

CANTON WEST

Development of Regional Impact # 1212

**C H E R O K E E C O U N T Y / C A N T O N
G E O R G I A**

T R A F F I C I M P A C T S T U D Y

Prepared for:

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**TRAFFIC IMPACT STUDY
FOR
CANTON WEST
CHEROKEE COUNTY / CANTON
GEORGIA**

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January 3, 2007
A&R Project No: 05-141

EXECUTIVE SUMMARY

The purpose of this study is to determine the traffic impact that will result from the proposed Canton West Mixed-Use Development. The development will be located between SR 108 and SR 5 and to the north of the Etowah River in Cherokee County, Georgia. The proposed Canton West development will consist of various residential, retail, office uses and an elementary school. The traffic analysis evaluated the following scenarios: existing conditions, the year 2020 without additional traffic generated by the site, and the year 2020 with the traffic generated by the development. The methodology used to prepare the traffic study was discussed and agreed upon in the GRTA methodology meeting held on October 3, 2006.

From the existing conditions analysis it was found that three intersections within the study area are currently not operating at the required LOS standard of D. One of these three existing intersections already has a planned or programmed improvement through GDOT and a DRI Notice of Decision (NOD). Analysis of the Base Year 2020 revealed nine of the intersections being analyzed were not up to the LOS standard. Seven of these nine intersections already have planned or programmed improvements through GDOT, the ARC TIP or other DRI Notices of Decision (NOD). Improvements were recommended at the intersections to restore them to the LOS standard.

The Future 2020 traffic including the site-generated traffic was then evaluated using existing lane geometry. Eleven study network intersections will not meet the required LOS standard after the project is completed if no roadway improvements are implemented. Eight of these eleven intersections already have planned or programmed improvements through GDOT, the ARC TIP or other DRI Notices of Decision (NOD). Improvements were again recommended to restore these intersections back to the LOS standard.

All improvements necessary at the study network intersections may require federal and / or state funds to serve the proposed DRI. Additionally, recommendations to allow the site accesses to operate satisfactorily were identified. Details can be found in the site access analysis section of the report.

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1. PROJECT DESCRIPTION

The purpose of this study is to determine the traffic impact that will result from the proposed Canton West development. The development will be located to the north of the Etowah River between SR 108 and SR 5 in Cherokee County, Georgia. After completion of the rezoning and annexation associated with the project, 997.2 acres of the development will be located in the City of Canton and the remaining 1,344.5 acres will be located in Cherokee County. For the purposes of this study, the Canton West development is proposed to consist of 479,600 square feet of retail space, 149,700 square feet of office space, 3,507 residential units and a 1,200 student elementary school. The residential units include 2,050 singly family detached housing units, 624 residential condominiums / townhouses, 313 high-rise residential condominium / townhouse units and 520 senior adult attached units.

A new roadway referred to as the SR 5 - SR 108 Connector is proposed through the site that will connect SR 108 to the west and SR 5 to the east. The development will have access to the public roadway network at either end of the SR 5 – SR 108 Connector, plus an additional site access is proposed on SR 108 further northeast of the connector road. The SR 5 – SR 108 is proposed as a median divided roadway. At the time this study was completed, the exact location and characteristics for all median breaks was not yet determined. As a result, it was agreed upon with GRTA to analyze only the main “town center” median break. In addition, the intersection of the north site driveway (which will connect to SR 108 to the north) and the SR 5 – SR 108 Connector was also included in the analysis. Please refer to the site plan for details. A location map for the site is shown in Figure 1.

1.1 Site Plan

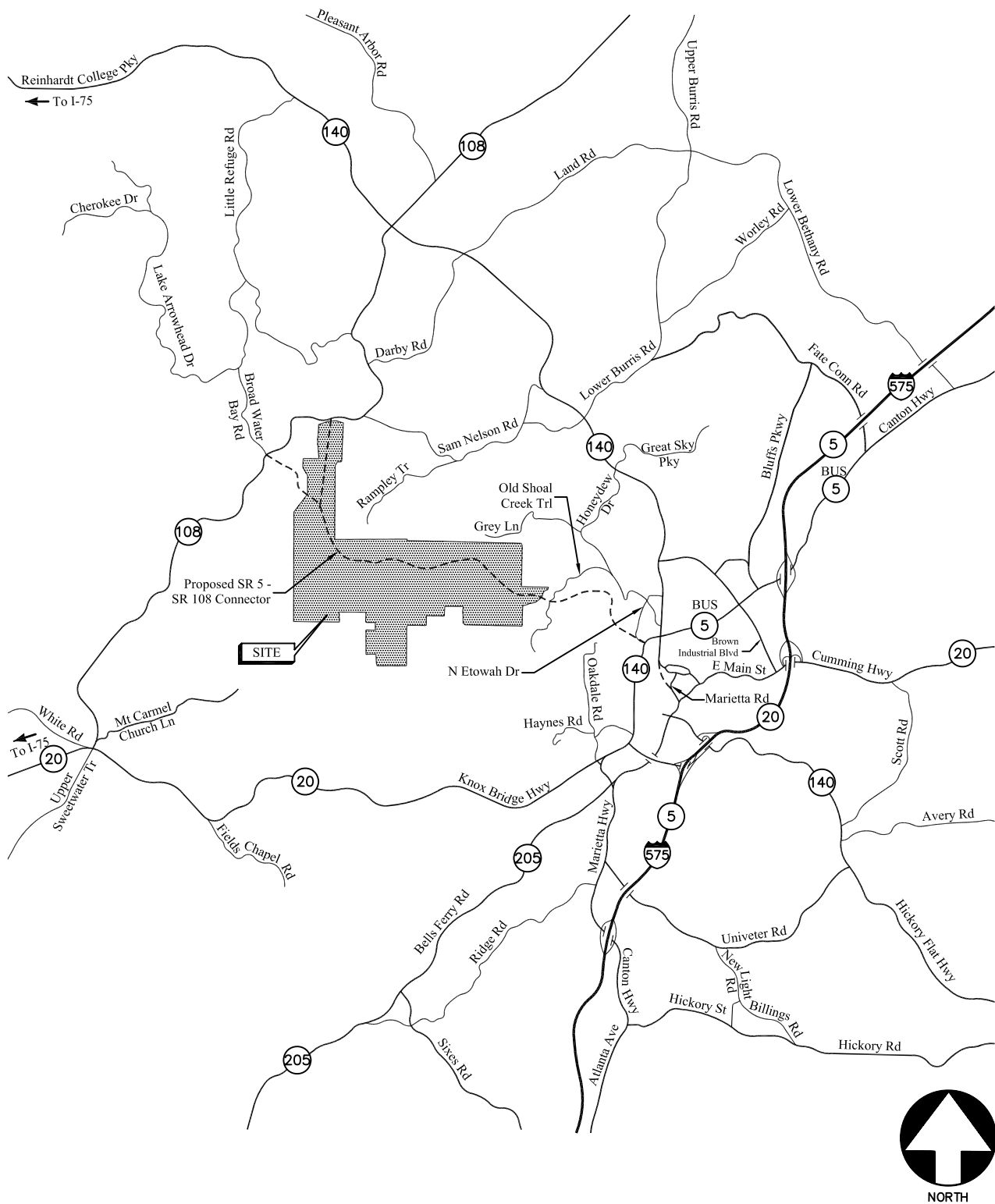
A site plan for this project is shown in Figure 2. A larger size drawing and a digital copy of the site plan are also provided with this report.

