53	0.58	0.53	0.53	0.08	0.08	0.08	0.16	0.29	0.29
Clearance Time (s)	7.0	6.5	6.5	7.0	6.5	6.5	7.0	7.0	7.0	7.0	7.0	7.0
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)	134	2717	845	134	2717	845	106	151	128	557	535	455
v/s Ratio Prot	0.07	0.49		c0.12	0.44			0.05		c0.13	0.04	
v/s Ratio Perm	0.70		0.01	c1.33		0.19	c0.12		0.12			0.06
v/c Ratio	1.31	0.91	0.03	2.51	0.83	0.35	1.49	0.65	1.47	0.80	0.15	0.20
Uniform Delay, d1	46.5	33.8	17.6	48.6	31.2	21.3	73.5	71.3	73.5	64.5	42.4	43.0
Progression Factor	1.00	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	184.2	5.9	0.1	703.3	3.1	1.1	263.9	9.2	247.3	8.1	0.1	0.2
Delay (s)	230.6	39.7	17.7	751.9	34.3	22.4	337.4	80.5	320.8	72.6	42.6	43.3
Level of Service	F	D	B	F	C	C	F	F	F	E	D	D
Approach Delay (s)		51.8			114.9			283.0			62.2	
Approach LOS		D			F			F			E	
Intersection Summary												
HCM 2000 Control Delay			98.5			HCM 2000 Level of Service				F		
HCM 2000 Volume to Capacity ratio			2.06									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			27.5			
Intersection Capacity Utilization			96.0%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Northwinds Pkwy

Future Build PM
04/06/2017

							
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	↑↑	↗	↖	↑↑	↖	↗	
Traffic Volume (veh/h)	261	74	78	711	227	265	
Future Volume (Veh/h)	261	74	78	711	227	265	
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	284	80	85	773	247	288	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)						8	
Median type	None		None				
Median storage veh)							
Upstream signal (ft)	1257						
pX, platoon unblocked							
vC, conflicting volume			364	840		142	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			364	840		142	
tC, single (s)			4.1	6.8		6.9	
tC, 2 stage (s)							
tF (s)			2.2	3.5		3.3	
p0 queue free %			93	12		67	
cM capacity (veh/h)			1191	282		880	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	142	142	80	85	386	386	535
Volume Left	0	0	0	85	0	0	247
Volume Right	0	0	80	0	0	0	288
cSH	1700	1700	1700	1191	1700	1700	611
Volume to Capacity	0.08	0.08	0.05	0.07	0.23	0.23	0.88
Queue Length 95th (ft)	0	0	0	6	0	0	255
Control Delay (s)	0.0	0.0	0.0	8.3	0.0	0.0	36.4
Lane LOS				A			E
Approach Delay (s)	0.0			0.8			36.4
Approach LOS				E			
Intersection Summary							
Average Delay			11.5				
Intersection Capacity Utilization			38.9%		ICU Level of Service		A
Analysis Period (min)			15				

Appendix I:
Future “Build” Improved Intersection Analysis

HCM Signalized Intersection Capacity Analysis

Future Build AM - Improved

1: Haynes Bridge Rd & GA 400 NB Ramps

04/07/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 		 					  	 	 	  	
Traffic Volume (vph)	1419	0	457	0	0	0	0	1531	619	259	1462	0
Future Volume (vph)	1419	0	457	0	0	0	0	1531	619	259	1462	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1		6.1					6.8	6.8	6.0	6.8	
Lane Util. Factor	0.97		0.88					0.91	0.88	0.97	0.91	
Frt	1.00		0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433		2787					5085	2787	3433	5085	
Flt Permitted	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433		2787					5085	2787	3433	5085	
Peak-hour factor, PHF	0.95	0.92	0.93	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.92
Adj. Flow (vph)	1494	0	491	0	0	0	0	1664	652	282	1589	0
RTOR Reduction (vph)	0	0	40	0	0	0	0	0	236	0	0	0
Lane Group Flow (vph)	1494	0	451	0	0	0	0	1664	416	282	1589	0
Turn Type	Prot		Perm					NA	Perm	Prot	NA	
Protected Phases	4							6		5	2	
Permitted Phases			4						6			
Actuated Green, G (s)	71.8		71.8					55.3	55.3	14.0	75.3	
Effective Green, g (s)	71.8		71.8					55.3	55.3	14.0	75.3	
Actuated g/C Ratio	0.45		0.45					0.35	0.35	0.09	0.47	
Clearance Time (s)	6.1		6.1					6.8	6.8	6.0	6.8	
Vehicle Extension (s)	3.0		3.0					5.1	5.1	4.1	5.1	
Lane Grp Cap (vph)	1540		1250					1757	963	300	2393	
v/s Ratio Prot	c0.44							c0.33		c0.08	0.31	
v/s Ratio Perm			0.16						0.15			
v/c Ratio	0.97		0.36					0.95	0.43	0.94	0.66	
Uniform Delay, d1	43.1		29.0					50.9	40.3	72.6	32.6	
Progression Factor	1.00		1.00					1.00	1.00	0.96	0.93	
Incremental Delay, d2	16.3		0.2					12.1	1.4	33.5	1.3	
Delay (s)	59.4		29.2					63.1	41.7	103.3	31.7	
Level of Service	E		C					E	D	F	C	
Approach Delay (s)		51.9			0.0			57.1			42.4	
Approach LOS		D			A			E			D	
Intersection Summary												
HCM 2000 Control Delay			51.0		HCM 2000 Level of Service				D			
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			160.0		Sum of lost time (s)				18.9			
Intersection Capacity Utilization			91.5%		ICU Level of Service				F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Haynes Bridge Rd & GA 400 SB Ramps