1.2 Consistency with Adopted Comprehensive Plan

The proposed zoning and densities for the Canton West development are consistent with the future plans of both the City of Canton and Cherokee County.

1.3 Project Phasing

The project’s impact will be evaluated in one phase, estimated for completion in the year 2020. This study will evaluate the traffic operations in the vicinity of the site for existing conditions (year 2006), the year 2020 without additional traffic generated by the site, and the year 2020 with the additional traffic generated by the development.



LOCATION MAP

FIGURE 1
A&R Engineering Inc.

2. TRIP GENERATION

Trip generation estimates for the project were based on the rates and equations published in the 7th edition of the Institute of Transportation Engineers (ITE) Trip Generation report. The ITE Trip Generation report contains traffic volume count data collected at similar facilities nationwide. Trip generation calculations for the Canton West Development without any reductions are shown in Table 1.

Land Use	Size	A.M. Peak Hour			P.M. Peak Hour			SAT Peak Hour			24-Hour
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	2-way
Singly Family Detached Housing	2,050 Units	361	1,083	1,444	1,024	601	1,625	991	844	1,835	16,740
Condominiums / Townhomes	624 Units	38	185	223	181	89	270	121	103	224	3,043
Residential Condominiums	313 Units	23	97	120	305	188	493	53	70	123	1,404
Senior Adult Housing -Attached	520 Units	19	23	42	35	22	57	70	86	156	1,810
Shopping Center	479,600 s.f.	245	156	401	846	916	1,762	1,247	1,151	2,398	18,815
General Office	149,700 s.f.	228	31	259	42	204	246	28	23	51	1,820
Elementary School*	1,200 students	255	209	464	14	17	31	0	0	0	1,548
Total:		1,169	1,784	2,953	2,447	2,037	4,484	2,510	2,277	4,787	45,180

*PM peak hour of adjacent street traffic was assumed to be 10% of the PM peak hour of the generator

2.1 Net Trip Ends

Due to the nature of the development mixed-use and pass-by reductions have been applied.

Mixed Use Reductions – The retail space proposed within the development will primarily serve the residents of the development; however, to be conservative a 35% mixed-use reduction in the retail trips is proposed. A 25% reduction is proposed in the office trips since a number of residents living in the development will also work within the development. The residential trip reductions have been calculated by summing the retail and office reductions.

Pass-by Reductions – The PM and Saturday peak hour pass-by trip reductions are proposed to be 10% for each time period. The 24-hour pass-by reductions have been calculated by assuming the total PM peak hour trip reduction is 10% of the total daily pass-by reduction. The reduction

calculations for Canton West Development are shown in Table 2.

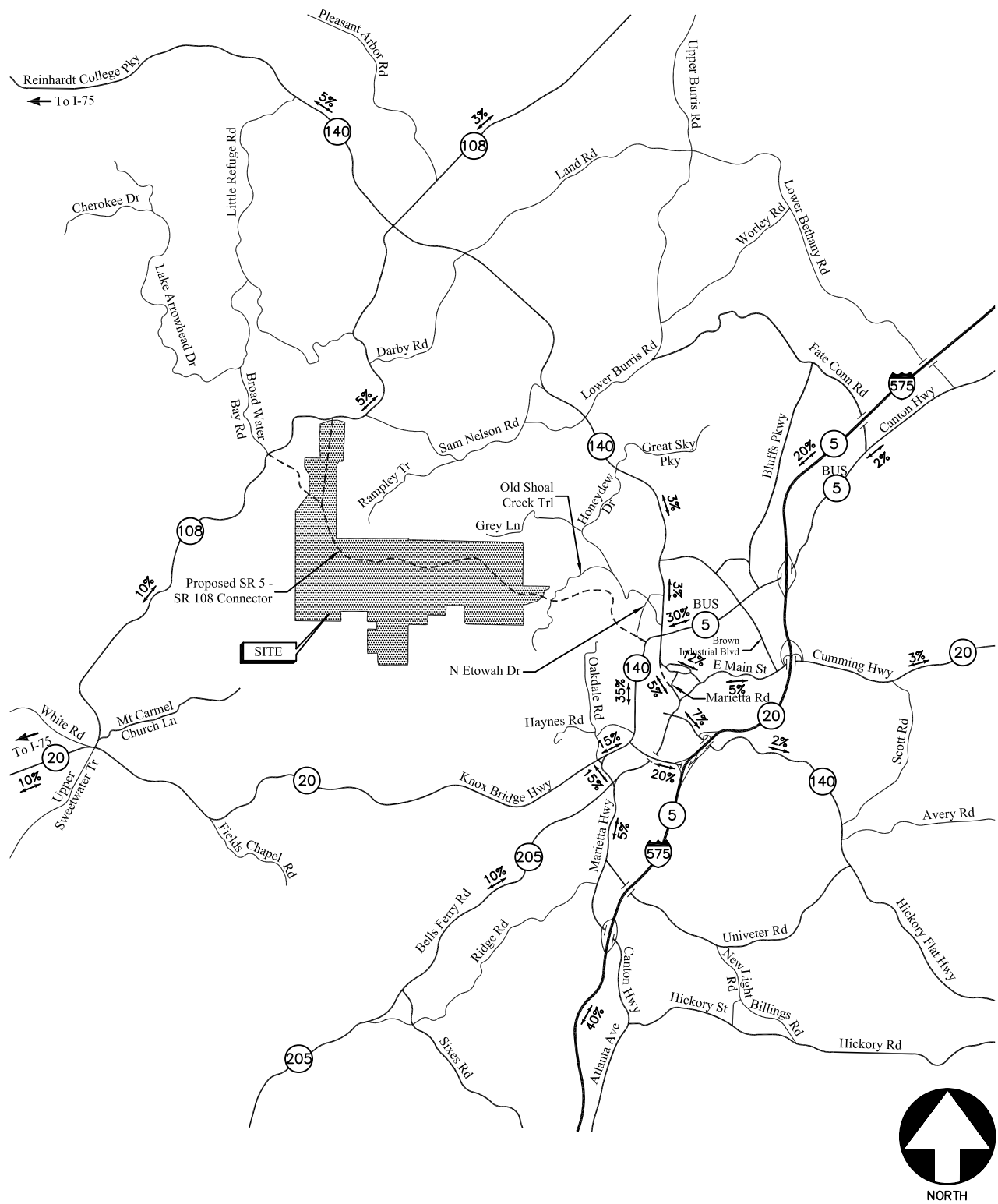
TABLE 2										
TRIP GENERATION WITH REDUCTIONS										
Land Use	A.M. Peak Hour			P.M. Peak Hour			SAT Peak Hour			24-Hour
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	2-way
Shopping Center	245	156	401	846	916	1,762	1,247	1,151	2,398	18,815
- Mixed-Use Reduction	-86	-55	-140	-296	-321	-617	-436	-403	-839	-6,585
- Pass-By Reduction	0	0	0	-55	-60	-115	-81	-75	-156	-1,145
Residential	441	1,388	1,829	1,545	899	2,444	1,235	1,103	2,338	22,997
- Mixed-Use Reduction	-143	-62	-205	-307	-372	-678	-443	-409	-852	-9,863
General Office	228	31	259	42	204	246	28	23	51	1,820
- Mixed-Use Reduction	-57	-8	-65	-11	-51	-62	-7	-6	-13	-455
Elementary School*	255	209	464	14	17	31	0	0	0	1,548
Total without reductions	1,169	1,784	2,953	2,447	2,036	4,483	2,510	2,277	4,787	45,180
Total with reductions	883	1,659	2,543	1,778	1,232	3,011	1,543	1,384	2,927	27,132