Future Build AM - Improved

04/07/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	554	136	548	97	45	48	150	2158	515	234	998	527
Future Volume (vph)	554	136	548	97	45	48	150	2158	515	234	998	527
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	6.4	6.4		5.8	6.1	6.1	5.9	6.1	7.0
Lane Util. Factor	*1.00	0.95	0.88	0.97	0.95		0.97	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1717	2787	3433	3263		3433	5085	1583	1770	5085	1583
Flt Permitted	0.95	0.97	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1717	2787	3433	3263		3433	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.91	0.92	0.95	0.92	0.92	0.92	0.92
Adj. Flow (vph)	602	148	596	105	49	53	163	2272	560	254	1085	573
RTOR Reduction (vph)	0	0	0	0	50	0	0	0	116	0	0	208
Lane Group Flow (vph)	373	377	596	105	52	0	163	2272	444	254	1085	365
Turn Type	Split	NA	pt+ov	Split	NA		Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	3	3	3 1	4	4		1	6		5	2	3
Permitted Phases									6			2
Actuated Green, G (s)	32.0	32.0	54.6	10.3	10.3		22.6	75.2	75.2	17.1	69.8	101.8
Effective Green, g (s)	32.0	32.0	54.6	10.3	10.3		22.6	75.2	75.2	17.1	69.8	101.8
Actuated g/C Ratio	0.20	0.20	0.34	0.06	0.06		0.14	0.47	0.47	0.11	0.44	0.64
Clearance Time (s)	7.0	7.0		6.4	6.4		5.8	6.1	6.1	5.9	6.1	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	5.0	5.0	3.0	5.0	3.0
Lane Grp Cap (vph)	354	343	951	220	210		484	2389	744	189	2218	1076
v/s Ratio Prot	0.21	c0.22	0.21	c0.03	0.02		0.05	c0.45		c0.14	0.21	0.07
v/s Ratio Perm									0.28			0.16
v/c Ratio	1.05	1.10	0.63	0.48	0.25		0.34	0.95	0.60	1.34	0.49	0.34
Uniform Delay, d1	64.0	64.0	44.2	72.3	71.2		61.9	40.6	31.2	71.5	32.3	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.72	0.56	0.49	0.64	0.84	1.58
Incremental Delay, d2	62.6	77.9	1.3	1.6	0.6		0.1	3.9	1.1	179.8	0.6	0.1
Delay (s)	126.6	141.9	45.5	73.9	71.8		44.9	26.7	16.4	225.5	27.6	21.5
Level of Service	F	F	D	E	E		D	C	B	F	C	C
Approach Delay (s)		95.0			72.9			25.7			52.1	
Approach LOS		F			E			C			D	
Intersection Summary												
HCM 2000 Control Delay			49.5			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			25.4			
Intersection Capacity Utilization			98.9%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Haynes Bridge Rd & Lakeview Pkwy/Northwinds Pkwy

Future Build AM - Improved

04/07/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	162	300	67	204	117	945	1294	513	454	1298	146
Future Volume (vph)	43	162	300	67	204	117	945	1294	513	454	1298	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.4	6.0	6.2	7.4	7.4	6.0	6.7		6.4	6.7	6.7
Lane Util. Factor	1.00	1.00	0.88	0.97	0.95	0.95	0.97	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.99	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	2787	3433	1755	1504	3433	4864		1770	5085	1583
Flt Permitted	0.55	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.17	1.00	1.00
Satd. Flow (perm)	1028	1863	2787	3433	1755	1504	3433	4864		320	5085	1583
Peak-hour factor, PHF	0.75	0.90	0.92	0.56	0.80	0.80	0.94	0.95	0.92	0.90	0.95	0.90
Adj. Flow (vph)	57	180	326	120	255	146	1005	1362	558	504	1366	162
RTOR Reduction (vph)	0	0	64	0	2	106	0	41	0	0	0	107
Lane Group Flow (vph)	57	180	262	120	268	25	1005	1879	0	504	1366	55
Turn Type	pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA		pm+pt	NA	Perm
Protected Phases	3	8	5	7	4		5	2		1	6	
Permitted Phases	8		8			4				6		6
Actuated Green, G (s)	25.9	25.7	69.7	9.4	30.5	30.5	44.0	66.6		54.9	54.6	54.6
Effective Green, g (s)	25.9	25.7	69.7	9.4	30.5	30.5	44.0	66.6		54.9	54.6	54.6
Actuated g/C Ratio	0.16	0.16	0.44	0.06	0.19	0.19	0.28	0.42		0.34	0.34	0.34
Clearance Time (s)	7.2	7.4	6.0	6.2	7.4	7.4	6.0	6.7		6.4	6.7	6.7
Vehicle Extension (s)	2.0	2.5	2.0	2.0	2.5	2.5	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	183	299	1214	201	334	286	944	2024		396	1735	540
v/s Ratio Prot	0.01	c0.10	0.06	0.03	c0.15		c0.29	0.39		c0.25	0.27	
v/s Ratio Perm	0.04		0.03			0.02				c0.19		0.03
v/c Ratio	0.31	0.60	0.22	0.60	0.80	0.09	1.06	0.93		1.27	0.79	0.10
Uniform Delay, d1	60.4	62.4	28.1	73.5	61.9	53.3	58.0	44.4		54.3	47.5	36.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.69	0.63		0.61	0.56	0.08
Incremental Delay, d2	0.4	2.9	0.0	3.2	12.7	0.1	36.6	3.2		133.4	2.1	0.2
Delay (s)	60.8	65.3	28.2	76.6	74.6	53.4	76.8	31.4		166.3	28.6	2.9
Level of Service	E	E	C	E	E	D	E	C		F	C	A
Approach Delay (s)		43.3			69.7			47.0			60.7	
Approach LOS		D			E			D			E	
Intersection Summary												
HCM 2000 Control Delay			53.2				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			27.7		
Intersection Capacity Utilization			101.1%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Haynes Bridge Rd & Morrison Pkwy/Westside Pkwy