*PM peak hour of adjacent street traffic was assumed to be 10% of the PM peak hour of the generator

3. TRIP DISTRIBUTION & ASSIGNMENT

The trip distribution is the percentage of the traffic generated by the site that travels to and from the site on each segment of the surrounding roadway network. Separate trip distributions were developed for the retail site traffic and the residential and office site traffic. The retail trip distribution, shown in Figure 3, was estimated based on the residential concentrations and the location of major roadways and highways that will serve the development. The residential and office distributions, shown in Figure 4, were estimated based on major employment centers and the residential concentrations; however, the office distribution is regionally based, while the retail distribution is locally based. The site-generated volumes were then distributed to the surrounding roadway network based on the driver's destination, and the most accessible route.





4. 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.

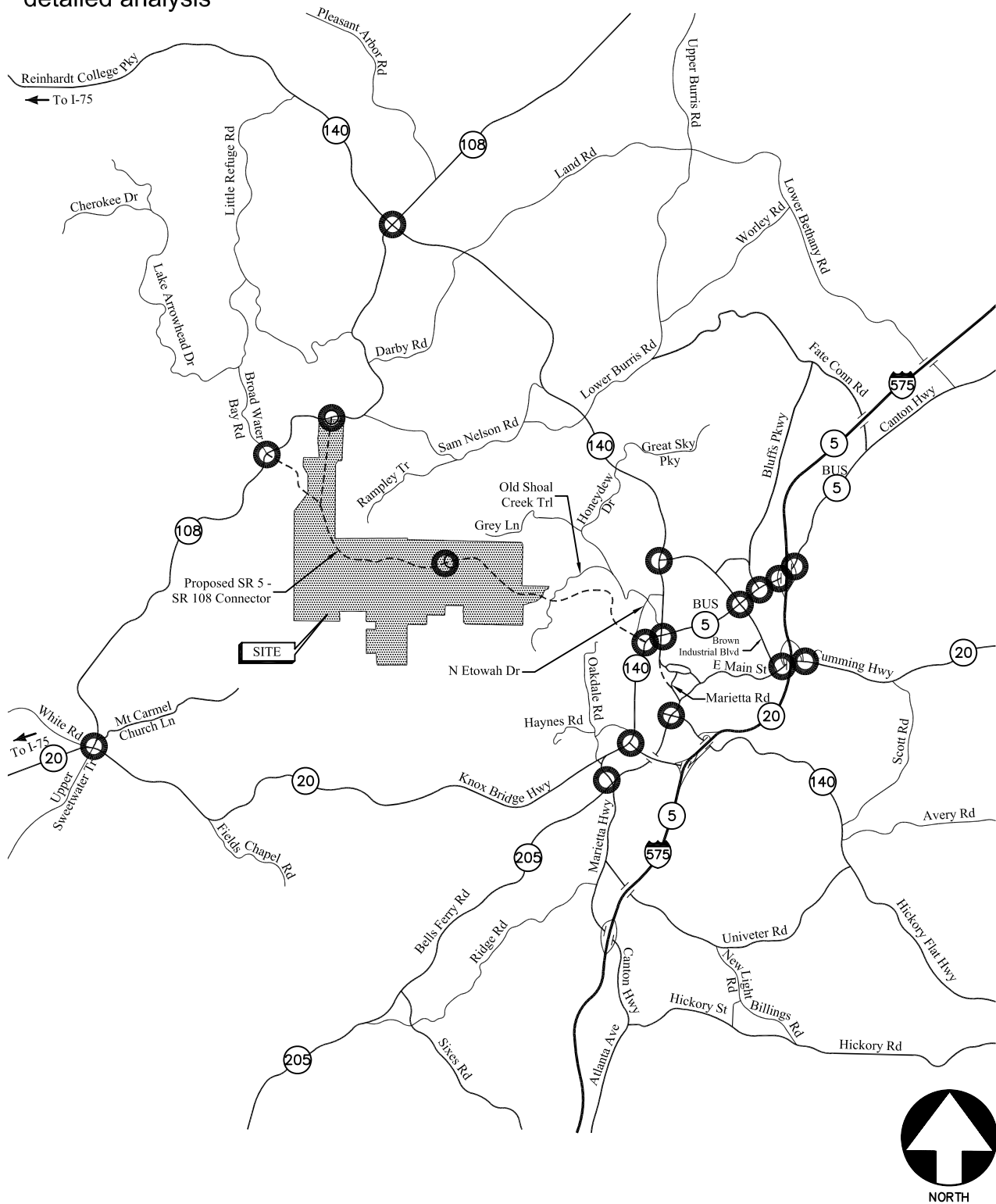
The traffic generated by the proposed project was then assigned to the area roadways using the trip distribution to determine the site-generated traffic on each roadway segment. The boundaries of the study network extend to the most distant intersections where at least 7% of the service volumes on the segment are attributed to project traffic. Subsequent analysis will consider already planned improvements to these intersections. The following intersections fell within the 7% rule and have been included in the traffic study:

1. Cumming Highway (SR 20) at I-575 Northbound Ramp
2. Cumming Highway (SR 20) at I-575 Southbound Ramp
3. Marietta Street at Hickory Flat Highway / Bobo Grinding Company Driveway
4. Marietta Highway (SR 20) at SR 140 (SR 20) / Big K-Mart Driveway
5. Riverstone Parkway at I-575 Northbound Ramp
6. Riverstone Parkway at I-575 Southbound Ramp
7. Riverstone Parkway at Riverstone Boulevard
8. Riverstone Parkway at Reinhardt College Parkway
9. Riverstone Parkway at Waleska Road (SR 140) / Waleska Street
10. Waleska Road (SR 140) at Reinhardt College Parkway
11. Reinhardt College Parkway (SR 140) at College Street (SR 108)
12. Knox Bridge Highway (SR 20) at Fincher Road (SR 108) / Upper Sweetwater Trail
13. Riverstone Parkway (SR 5) at Proposed SR 5 – SR 108 Connector / N Etowah Drive
14. Fincher Road (SR 108) at Proposed SR 5 – SR 108 Connector / Broad Water Bay Road
15. Marietta Highway at Bells Ferry Road

The study intersections are shown in Figure 5. Other intersections within this corridor, such as unsignalized side streets, right-in/right-out driveways or private driveways were viewed as insignificant and have not been included in the study network. In addition to the above intersections, site driveways along SR 5 – SR 108 Connector, Riverstone Parkway and Fincher Road have been included in the analysis during the A.M., P.M. peak hour and SAT peak hour as agreed upon in the methodology meeting held on October 3, 2006.