Future Build AM - Improved

04/07/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	520	359	309	1213	45	568	848	147	59	1210	216
Future Volume (vph)	83	520	359	309	1213	45	568	848	147	59	1210	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.6
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	1.00	0.91	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)	1770	3539	1583	1770	3539	1583	3433	5085	1583	1770	5085	1583
Flt Permitted	0.09	1.00	1.00	0.24	1.00	1.00	0.95	1.00	1.00	0.31	1.00	1.00
Satd. Flow (perm)	168	3539	1583	454	3539	1583	3433	5085	1583	571	5085	1583
Peak-hour factor, PHF	0.90	0.92	0.92	0.92	0.97	0.92	0.92	0.95	0.95	0.90	0.97	0.93
Adj. Flow (vph)	92	565	390	336	1251	49	617	893	155	66	1247	232
RTOR Reduction (vph)	0	0	62	0	0	31	0	0	96	0	0	108
Lane Group Flow (vph)	92	565	328	336	1251	18	617	893	59	66	1247	124
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	3	8	5	7	4		5	2		1	6	3
Permitted Phases	8		8	4		4			2	6		6
Actuated Green, G (s)	51.7	44.3	71.9	71.3	57.3	57.3	27.6	61.4	61.4	49.3	41.5	48.9
Effective Green, g (s)	51.7	44.3	71.9	71.3	57.3	57.3	27.6	61.4	61.4	49.3	41.5	48.9
Actuated g/C Ratio	0.32	0.28	0.45	0.45	0.36	0.36	0.17	0.38	0.38	0.31	0.26	0.31
Clearance Time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.6
Vehicle Extension (s)	2.5	2.5	3.0	2.5	2.5	2.5	3.0	5.5	5.5	2.0	5.5	2.5
Lane Grp Cap (vph)	128	979	711	371	1267	566	592	1951	607	234	1318	483
v/s Ratio Prot	0.03	0.16	0.08	c0.12	c0.35		c0.18	0.18		0.01	c0.25	0.01
v/s Ratio Perm	0.20		0.13	0.29		0.01			0.04	0.07		0.07
v/c Ratio	0.72	0.58	0.46	0.91	0.99	0.03	1.04	0.46	0.10	0.28	0.95	0.26
Uniform Delay, d1	43.9	49.8	30.6	33.2	51.0	33.3	66.2	36.9	31.6	39.8	58.2	41.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.39	0.36	1.00	1.00	1.00
Incremental Delay, d2	16.4	0.7	0.5	24.7	22.0	0.0	40.4	0.5	0.2	0.2	14.9	0.2
Delay (s)	60.3	50.5	31.1	58.0	73.0	33.3	100.4	14.7	11.6	40.0	73.0	42.1
Level of Service	E	D	C	E	E	C	F	B	B	D	E	D
Approach Delay (s)		44.1			68.7			46.2			67.0	
Approach LOS		D			E			D			E	
Intersection Summary												
HCM 2000 Control Delay			57.5			HCM 2000 Level of Service		E				
HCM 2000 Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)		26.2				
Intersection Capacity Utilization			99.5%			ICU Level of Service		F				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Northwinds Pkwy/Northwinds Extension & Kimball Bridge Rd

Future Build AM - Improved

04/07/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	594	273	313	268	0	40	21	128	0	106	1
Future Volume (vph)	4	594	273	313	268	0	40	21	128	0	106	1
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	1.00		1.00	0.95			0.95	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.87			1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863		1770	3082			3522	
Flt Permitted	0.58	1.00	1.00	0.21	1.00		0.40	1.00			1.00	
Satd. Flow (perm)	1077	1863	1583	398	1863		754	3082			3522	
Peak-hour factor, PHF	0.50	0.97	0.90	0.93	0.90	0.92	0.50	0.92	0.90	0.92	0.90	0.25
Adj. Flow (vph)	8	612	303	337	298	0	80	23	142	0	118	4
RTOR Reduction (vph)	0	0	102	0	0	0	0	115	0	0	2	0
Lane Group Flow (vph)	8	612	201	337	298	0	80	50	0	0	120	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	46.6	45.8	45.8	66.0	59.2		18.7	18.7			9.0	
Effective Green, g (s)	46.6	45.8	45.8	66.0	59.2		18.7	18.7			9.0	
Actuated g/C Ratio	0.48	0.47	0.47	0.68	0.61		0.19	0.19			0.09	
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	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	524	882	749	473	1140		184	596			327	
v/s Ratio Prot	0.00	0.33		c0.10	0.16		c0.02	0.02			0.03	
v/s Ratio Perm	0.01		0.13	c0.38			c0.07					
v/c Ratio	0.02	0.69	0.27	0.71	0.26		0.43	0.08			0.37	
Uniform Delay, d1	13.0	20.0	15.3	12.1	8.7		33.1	32.0			41.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	2.4	0.2	5.0	0.1		1.6	0.1			0.7	
Delay (s)	13.0	22.3	15.5	17.2	8.8		34.8	32.0			41.9	
Level of Service	B	C	B	B	A		C	C			D	
Approach Delay (s)		20.0			13.2			32.9			41.9	
Approach LOS		C			B			C			D	
Intersection Summary												
HCM 2000 Control Delay			20.8			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			96.7			Sum of lost time (s)			24.0			
Intersection Capacity Utilization			72.5%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Northwinds Pkwy Extension/2nd St & SR 120 (Old Milton Pkwy)

Future Build AM - Improved

04/07/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	1468	41	530	2061	321	38	32	85	100	5	37
Future Volume (vph)	140	1468	41	530	2061	321	38	32	85	100	5	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.5	6.5	7.0	6.5	6.5	6.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.97	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)	1770	5085	1583	1770	5085	1583	1770	1863	1583	3433	1863	1583
Flt Permitted	0.07	1.00	1.00	0.07	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	124	5085	1583	128	5085	1583	1386	1863	1583	3433	1863	1583
Peak-hour factor, PHF	0.80	0.92	0.75	0.92	0.93	0.90	0.56	0.50	0.42	0.92	0.25	0.48
Adj. Flow (vph)	175	1596	55	576	2216	357	68	64	202	109	20	77
RTOR Reduction (vph)	0	0	30	0	0	44	0	0	188	0	0	71
Lane Group Flow (vph)	175	1596	25	576	2216	313	68	64	14	109	20	6
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8			4
Actuated Green, G (s)	92.3	78.0	78.0	133.0	111.7	111.7	16.5	11.5	11.5	6.0	13.5	13.5
Effective Green, g (s)	92.3	78.0	78.0	133.0	111.7	111.7	16.5	11.5	11.5	6.0	13.5	13.5
Actuated g/C Ratio	0.54	0.46	0.46	0.78	0.65	0.65	0.10	0.07	0.07	0.04	0.08	0.08
Clearance Time (s)	7.0	6.5	6.5	7.0	6.5	6.5	6.0	7.0	7.0	7.0	7.0	7.0
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)	204	2319	722	560	3321	1034	144	125	106	120	147	124
v/s Ratio Prot	0.07	0.31		c0.29	0.44		0.01	c0.03		c0.03	0.01	
v/s Ratio Perm	0.39		0.02	c0.51		0.20	0.03		0.01			0.00
v/c Ratio	0.86	0.69	0.03	1.03	0.67	0.30	0.47	0.51	0.13	0.91	0.14	0.05
Uniform Delay, d1	43.5	36.9	25.7	52.2	18.2	12.8	72.6	77.0	75.0	82.2	73.3	72.8
Progression Factor	1.00	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	28.1	1.7	0.1	45.5	1.1	0.8	2.4	3.5	0.5	54.0	0.4	0.2
Delay (s)	71.6	38.6	25.8	97.8	19.3	13.6	75.1	80.5	75.6	136.3	73.7	73.0
Level of Service	E	D	C	F	B	B	E	F	E	F	E	E
Approach Delay (s)		41.3			33.0			76.4			106.5	
Approach LOS		D			C			E			F	
Intersection Summary												
HCM 2000 Control Delay			41.1									D
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			171.0									27.5
Intersection Capacity Utilization			84.3%									E
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Northwinds Pkwy

Future Build AM - Improved
04/07/2017

							
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	↑↑	↑	↵	↑↑	↵	↑	
Traffic Volume (veh/h)	765	230	243	299	49	58	
Future Volume (Veh/h)	765	230	243	299	49	58	
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	832	250	264	325	53	63	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)						8	
Median type	None			None			
Median storage veh							
Upstream signal (ft)	1211						
pX, platoon unblocked							
vC, conflicting volume			1082		1522	416	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			1082		1522	416	
tC, single (s)			4.1		6.8	6.9	
tC, 2 stage (s)							
tF (s)			2.2		3.5	3.3	
p0 queue free %			59		17	89	
cM capacity (veh/h)			640		64	585	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	416	416	250	264	162	162	116
Volume Left	0	0	0	264	0	0	53
Volume Right	0	0	250	0	0	0	63
cSH	1700	1700	1700	640	1700	1700	140
Volume to Capacity	0.24	0.24	0.15	0.41	0.10	0.10	0.83
Queue Length 95th (ft)	0	0	0	50	0	0	131
Control Delay (s)	0.0	0.0	0.0	14.5	0.0	0.0	85.1
Lane LOS				B			F
Approach Delay (s)	0.0			6.5			85.1
Approach LOS							F
Intersection Summary							
Average Delay			7.7				
Intersection Capacity Utilization			47.9%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

Future Build PM - Improved

1: Haynes Bridge Rd & GA 400 NB Ramps

04/07/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 		 					  	 	 	  	
Traffic Volume (vph)	1046	0	410	0	0	0	0	1943	934	956	2371	0
Future Volume (vph)	1046	0	410	0	0	0	0	1943	934	956	2371	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1		6.1					6.8	6.8	6.0	6.8	
Lane Util. Factor	0.97		0.88					0.91	0.88	0.97	0.91	
Frt	1.00		0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433		2787					5085	2787	3433	5085	
Flt Permitted	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433		2787					5085	2787	3433	5085	
Peak-hour factor, PHF	0.97	0.92	0.95	0.92	0.92	0.92	0.92	0.97	0.96	0.96	0.97	0.92
Adj. Flow (vph)	1078	0	432	0	0	0	0	2003	973	996	2444	0
RTOR Reduction (vph)	0	0	52	0	0	0	0	0	292	0	0	0
Lane Group Flow (vph)	1078	0	380	0	0	0	0	2003	681	996	2444	0
Turn Type	Prot		Perm					NA	Perm	Prot	NA	
Protected Phases	4							6		5	2	
Permitted Phases			4						6			
Actuated Green, G (s)	43.9		43.9					57.2	57.2	40.0	103.2	
Effective Green, g (s)	43.9		43.9					57.2	57.2	40.0	103.2	
Actuated g/C Ratio	0.27		0.27					0.36	0.36	0.25	0.65	
Clearance Time (s)	6.1		6.1					6.8	6.8	6.0	6.8	
Vehicle Extension (s)	3.0		3.0					5.1	5.1	4.1	5.1	
Lane Grp Cap (vph)	941		764					1817	996	858	3279	
v/s Ratio Prot	c0.31							c0.39		c0.29	0.48	
v/s Ratio Perm			0.14						0.24			
v/c Ratio	1.15		0.50					1.10	0.68	1.16	0.75	
Uniform Delay, d1	58.0		48.8					51.4	43.7	60.0	19.4	
Progression Factor	1.00		1.00					1.00	1.00	0.98	0.90	
Incremental Delay, d2	78.1		0.5					55.0	3.8	73.7	0.1	
Delay (s)	136.2		49.3					106.4	47.5	132.5	17.6	
Level of Service	F		D					F	D	F	B	
Approach Delay (s)		111.3			0.0			87.1			50.9	
Approach LOS		F			A			F			D	
Intersection Summary												
HCM 2000 Control Delay			76.0									
HCM 2000 Volume to Capacity ratio			1.13									
Actuated Cycle Length (s)			160.0									
Intersection Capacity Utilization			108.7%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Haynes Bridge Rd & GA 400 SB Ramps

Future Build PM - Improved

04/07/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	235	42	651	465	204	233	643	2139	177	89	2172	1133
Future Volume (vph)	235	42	651	465	204	233	643	2139	177	89	2172	1133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	6.4	6.4		5.8	6.1	6.1	5.9	6.1	7.0
Lane Util. Factor	0.95	0.95	0.88	0.97	0.95		0.97	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1710	2787	3433	3259		3433	5085	1583	1770	5085	1583
Flt Permitted	0.95	0.97	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1710	2787	3433	3259		3433	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.94	0.94	0.92	0.94	0.97	0.97	0.92	0.92	0.97	0.97
Adj. Flow (vph)	255	46	693	495	222	248	663	2205	192	97	2239	1168
RTOR Reduction (vph)	0	0	0	0	127	0	0	0	56	0	0	29
Lane Group Flow (vph)	150	151	693	495	343	0	663	2205	136	97	2239	1139
Turn Type	Split	NA	pt+ov	Split	NA		Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	3	3	3 1	4	4		1	6		5	2	3
Permitted Phases									6			2
Actuated Green, G (s)	20.0	20.0	46.2	20.6	20.6		26.2	79.9	79.9	14.1	67.9	87.9
Effective Green, g (s)	20.0	20.0	46.2	20.6	20.6		26.2	79.9	79.9	14.1	67.9	87.9
Actuated g/C Ratio	0.12	0.12	0.29	0.13	0.13		0.16	0.50	0.50	0.09	0.42	0.55
Clearance Time (s)	7.0	7.0		6.4	6.4		5.8	6.1	6.1	5.9	6.1	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	5.0	5.0	3.0	5.0	3.0
Lane Grp Cap (vph)	210	213	804	441	419		562	2539	790	155	2157	938
v/s Ratio Prot	0.09	0.09	0.25	c0.14	0.11		c0.19	0.43		0.05	0.44	c0.15
v/s Ratio Perm									0.09			0.57
v/c Ratio	0.71	0.71	0.86	1.12	0.82		1.18	0.87	0.17	0.63	1.04	1.21
Uniform Delay, d1	67.3	67.2	53.9	69.7	67.9		66.9	35.4	21.9	70.4	46.0	36.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.54	0.23	0.20	0.88	0.92	0.88
Incremental Delay, d2	10.9	10.3	9.4	80.7	11.8		82.7	0.4	0.0	3.0	23.4	100.2
Delay (s)	78.2	77.5	63.3	150.4	79.6		119.1	8.6	4.4	64.7	65.8	131.8
Level of Service	E	E	E	F	E		F	A	A	E	E	F
Approach Delay (s)		67.7			115.9			32.3			87.8	
Approach LOS		E			F			C			F	
Intersection Summary												
HCM 2000 Control Delay			68.7			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.26									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			25.4			
Intersection Capacity Utilization			117.8%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Haynes Bridge Rd & Lakeview Pkwy/Northwinds Pkwy