LEGEND

- - Intersections to be included in the detailed analysis



STUDY INTERSECTION

FIGURE 5

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5. PLANNED & PROGRAMMED IMPROVEMENTS

The following improvements have been identified in the Atlanta Regional Commission's Transportation Improvement Program (TIP) and Regional Transportation Plan (RTP). Georgia DOT has also been researched and . Additional improvements for Cherokee County are planned; however, they are not relevant to this project. Details of the planned programs can be found in the Appendix.

- AR-917: I-575 from I-75 North to SR 5 Business
 - Includes widening of I-575 from four lanes to six lanes.
- AR-H-007: I-575 from SR 20 to SR 5 Business
 - Includes the addition of HOV lanes on I-575.
- CH-010D: Bells Ferry Road from Sixes Road to SR 20 (Knox Bridge Highway)
 - Includes widening of Bells Ferry Road from two lanes to four lanes.
- CH-020A1: SR 20 from I-575 to CR 238 (Old Orange Mill Road)
 - Includes construction of truck climbing lanes on SR 20 and intersection improvements along that corridor.
- CH-020A2: SR 20 from I-75 North in Bartow County to I –575 in Cherokee County
 - Includes widening of SR 20 from two lanes to four lanes.
- CH-020B: SR 20 (Cumming Highway) from I-575 to SR 369 (Hightower Road)
 - Includes widening of SR 20 from two lanes to four lanes.
- CH-140C: SR 140 (Reinhardt College Parkway) from Lower Burris Road to SR 5 (Riverstone Parkway)
 - Includes widening of SR 140 (Reinhardt College Parkway) from two lanes to four lanes.
- CH-140D2: SR 140 (Hickory Flat Road) from I-575 to East Cherokee Drive
 - Includes widening of SR 140 from two lanes to four lanes.
- CH-202: Hickory Flat Road Extension from Marietta Road to Waleska Street
 - Includes construction of two-lane roadway.
- CH-203: SR 20 (Knox Bridge Highway) at Etowah River
 - Includes replacement of the existing bridge on SR 20 over the Etowah River.
- CH-206: Marietta Road at Hickory Flat Road
 - Includes widening of SR 20 (Cumming Highway) from two lanes to four lanes.

- CH-207: SR 5(Marietta Highway/Riverstone Parkway) at SR 140 Connector, Canton Mill Lane and Old Ball Ground Highway
 - Includes signal coordination system and intersection improvements.
- CH-209: SR 20 (Knox Bridge Road) at SR 108(Fincher Road), White Road and Upper Sweetwater Trail
 - Includes roadway operational upgrades.
- CH-214: North Canton Parkway From Lower Burris Road to SR 140
 - Includes construction of four-lane roadway.
- CH-216: East Main Street from Dupree Street to Brown Industrial Avenue
 - Includes improvement of pedestrian facility.
- CH-AR-231: I-575 North at SR 20 (Main Street / Cumming Highway)
 - Includes reconstruction of the interchange with two ramps.
- CH-AR-240: Hickory Flat Road from I-575 to Marietta Road
 - Includes roadway operational upgrades.
- CH-AR-241: Waleska Street from Main Street / North Street to SR 5
 - Includes bicycle and pedestrian improvements.
- CH-AR-242A: Railroad Street from East Marietta Street to Waleska Street/SR 140
 - Includes construction of bicycle lanes and sidewalks.
- CH-AR-261: Canton Intermodal Facility
 - Includes construction of transit facilities.
- CH-AR-BP011: Marietta Road from Marietta Highway to East Marietta Street
 - Includes construction of pedestrian facilities.
- City of Canton Projects
 - Includes upgrading Railroad Street to improve the connection from Marietta Road across from Dr John T Petit Streets and extending Brown Industrial Blvd to Riverstone Parkway
- GDOT Project at I-575 SB Ramps and SR 20
 - Includes adding a new southbound half diamond on ramp from SR 20 onto I-575 Southbound
- GDOT Project ID 0002846
 - Includes the widening of Hickory Flat Road in Canton.

- GDOT Project ID 0002847
 - Includes the widening of Waleska Street from Main / North Street to SR 5BU.
- GDOT Project ID 0003681
 - Includes Widening of SR 20 from I-575 to SR 369.
- GDOT Project ID 0003778
 - Includes provision of pedestrian lighting on CS 684 / East Main Street in Canton.
- GDOT Project ID 0004495
 - Includes providing Bicycle and Pedestrian facility for CS 678 / Marietta Road from Marietta Highway to East Marietta Street.
- GDOT Project ID 0006036
 - Includes provision of Passing Lanes for SR 140 from E Valley Road / Bartow to Garland MTN Trail/Cherokee.
- GDOT Project ID 0006037
 - Includes provision of Passing Lanes on SR 140 from Little Refuge Road to Shoal Creek.
- GDOT Project ID 0006039
 - Includes Widening of Bells Ferry Road from North of Sixes Road to SR 20 / Knox Bridge Highway.
- GDOT Project ID 0006040
 - Includes Widening of SR 140 / Hickory Flat Road from CR 311 / East Cherokee Drive to I-575.
- GDOT Project ID 0006042
 - Includes construction of roadway for Hickory Flat Road Extension from Marietta Street to Waleska Street.
- GDOT Project ID 0006719
 - Includes Intersection improvement for CS 678 (Marietta Road) at CS 681 (Hickory Flat Road).
- GDOT Project ID 006791
 - Includes signal, roadway, pedestrian, transit and landscaping improvements along SR Bus 5 (Riverstone Pkwy) between SR140 / Waleska (North Etowah Drive) and to CS785 / Riverstone Boulevard (Riverstone Blvd) in Canton.

- GDOT Project ID 0007836
 - Includes Widening of SR 20 from I-75 / Bartow to I-575 / Cherokee.
- GDOT Project ID 630942
 - Includes the widening of SR 140 from SR 5BU in Canton to CR 766 / Lower Burris Road.
- GDOT Project ID 632790
 - Includes provision of Passing Lanes, 3 Truck Climbing Lanes and intersection improvements on SR 20 from I-575 to CR 238.
- GDOT Project ID 632900
 - Includes replacement of Bridge at SR 20 at Etowah River.
- GDOT Project ID 641900
 - Includes the widening of SR 140 from CR 766 to CR 52.
- GDOT Project ID 662650
 - Includes intersection improvement of SR 20 at SR 108 and CR 17 / White Road and CR 13 / Mount Carmel Lane.

6. EXISTING CONDITIONS

An inventory was performed of the roadways in the area surrounding the site. The following is a brief description of each of these facilities.

6.1 Description of Transportation Facilities in Study Network

Fincher Road (SR 108)

Fincher Road is a north-south two-lane undivided roadway with a posted speed limit of 45 mph in the vicinity of the proposed development. This road provides some of the access points to the site.

Riverstone Parkway (SR 5 BUS)

Riverstone Parkway is an east-west roadway with a posted speed limit of 45 mph in the vicinity of the proposed development.

Knox Bridge Highway (SR 20)

Knox Bridge Highway is an east-west roadway with a posted speed limit of 55 mph.