Future Build PM - Improved

04/07/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	166	1046	591	222	449	345	1920	56	123	1558	55
Future Volume (vph)	113	166	1046	591	222	449	345	1920	56	123	1558	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.2	7.4	6.0	6.2	7.4	7.4	6.0	6.7		6.4	6.7	6.7
Lane Util. Factor	1.00	1.00	0.88	0.97	0.95	0.95	0.97	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.95	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	2787	3433	1673	1504	3433	5060		1770	5085	1583
Flt Permitted	0.53	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.08	1.00	1.00
Satd. Flow (perm)	981	1863	2787	3433	1673	1504	3433	5060		158	5085	1583
Peak-hour factor, PHF	0.90	0.90	0.94	0.92	0.92	0.94	0.92	0.95	0.80	0.90	0.95	0.92
Adj. Flow (vph)	126	184	1113	642	241	478	375	2021	70	137	1640	60
RTOR Reduction (vph)	0	0	118	0	14	128	0	2	0	0	0	39
Lane Group Flow (vph)	126	184	995	642	366	211	375	2089	0	137	1640	21
Turn Type	pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA		pm+pt	NA	Perm
Protected Phases	3	8	5	7	4		5	2		1	6	
Permitted Phases	8		8			4				6		6
Actuated Green, G (s)	27.0	20.2	43.2	34.0	46.4	46.4	23.0	69.5		56.8	56.5	56.5
Effective Green, g (s)	27.0	20.2	43.2	34.0	46.4	46.4	23.0	69.5		56.8	56.5	56.5
Actuated g/C Ratio	0.17	0.13	0.27	0.21	0.29	0.29	0.14	0.43		0.35	0.35	0.35
Clearance Time (s)	7.2	7.4	6.0	6.2	7.4	7.4	6.0	6.7		6.4	6.7	6.7
Vehicle Extension (s)	2.0	2.5	2.0	2.0	2.5	2.5	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	199	235	752	729	485	436	493	2197		152	1795	558
v/s Ratio Prot	0.03	0.10	c0.19	c0.19	0.22		0.11	c0.41		0.05	c0.32	
v/s Ratio Perm	0.08		0.17			0.14				0.26		0.01
v/c Ratio	0.63	0.78	1.32	0.88	0.75	0.48	0.76	0.95		0.90	0.91	0.04
Uniform Delay, d1	59.9	67.8	58.4	61.0	51.6	46.9	65.9	43.6		65.7	49.4	33.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.94		0.87	0.82	1.00
Incremental Delay, d2	4.8	15.0	154.5	11.7	6.3	0.6	3.1	6.1		30.3	5.4	0.1
Delay (s)	64.7	82.8	212.9	72.8	57.9	47.5	49.8	47.2		87.7	46.0	34.0
Level of Service	E	F	F	E	E	D	D	D		F	D	C
Approach Delay (s)		182.9			62.3			47.6			48.7	
Approach LOS		F			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			77.9				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			1.05									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			27.7		
Intersection Capacity Utilization			99.3%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Haynes Bridge Rd & Morrison Pkwy/Westside Pkwy

Future Build PM - Improved

04/07/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	194	761	502	332	710	69	510	1717	256	53	876	115
Future Volume (vph)	194	761	502	332	710	69	510	1717	256	53	876	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.6
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	1.00	0.91	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)	1770	3539	1583	1770	3539	1583	3433	5085	1583	1770	5085	1583
Flt Permitted	0.22	1.00	1.00	0.09	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	404	3539	1583	171	3539	1583	3433	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.87	0.95	0.92	0.92	0.93	0.77	0.92	0.92	0.92	0.81	0.92	0.92
Adj. Flow (vph)	223	801	546	361	763	90	554	1866	278	65	952	125
RTOR Reduction (vph)	0	0	90	0	0	63	0	0	104	0	0	74
Lane Group Flow (vph)	223	801	456	361	763	27	554	1866	174	65	952	51
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	3	8	5	7	4		5	2		1	6	3
Permitted Phases	8		8	4		4			2			6
Actuated Green, G (s)	54.0	37.2	67.3	71.2	47.8	47.8	30.1	62.6	62.6	6.7	39.1	55.9
Effective Green, g (s)	54.0	37.2	67.3	71.2	47.8	47.8	30.1	62.6	62.6	6.7	39.1	55.9
Actuated g/C Ratio	0.34	0.23	0.42	0.45	0.30	0.30	0.19	0.39	0.39	0.04	0.24	0.35
Clearance Time (s)	6.6	6.7	6.4	6.4	6.7	6.7	6.4	6.5	6.5	6.3	6.5	6.6
Vehicle Extension (s)	2.5	2.5	3.0	2.5	2.5	2.5	3.0	5.5	5.5	2.0	5.5	2.5
Lane Grp Cap (vph)	279	822	665	351	1057	472	645	1989	619	74	1242	553
v/s Ratio Prot	0.08	0.23	0.13	c0.18	0.22		0.16	c0.37		0.04	c0.19	0.01
v/s Ratio Perm	0.19		0.16	c0.28		0.02			0.11			0.02
v/c Ratio	0.80	0.97	0.69	1.03	0.72	0.06	0.86	0.94	0.28	0.88	0.77	0.09
Uniform Delay, d1	41.2	60.9	37.7	52.1	50.2	40.0	62.9	46.8	33.3	76.2	56.2	35.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.56	0.42	0.08	1.00	1.00	1.00
Incremental Delay, d2	14.3	25.0	2.9	55.5	2.3	0.0	6.1	5.9	0.6	62.7	4.6	0.1
Delay (s)	55.5	86.0	40.7	107.7	52.5	40.1	41.5	25.4	3.2	139.0	60.8	35.1
Level of Service	E	F	D	F	D	D	D	C	A	F	E	D
Approach Delay (s)		65.9			68.0			26.4			62.4	
Approach LOS		E			E			C			E	
Intersection Summary												
HCM 2000 Control Delay			49.6				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			1.02									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			26.2		
Intersection Capacity Utilization			97.5%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Northwinds Pkwy/Bailey Johnson Ave & Kimball Bridge Rd