I - 575

I-575 is a four-lane (two lanes in each direction) north-south interstate facility to the east of the proposed development.

Cumming Highway

Cumming Highway is an east-west roadway and has a speed limit of 45 mph. Cumming Highway is a four-lane roadway towards the west and a two-lane roadway towards the east from approximately 500 feet to the east of Governors Walk Drive. There is a Georgia DOT project, which will widen Cumming Highway from two-lane roadway to Four-lane roadway.

Marietta Highway

Marietta Highway is a north-south four lane undivided roadway with a two way turn lane in the middle. It extends between Riverstone Parkway in the north and Canton Highway in the south.

Bells Ferry Road (SR 205)

Bells Ferry Road is a two-lane undivided roadway with a posted speed limit of 30 mph.

Reinhardt College Parkway (SR 140)

Reinhardt College Parkway is a north-south roadway with a posted speed limit of 45 mph.

Waleska Street

Waleska Street is a north-south four-lane roadway with a posted speed limit of 35 mph. It extends between Riverstone Parkway in the north and Main Street in the south.

Marietta Road

Marietta Road is a north-south two-lane undivided roadway with a posted limit of 30 mph. Marietta Road extends between Marietta Street in the north and Bells Ferry Road in the south.

Hickory Flat Highway

Hickory Flat Highway is a two-lane roadway with a posted speed limit of 35 mph.

Riverstone Boulevard

Riverstone Boulevard is a six-lane roadway that extends between Riverstone Parkway south and Reinhardt College Parkway in the west.

N Etowah Drive

N Etowah Drive is a two-lane roadway running between Waleska Road in the north and Waleska Street in the south. It is posted with a speed limit of 25 mph.

Broad Water Bay Road

Broad Water Bay Road is a two-lane roadway with a posted speed limit of 25 mph. It extends from Lake Arrowhead Drive in the north to Fincher Road (SR 108) in the south.

Upper Sweetwater Trail

Upper Sweetwater Trail is a two-lane north-south roadway extends from Knox Bridge Highway in the north to Lower Sweetwater Lane / Upper Sweetwater Lane in the south.

Land Road

Land Road is an east-west two-lane roadway that extends from Upper Bethany Road / Hornage Road in east to Reinhardt College Parkway in west.

Lower Burris Road

Lower Burris Road is a two-lane roadway running between Land Road in north and Reinhardt College Parkway in west.

Bluffs Parkway

Bluffs Parkway is a north-south roadway. Bluffs Parkway extends between Fate Connected Road in the north and Riverstone Boulevard in the south.

Brown Industrial Boulevard

Brown Industrial Boulevard is a north-south two-lane roadway. Presently, Brown Industrial Boulevard extends northwards from Cumming Highway in the south. In future Brown Industrial Boulevard will get extended to Riverstone Parkway in the north and line up with Reinhardt College Parkway.

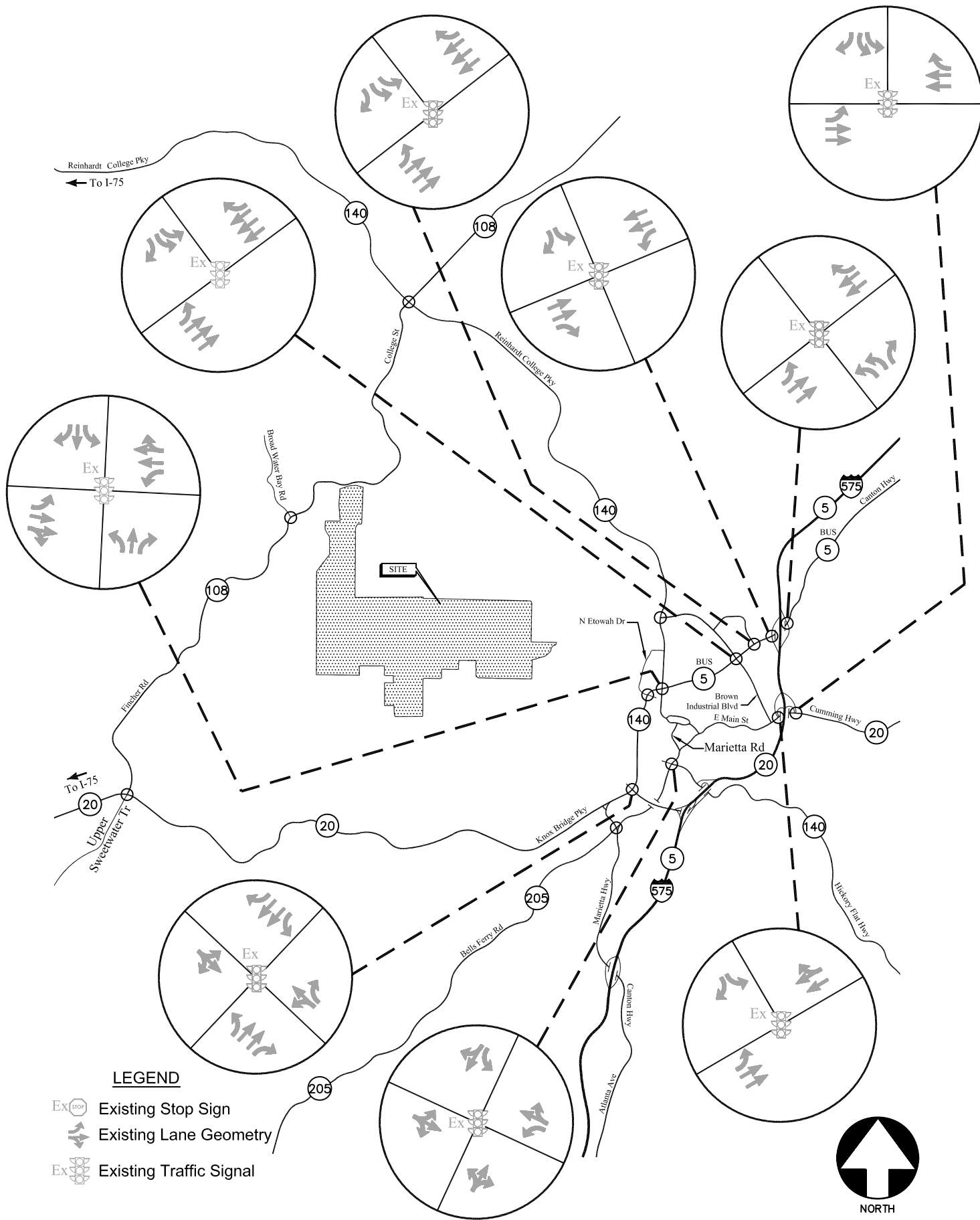
6.2 Analysis Summary

Existing traffic counts were collected at the intersections listed in Section 4 - Study Area Network (Figures 6 and 7). In addition to traffic counts, intersection geometry data was also obtained (Figures 8 and 9). Turning movement counts were collected during the agreed upon hours of 7:00 AM – 9:00 AM and 4:00 PM - 6:00 PM on weekdays and 11:00 AM- 1:00 PM on Saturday. The four consecutive 15-minute interval volumes that summed to produce the highest volume at each intersection during each two-hour period were then determined. These volumes make up the A.M., P.M. and SAT peak hour traffic volumes for the intersections counted. The existing traffic volumes are shown in Figures 6 and 7. Additionally, the existing intersection traffic control and lane geometry for the study area network is shown in Figures 8 and 9.

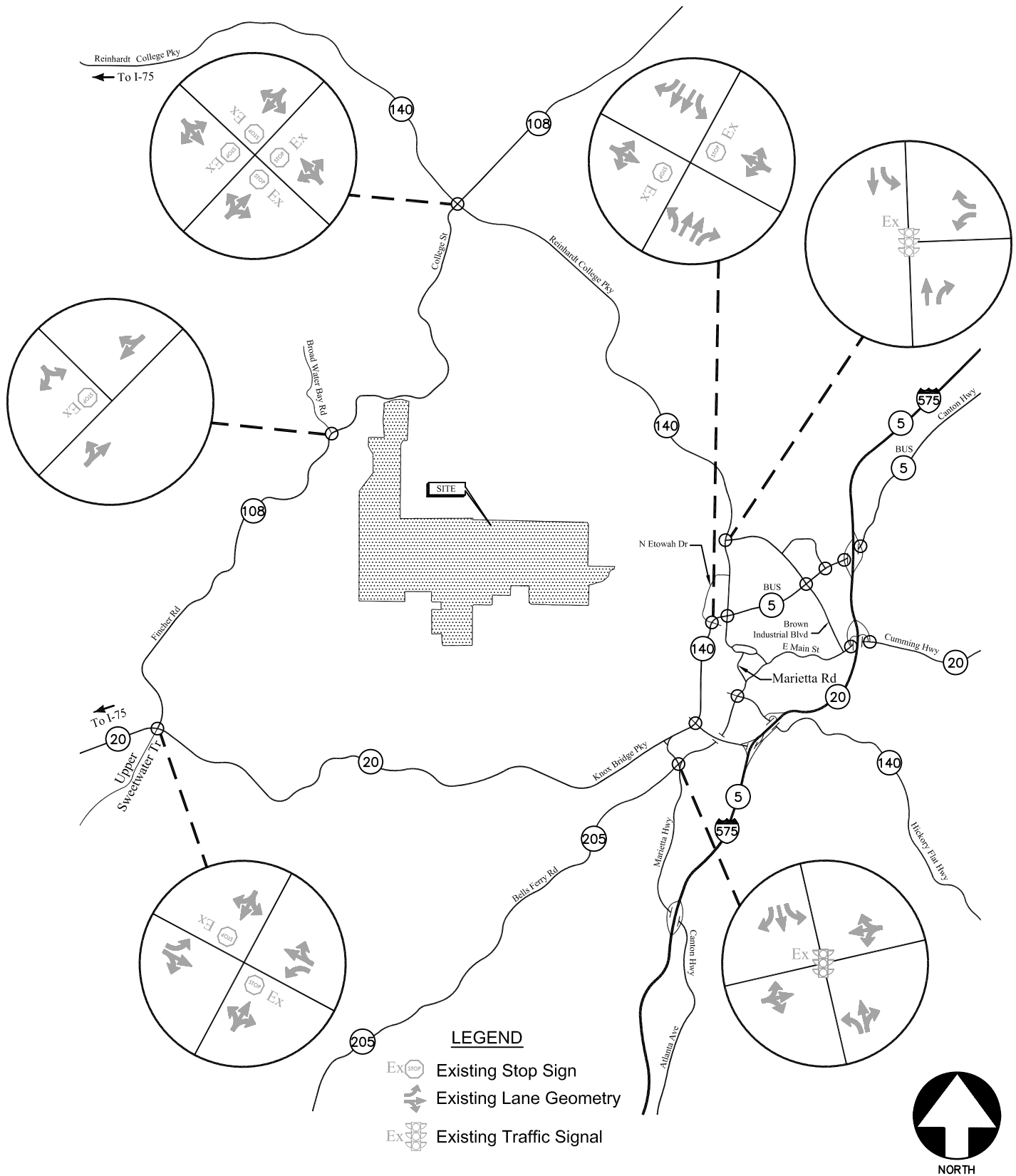
The site-generated volumes shown in Table 2 were distributed to the surrounding roadway network in accordance with the trip distributions. The site-generated volumes for the study intersections are shown in Figures 10 & 11. Existing traffic operations were analyzed at all the existing intersections in accordance with the HCM methodology using Synchro software. The results of the analysis are shown in Table 3.

As shown in Table 3 on page 20, the following intersections do not currently operate at LOS D (the LOS standard) in the existing condition. One of these intersections already has a planned or programmed improvement through GDOT and a DRI Notice of Decision (NOD). If available, the planned or programmed improvements are listed after each intersection:

1. Cumming Highway (SR 20) at I-575 Southbound Ramp
 - GDOT has a planned improvement project to upgrade the I-575 SB on ramp.
 - Improvement to widen SR 20 from 2 to 4 lanes between I-75 and I-575 listed in Attachment A of the NOD for DRI 1186 (Willoughby and Sewell)
2. College Street (SR 108) at Reinhardt College Parkway (SR 140)
3. Riverstone Parkway (SR 5) at N. Etowah Drive