Future Build PM - Improved

04/07/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	211	66	280	500	1	266	101	194	0	29	4
Future Volume (vph)	0	211	66	280	500	1	266	101	194	0	29	4
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	1.00	1.00	0.95			0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.89			0.97	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		1863	1583	1770	1863	1583	1770	3165			3433	
Flt Permitted		1.00	1.00	0.33	1.00	1.00	0.38	1.00			1.00	
Satd. Flow (perm)		1863	1583	613	1863	1583	712	3165			3433	
Peak-hour factor, PHF	0.92	0.78	0.72	0.88	0.86	0.25	0.86	0.92	0.74	0.92	0.92	0.50
Adj. Flow (vph)	0	271	92	318	581	4	309	110	262	0	32	8
RTOR Reduction (vph)	0	0	71	0	0	2	0	168	0	0	7	0
Lane Group Flow (vph)	0	271	21	318	581	2	309	204	0	0	33	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)		18.1	18.1	38.3	38.3	38.3	28.2	28.2			6.6	
Effective Green, g (s)		18.1	18.1	38.3	38.3	38.3	28.2	28.2			6.6	
Actuated g/C Ratio		0.23	0.23	0.49	0.49	0.49	0.36	0.36			0.08	
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	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)		429	364	508	908	772	466	1136			288	
v/s Ratio Prot		0.15		0.11	c0.31		c0.13	0.06			0.01	
v/s Ratio Perm			0.01	0.19		0.00	c0.11					
v/c Ratio		0.63	0.06	0.63	0.64	0.00	0.66	0.18			0.11	
Uniform Delay, d1		27.2	23.6	13.6	15.0	10.3	19.8	17.2			33.2	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2		3.0	0.1	2.4	1.5	0.0	3.5	0.1			0.2	
Delay (s)		30.2	23.6	16.0	16.5	10.3	23.4	17.3			33.4	
Level of Service		C	C	B	B	B	C	B			C	
Approach Delay (s)		28.5			16.3			20.1			33.4	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			20.2									
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			78.5									
Intersection Capacity Utilization			66.9%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Northwinds Pkwy Extension/2nd St & SR 120 (Old Milton Pkwy)

Future Build PM - Improved

04/07/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  					 		
Traffic Volume (vph)	139	2276	26	303	2121	319	109	49	267	401	20	149
Future Volume (vph)	139	2276	26	303	2121	319	109	49	267	401	20	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.5	6.5	7.0	6.5	6.5	6.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.97	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)	1770	5085	1583	1770	5085	1583	1770	1863	1583	3433	1863	1583
Flt Permitted	0.05	1.00	1.00	0.04	1.00	1.00	0.70	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	85	5085	1583	79	5085	1583	1313	1863	1583	3433	1863	1583
Peak-hour factor, PHF	0.79	0.92	0.61	0.90	0.94	0.90	0.69	0.50	0.90	0.90	0.25	0.92
Adj. Flow (vph)	176	2474	43	337	2256	354	158	98	297	446	80	162
RTOR Reduction (vph)	0	0	21	0	0	66	0	0	174	0	0	136
Lane Group Flow (vph)	176	2474	22	337	2256	288	158	98	123	446	80	26
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8			4
Actuated Green, G (s)	98.9	87.9	87.9	114.9	96.9	96.9	27.6	18.6	18.6	17.0	27.6	27.6
Effective Green, g (s)	98.9	87.9	87.9	114.9	96.9	96.9	27.6	18.6	18.6	17.0	27.6	27.6
Actuated g/C Ratio	0.58	0.51	0.51	0.67	0.57	0.57	0.16	0.11	0.11	0.10	0.16	0.16
Clearance Time (s)	7.0	6.5	6.5	7.0	6.5	6.5	6.0	7.0	7.0	7.0	7.0	7.0
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)	157	2613	813	250	2881	897	235	202	172	341	300	255
v/s Ratio Prot	0.07	0.49		c0.16	0.44		0.04	0.05		c0.13	0.04	
v/s Ratio Perm	0.58		0.01	c0.75		0.18	0.07		c0.08			0.02
v/c Ratio	1.12	0.95	0.03	1.35	0.78	0.32	0.67	0.49	0.72	1.31	0.27	0.10
Uniform Delay, d1	52.8	39.3	20.5	63.1	28.9	19.6	66.3	71.7	73.7	77.0	62.8	61.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	108.0	8.9	0.1	180.8	2.2	0.9	7.4	1.8	13.3	158.2	0.5	0.2
Delay (s)	160.8	48.3	20.5	243.8	31.1	20.6	73.7	73.5	86.9	235.2	63.3	61.3
Level of Service	F	D	C	F	C	C	E	E	F	F	E	E
Approach Delay (s)		55.2			54.1			80.8			174.3	
Approach LOS		E			D			F			F	
Intersection Summary												
HCM 2000 Control Delay			68.7				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			1.28									
Actuated Cycle Length (s)			171.0				Sum of lost time (s)			27.5		
Intersection Capacity Utilization			96.0%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Northwinds Pkwy

Future Build PM - Improved
04/07/2017

	→	↘	↙	←	↖	↗	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	↑↑	↗	↙	↑↑	↙	↗	
Traffic Volume (veh/h)	261	74	78	711	227	265	
Future Volume (Veh/h)	261	74	78	711	227	265	
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	284	80	85	773	247	288	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)						8	
Median type	None			None			
Median storage veh							
Upstream signal (ft)	1257						
pX, platoon unblocked							
vC, conflicting volume			364		840	142	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			364		840	142	
tC, single (s)			4.1		6.8	6.9	
tC, 2 stage (s)							
tF (s)			2.2		3.5	3.3	
p0 queue free %			93		12	67	
cM capacity (veh/h)			1191		282	880	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	142	142	80	85	386	386	535
Volume Left	0	0	0	85	0	0	247
Volume Right	0	0	80	0	0	0	288
cSH	1700	1700	1700	1191	1700	1700	611
Volume to Capacity	0.08	0.08	0.05	0.07	0.23	0.23	0.88
Queue Length 95th (ft)	0	0	0	6	0	0	255
Control Delay (s)	0.0	0.0	0.0	8.3	0.0	0.0	36.4
Lane LOS				A			E
Approach Delay (s)	0.0			0.8			36.4
Approach LOS							E
Intersection Summary							
Average Delay			11.5				
Intersection Capacity Utilization			38.9%		ICU Level of Service		A
Analysis Period (min)			15				