EXISTING TRAFFIC CONTROL AND
LANE GEOMETRY - SHEET 1 OF 2



EXISTING TRAFFIC CONTROL AND
LANE GEOMETRY - SHEET 2 OF 2

TABLE 3								
EXISTING INTERSECTION OPERATIONS								
Intersection	AM/PM/ SAT LOS Standard	Traffic Control	A.M. Peak Hour		P.M. Peak Hour		SAT Peak Hour	
			LOS (Delay)	v/c*	LOS (Delay)	v/c*	LOS (Delay)	v/c*
Cumming Highway (SR 20) at I-575 Northbound Ramp	D/D/D	Signalized	C (22.7)	0.49	C (23.7)	0.65	B (18.9)	0.35
Cumming Highway (SR 20) at I-575 Southbound Ramp	D/E/D	Signalized	A (8.6)	0.47	E (59.5)	1.33	A (9.6)	0.38
Marietta Street at Hickory Flay Highway / Bobo Grinding Company Driveway	D/D/D	Signalized	C (20.8)	0.41	C (23.6)	0.71	B (19.3)	0.39
Marietta Highway (SR 20) at SR 140 (SR 20) / Big K-Mart Driveway	D/D/D	Signalized	D (53.5)	0.95	D (40.8)	0.84	D (35.7)	0.71
Riverstone Parkway at I-575 Northbound Ramp	D/D/D	Signalized	C (24.4)	0.36	C (25.5)	0.72	C (27.7)	0.74
Riverstone Parkway at I-575 Southbound Ramp	D/D/D	Signalized	A (4.4)	0.41	A (4.5)	0.60	A (6.5)	0.61
Riverstone Parkway at Riverstone Boulevard	D/D/D	Signalized	A (9.0)	0.27	B (13.7)	0.39	B (12.9)	0.45
Riverstone Parkway at Reinhardt College Parkway	D/D/D	Signalized	B (10.1)	0.33	B (11.7)	0.43	A (9.9)	0.48
Riverstone Parkway at Waleska Road (SR 140) / Waleska Street	D/D/D	Signalized	C (28.0)	0.73	C (27.4)	0.72	C (22.3)	0.55
Waleska Road (SR 140) at Reinhardt College Parkway	D/D/D	Signalized	B (12.7)	0.53	B (17.9)	0.47	B (17.8)	0.33
College Street (SR 108) at Reinhardt College Parkway (SR 140)								
-Eastbound Approach	E/D/D	All Ways Stop Controlled	E (48.3)	-	B (14.5)	-	B (11.0)	-
-Westbound Approach	D/D/D		C (19.8)	-	D (25.5)	-	B (11.0)	-
-Northbound Approach	D/D/D		C (21.4)	-	B (11.3)	-	A (9.6)	-
-Southbound Approach	D/D/D		D (33.8)	-	B (13.0)	-	A (9.9)	-
Knox Bridge Highway (SR 20) at Fincher Road (SR 108)								
-Eastbound Left	D/D/D	Stop Controlled on Fincher Road / Upper Sweetwater Trail	A (8.3)	-	A (8.8)	-	A (8.1)	-
-Westbound Left	D/D/D		A (8.3)	-	A (8.0)	-	A (7.9)	-
-Northbound Approach	D/D/D		B (13.2)	-	C (20.5)	-	B (13.5)	-
-Southbound Approach	D/D/D		D (34.4)	-	D (26.6)	-	C (15.9)	-
Riverstone Parkway (SR 5) at N Etowah Drive								
-Eastbound Approach	D/E/D	Stop Controlled on N Etowah Drive	C (21.2)	-	F (189.1)	-	D (26.2)	-
-Westbound Approach	E/D/E		F (57.8)	-	D (31.5)	-	E (46.9)	-
-Northbound Left	D/D/D		B (11.5)	-	B (11.5)	-	B (10.3)	-
-Southbound Left	D/D/D		B (10.1)	-	B (10.8)	-	B (10.7)	-
Fincher Road (SR 108) at Broad Water Bay Road								
-Eastbound approach	D/D/D	Stop Controlled on Broad Water Bay Road	A (9.5)	-	A (9.5)	-	A (9.2)	-
-Northbound Left	D/D/D		A (0.5)	-	A (1.9)	-	A (3.3)	-
Marietta Highway at Bells Ferry Road	D/D/D	Signalized	C (33.5)	0.61	C (34.8)	0.68	D (37.5)	0.57

* v/c ratios are not calculated for unsignalized intersections.

7. FUTURE YEAR BACKGROUND TRAFFIC

It was agreed upon with GRTA to use a 3.0% growth factor per year to estimate the future year 2020 traffic volumes prior to the addition of traffic from the proposed site. This growth factor was applied to the existing traffic volumes on the roadways to estimate the future year 2020 traffic volumes prior to the addition of the site-generated volumes. The future year (base) traffic volumes for 2020 at all the study intersections are shown in Figures 12 and 13.

Traffic operation analyses for the following Base Scenarios were performed:

- Base Year 2020 traffic with existing lane geometry
- Base Year 2020 traffic with additional recommended improvements to bring all intersections to LOS standard of D.

Results of the analyses for the above scenarios are shown in Tables 4 and 5. Recommendations to bring the intersections back to the LOS standard are discussed after Table 4.