Appendix J:
Traffic Volume Worksheets

16-149 Northwinds Summit-City of Alpharetta-GA

Traffic Volumes
Future Conditions

A&R Engineering
April 2017

1. Haynes Bridge @ GA 400 NB

A.M. Peak Hour

Condition	Northbound				Southbound				Eastbound				Westbound			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	0	916	607	1523	187	1292	0	1479	938	0	448	1386	0	0	0	0
2018 No-Build (Kimball Bridge Corridor Study):	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1	
Jackson Healthcare Traffic:	0	92	0	92	6	13	0	19	60	0	0	60	0	0	0	0
Added Fuqua Traffic:	0	194	0	194	32	63	0	95	199	0	0	199	0	0	0	0
Base Condition:	0	1220	619	1839	229	1394	0	1623	1216	0	457	1673	0	0	0	0
Total New Trips:	0	311	0	311	30	68	0	98	203	0	0	203	0	0	0	0
Pass-by Trips:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Future Traffic Volumes:	0	1531	619	2150	259	1462	0	1721	1419	0	457	1876	0	0	0	0

P.M. Peak Hour

Condition	Northbound				Southbound				Eastbound				Westbound			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	0	1715	916	2631	688	1776	0	2464	869	0	402	1271	0	0	0	0
2018 No-Build (Kimball Bridge Corridor Study):	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1	
Jackson Healthcare Traffic:	0	16	0	16	34	78	0	112	10	0	0	10	0	0	0	0
Added Fuqua Traffic:	0	81	0	81	85	170	0	255	87	0	0	87	0	0	0	0
Base Condition:	0	1846	934	2780	821	2060	0	2881	983	0	410	1393	0	0	0	0
Total New Trips:	0	97	0	97	135	311	0	446	63	0	0	63	0	0	0	0
Pass-by Trips:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Future Traffic Volumes:	0	1943	934	2877	956	2371	0	3327	1046	0	410	1456	0	0	0	0

16-149 Northwinds Summit-City of Alpharetta-GA
Traffic Volumes
Future Conditions

A&R Engineering
 April 2017

2. Haynes Bridge @ GA 400 SB

A.M. Peak Hour

Condition	Northbound				Southbound				Eastbound				Westbound			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	147	1580	1	1728	4	868	439	1311	408	1	537	946	0	1	1	2
2018 No-Build (Kimball Bridge Corridor Study):	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1	
Jackson Healthcare Traffic:	0	152	0	152	0	18	8	26	40	0	0	40	0	0	0	0
Added Fuqua Traffic:	0	394	0	394	0	95	71	166	98	0	0	98	0	0	0	0
Base Condition:	150	2158	1	2309	4	998	527	1529	554	1	548	1103	0	1	1	2
Total New Trips:	0	0	514	514	230	0	0	230	0	135	0	135	97	44	47	188
Pass-by Trips:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Future Traffic Volumes:	150	2158	515	2823	234	998	527	1759	554	136	548	1238	97	45	48	190

P.M. Peak Hour

Condition	Northbound				Southbound				Eastbound				Westbound			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	630	1923	0	2553	0	1776	889	2665	183	0	638	821	1	1	2	4
2018 No-Build (Kimball Bridge Corridor Study):	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1	
Jackson Healthcare Traffic:	0	26	0	26	0	112	51	163	7	0	0	7	0	0	0	0
Added Fuqua Traffic:	0	168	0	168	0	265	175	440	41	0	0	41	0	0	0	0
Base Condition:	643	2156	0	2799	0	2189	1133	3322	235	0	651	886	1	1	2	4
Total New Trips:	0	0	160	160	72	0	0	72	0	42	0	42	446	203	213	862
Pass-by Trips:	0	-17	17	0	17	-17	0	0	0	0	0	0	18	0	18	36
Future Traffic Volumes:	643	2139	177	2959	89	2172	1133	3394	235	42	651	928	465	204	233	902

16-149 Northwinds Summit-City of Alpharetta-GA

Traffic Volumes
Future Conditions

A&R Engineering
April 2017

3. Haynes Bridge @ Northwinds

A.M. Peak Hour

Condition	Northbound				Southbound				Eastbound				Westbound			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	446	1222	315	1983	86	1047	42	1175	3	133	130	266	40	109	48	197
2018 No-Build (Kimball Bridge Corridor Study):	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1	
Jackson Healthcare Traffic:	0	0	192	192	136	0	0	136	0	0	0	0	26	0	19	45
Added Fuqua Traffic:	490	0	0	490	0	0	103	103	40	26	167	233	0	93	0	93
Base Condition:	945	1247	513	2705	224	1068	146	1438	43	162	300	505	67	204	68	339
Total New Trips:	0	47	0	47	230	230	0	460	0	0	0	0	0	0	49	49
Pass-by Trips:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Future Traffic Volumes:	945	1294	513	2752	454	1298	146	1898	43	162	300	505	67	204	117	388

P.M. Peak Hour

Condition	Northbound				Southbound				Eastbound				Westbound			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	132	1673	23	1828	27	1457	2	1486	24	83	596	703	420	182	107	709
2018 No-Build (Kimball Bridge Corridor Study):	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1	
Jackson Healthcare Traffic:	0	0	33	33	23	0	0	23	0	0	0	0	163	0	115	278
Added Fuqua Traffic:	210	0	0	210	0	0	53	53	89	81	438	608	0	36	0	36
Base Condition:	345	1707	56	2108	51	1486	55	1592	113	166	1046	1325	591	222	224	1037
Total New Trips:	0	213	0	213	72	72	0	144	0	0	0	0	0	0	225	225
Pass-by Trips:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Future Traffic Volumes:	345	1920	56	2321	123	1558	55	1736	113	166	1046	1325	591	222	449	1262

16-149 Northwinds Summit-City of Alpharetta-GA
Traffic Volumes
Future Conditions

A&R Engineering
 April 2017

4. Haynes Bridge @ Westside

A.M. Peak Hour

Condition	Northbound					Southbound					Eastbound					Westbound				
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	522	736	122	1380	58	772	164	994	65	493	180	738	203	1141	44	1388				
2018 No-Build (Kimball Bridge Corridor Study):	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1					
Jackson Healthcare Traffic:	6	12	2	20	0	84	0	84	0	0	40	40	12	0	0	12				
Added Fuqua Traffic:	0	23	17	40	0	54	49	103	17	17	0	34	49	49	0	98				
Base Condition:	538	786	143	1467	59	926	216	1201	83	520	224	827	268	1213	45	1526				
Total New Trips:	30	62	4	96	0	284	0	284	0	0	135	135	41	0	0	41				
Pass-by Trips:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Future Traffic Volumes:	568	848	147	1563	59	1210	216	1485	83	520	359	962	309	1213	45	1567				

P.M. Peak Hour

Condition	Northbound					Southbound					Eastbound					Westbound				
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	334	1290	180	1804	52	732	91	875	149	705	444	1298	289	674	68	1031				
2018 No-Build (Kimball Bridge Corridor Study):	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1					
Jackson Healthcare Traffic:	34	71	10	115	0	14	0	14	0	0	7	7	2	0	0	2				
Added Fuqua Traffic:	0	46	42	88	0	27	22	49	42	42	0	84	22	22	0	44				
Base Condition:	375	1433	236	2044	53	788	115	956	194	761	460	1415	319	710	69	1098				
Total New Trips:	135	284	20	439	0	88	0	88	0	0	42	42	13	0	0	13				
Pass-by Trips:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Future Traffic Volumes:	510	1717	256	2483	53	876	115	1044	194	761	502	1457	332	710	69	1111				

16-149 Northwinds Summit-City of Alpharetta-GA

Traffic Volumes
Future Conditions

A&R Engineering
April 2017

5. Kimball Bridge @ Northwinds

A.M. Peak Hour

Condition	Northbound				Southbound				Eastbound				Westbound			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
2018 Build Volumes (Kimball Bridge Corridor Study)	8	0	113	121	0	1	1	2	4	588	132	724	241	265	0	506
2018 No-Build (Kimball Bridge Corridor Study):	6	33	131	170	144	29	0	173	2	551	107	660	228	233	73	534
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1	
Jackson Healthcare Traffic:	4	3	2	9	0	24	0	24	0	0	32	32	16	0	0	16
Added Fuqua Traffic:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Base Condition:	12	3	116	131	0	25	1	26	4	594	165	763	259	268	0	527
Total New Trips:	28	18	12	58	0	81	0	81	0	0	108	108	54	0	0	54
Pass-by Trips:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Future Traffic Volumes:	40	21	128	189	0	106	1	107	4	594	273	871	313	268	0	581

P.M. Peak Hour

Condition	Northbound				Southbound				Eastbound				Westbound			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
2018 Build Volumes (Kimball Bridge Corridor Study)	110	0	125	235	0	0	4	4	0	209	26	235	257	495	1	753
2018 No-Build (Kimball Bridge Corridor Study):	101	25	152	278	82	23	0	105	3	228	7	238	161	381	249	791
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1	
Jackson Healthcare Traffic:	27	20	14	61	0	4	0	4	0	0	6	6	3	0	0	3
Added Fuqua Traffic:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Base Condition:	138	20	140	298	0	4	4	8	0	211	32	243	263	500	1	764
Total New Trips:	128	81	54	263	0	25	0	25	0	0	34	34	17	0	0	17
Pass-by Trips:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Future Traffic Volumes:	266	101	194	561	0	29	4	33	0	211	66	277	280	500	1	781

16-149 Northwinds Summit-City of Alpharetta-GA

Traffic Volumes
Future Conditions

A&R Engineering
April 2017

6. Old Milton @ Northwinds

A.M. Peak Hour

Condition	Northbound				Southbound				Eastbound				Westbound			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing 2015 (From Northwinds Extension Study)	37	31	63	131	98	5	36	139	137	1439	40	1616	417	2020	315	2752
2018 No-Build (Kimball Bridge Corridor Study):	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1	
Jackson Healthcare Traffic:	0	0	3	3	0	0	0	0	0	0	0	0	24	0	0	24
Added Fuqua Traffic:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Base Condition:	38	32	67	137	100	5	37	142	140	1468	41	1649	449	2061	321	2831
Total New Trips:	0	0	18	18	0	0	0	0	0	0	0	0	81	0	0	81
Pass-by Trips:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Future Traffic Volumes:	38	32	85	155	100	5	37	142	140	1468	41	1649	530	2061	321	2912

P.M. Peak Hour

Condition	Northbound				Southbound				Eastbound				Westbound			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing 2015 (From Northwinds Extension Study)	107	48	163	318	393	20	146	559	136	2231	25	2392	269	2079	313	2661
2018 No-Build (Kimball Bridge Corridor Study):	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1	
Jackson Healthcare Traffic:	0	0	20	20	0	0	0	0	0	0	0	0	4	0	0	4
Added Fuqua Traffic:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Base Condition:	109	49	186	344	401	20	149	570	139	2276	26	2441	278	2121	319	2718
Total New Trips:	0	0	81	81	0	0	0	0	0	0	0	0	25	0	0	25
Pass-by Trips:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Future Traffic Volumes:	109	49	267	425	401	20	149	570	139	2276	26	2441	303	2121	319	2743

16-149 Northwinds Summit-City of Alpharetta-GA

Traffic Volumes
Future Conditions

A&R Engineering
April 2017

7. Northwinds @ Site Drwy 2

A.M. Peak Hour

Condition	Northbound				Southbound				Eastbound				Westbound			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	0	0	0	0	0	0	0	0	0	429	0	429	0	249	0	249
2018 No-Build (Kimball Bridge Corridor Study):	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1	
Jackson Healthcare Traffic:	0	0	0	0	0	0	0	0	0	327	0	327	0	45	0	45
Added Fuqua Traffic:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Base Condition:	0	0	0	0	0	0	0	0	0	765	0	765	0	299	0	299
Total New Trips:	49	0	58	107	0	0	0	0	0	0	230	230	243	0	0	243
Pass-by Trips:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Future Traffic Volumes:	49	0	58	107	0	0	0	0	0	765	230	995	243	299	0	542

P.M. Peak Hour

Condition	Northbound				Southbound				Eastbound				Westbound			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	0	0	0	0	0	0	0	0	0	202	0	202	0	426	0	426
2018 No-Build (Kimball Bridge Corridor Study):	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1	
Jackson Healthcare Traffic:	0	0	0	0	0	0	0	0	0	57	0	57	0	278	0	278
Added Fuqua Traffic:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Base Condition:	0	0	0	0	0	0	0	0	0	263	0	263	0	713	0	713
Total New Trips:	225	0	263	488	0	0	0	0	0	0	72	72	76	0	0	76
Pass-by Trips:	2	0	2	4	0	0	0	0	0	-2	2	0	2	-2	0	0
Future Traffic Volumes:	227	0	265	492	0	0	0	0	0	261	74	335	78	711	0	789