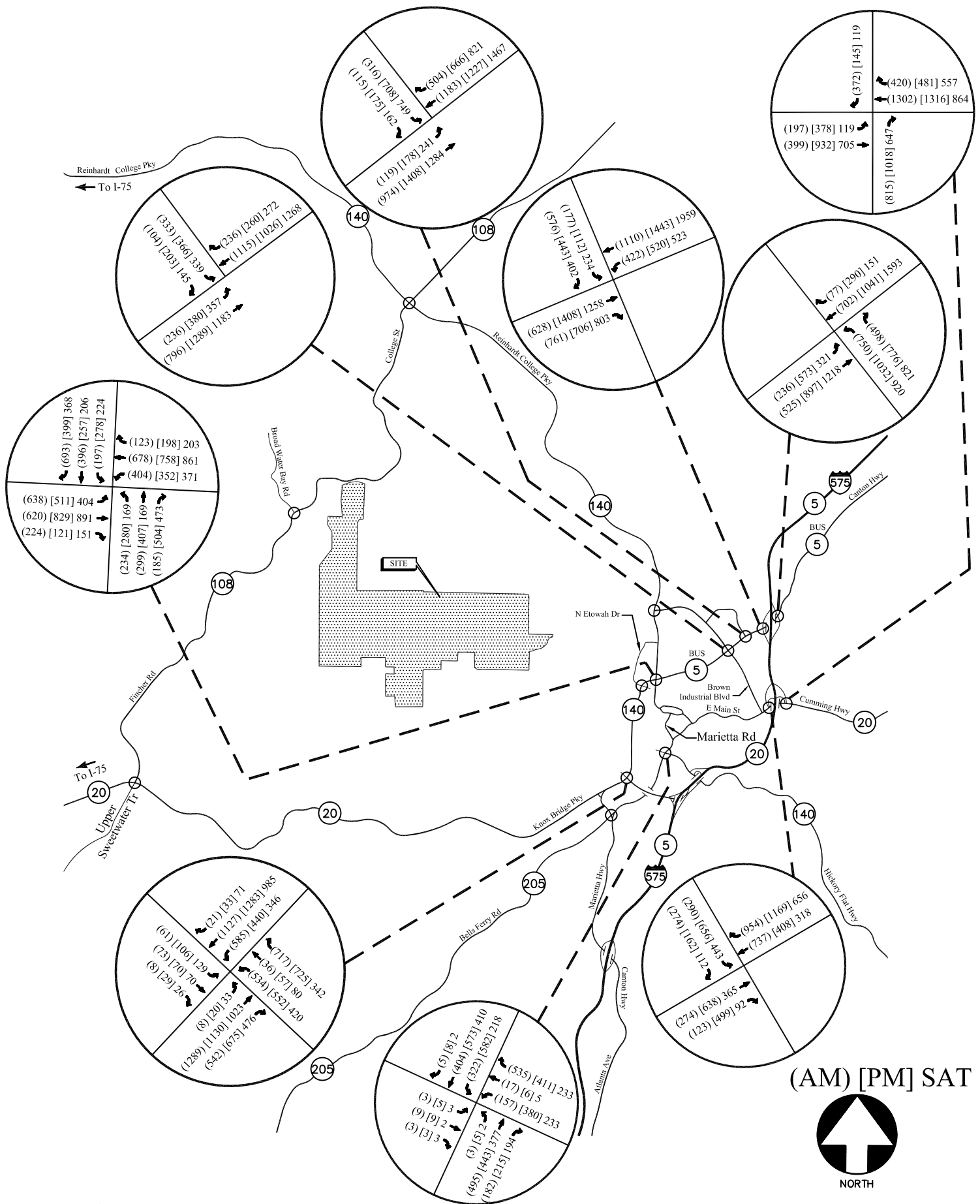


TABLE 4								
BASE INTERSECTION OPERATIONS								
Intersection	AM/PM/ SAT LOS Standard	Traffic Control	A.M. Peak Hour		P.M. Peak Hour		SAT Peak Hour	
			LOS (Delay)	v/c*	LOS (Delay)	v/c*	LOS (Delay)	v/c*
Cumming Highway (SR 20) at I-575 Northbound Ramp	D/D/D	Signalized	A (2.3)	0.44	A (7.0)	0.70	A (1.1)	0.35
Cumming Highway (SR 20) at I-575 Southbound Ramp	D/E/D	Signalized	C (34.6)	0.82	E (69.4)	1.08	D (37.2)	0.66
Marietta Street at Hickory Flay Highway / Bobo Grinding Company Driveway	D/D/D	Signalized	C (26.8)	0.66	E (72.8)	1.11	C (21.5)	0.60
Marietta Highway (SR 20) at SR 140 (SR 20) / Big K-Mart Driveway	D/D/D	Signalized	F (175.3)	1.43	F (119.2)	1.27	E (66.4)	1.07
Riverstone Parkway at I-575 Northbound Ramp	D/D/D	Signalized	C (26.3)	0.59	E (77.0)	1.21	F (91.4)	1.25
Riverstone Parkway at I-575 Southbound Ramp	D/D/D	Signalized	A (6.9)	0.66	B (13.8)	0.88	B (13.5)	0.90
Riverstone Parkway at Riverstone Boulevard	D/D/D	Signalized	A (9.8)	0.42	B (15.1)	0.67	B (18.4)	0.70
Riverstone Parkway at Reinhardt College Parkway	D/D/D	Signalized	A (7.2)	0.58	B (10.8)	0.71	A (8.6)	0.60
Riverstone Parkway at Waleska Road (SR 140) / Waleska Street	D/D/D	Signalized	F (82.2)	1.14	E (63.8)	1.09	C (32.8)	0.89
Waleska Road (SR 140) at Reinhardt College Parkway	D/D/D	Signalized	C (24.0)	0.81	D (50.0)	1.02	C (23.4)	0.53
College Street (SR 108) at Reinhardt College Parkway (SR 140)								
-Eastbound Approach	E/D/D	All Ways Stop Controlled	F (392.3)	-	E (49.5)	-	C (21.8)	-
-Westbound Approach	D/D/D		F (76.4)	-	F (276.3)	-	C (22.7)	-
-Northbound Approach	D/D/D		F (103.6)	-	C (16.5)	-	B (13.5)	-
-Southbound Approach	D/D/D		F (272.9)	-	C (24.7)	-	B (14.7)	-
Knox Bridge Highway (SR 20) at Fincher Road (SR 108)								
-Eastbound Left	D/D/D	Stop Controlled on Fincher Road / Upper Sweetwater Trail	A (9.1)	-	B (10.1)	-	A (8.7)	-
-Westbound Left	D/D/D		A (9.1)	-	A (8.6)	-	A (8.3)	-
-Northbound Approach	D/D/D		C (22.7)	-	F (75.3)	-	C (21.2)	-
-Southbound Approach	D/D/D		F (574.7)	-	F (400.5)	-	E (39.8)	-
Riverstone Parkway (SR 5) at N Etowah Drive								
-Eastbound Approach	D/E/D	Stop Controlled on N Etowah Drive	F (244.5)	-	F (999.0)	-	F (234.7)	-
-Westbound Approach	E/D/E		F (1188.0)	-	F (499.8)	-	F (462.7)	-
-Northbound Left	D/D/D		C (16.8)	-	C (18.0)	-	B (13.7)	-
-Southbound Left	D/D/D		B (13.0)	-	B (14.9)	-	B (14.5)	-
Fincher Road (SR 108) at Broad Water Bay Road								
-Eastbound approach	D/D/D	Stop Controlled on Broad Water Bay Road	B (10.2)	-	B (10.2)	-	A (9.8)	-
-Northbound Left	D/D/D		A (0.6)	-	A (2.0)	-	A (3.4)	-
Marietta Highway at Bells Ferry Road	D/D/D	Signalized	D (41.3)	0.93	E (57.5)	1.10	D (40.0)	0.87

* v/c ratios are not calculated for unsignalized intersections.

As shown in Table 4, the following intersections do not currently operate at LOS D (the LOS standard) in the base condition. A number of these intersections already have planned or programmed improvements through GDOT, the ARC TIP or other DRI Notices of Decision (NOD). If available, the planned or programmed improvements are listed after each intersection:

1. Cumming Highway (SR 20) at I-575 Southbound Ramp
 - GDOT has a planned improvement project to upgrade the I-575 SB on ramp.
 - GDOT Project ID 0007836 includes widening SR 20 from 2 to 4 lanes between I-75 and I-575. Also listed in Attachment A of the NOD for DRI 1186 (Willoughby and Sewell).
2. Marietta Street at Hickory Flat Highway / Bobo Grinding Company Driveway
 - ARC TIP project (CH-202) / GDOT Project ID 0006042 that includes extending Hickory Flat Rd from Marietta Rd to Waleska St
 - GDOT Project ID 0006719 that includes various intersection improvements
3. Marietta Highway (SR 20) SR 140 (SR 20) / Big K-Mart Driveway
 - GDOT Project ID 0007836 includes widening SR 20 from 2 to 4 lanes between I-75 and I-575. Also listed in Attachment A of the NOD for DRI 1186 (Willoughby and Sewell).
4. Riverstone Parkway at I-575 Northbound Ramp
 - Improvement to provide two eastbound left turn lanes from Riverstone Parkway onto I-575 Northbound on ramp listed in Attachment A of the NOD for DRI 1113 (Riverstone)
5. Riverstone Parkway at Waleska Road (SR 140) / Waleska Street
 - ARC TIP project (CH-140C) that includes widening SR 140 from 2 to 4 lanes between Lower Burris Road and Riverstone Parkway (SR 5)
6. College Street (SR 108) at Reinhardt College Parkway (SR 140)
7. Knox Bridge Highway (SR 20) at Fincher Road (SR 108)
 - GDOT Project ID 662650 that includes various intersection improvements
 - Improvement to signalize when warranted and add various turn lanes listed in Attachment A of the NOD for DRI 1186 (Willoughby and Sewell)
8. Riverstone Parkway (SR 5) at N. Etowah Drive
9. Marietta Highway at Bells Ferry Road
 - ARC TIP project (CH-010D) / GDOT project ID 0006039 that includes widening Bells Ferry Road from 2 to 4 lanes between Sixes Road and SR 20 (Knox Bridge Road)

Analysis of the future year (Base 2020) traffic volumes indicates that nine study intersections will not operate within the LOS standard. The following improvements were identified for the intersections that did not comply with the LOS standard.

- Cumming Highway (SR 20) at I-575 Southbound Ramp
 - Add a dedicated westbound right turn lane with free phasing on Cumming Highway (SR 20) as per Georgia DOT standards.
- Marietta Street at Hickory Flat Highway / Bobo Grinding Company Driveway
 - Add an additional southbound left turn lane on Marietta Street creating dual left turn lanes and change the phasing from protected permissive to protected only phasing. This improvement will require a receiving lane to be added on Hickory Flat Highway westbound.
- Marietta Highway (SR 20) at SR 140 (SR 20) / Big K-Mart Driveway
 - Add a dedicated westbound left turn lane on SR 140 (SR 20) per Georgia DOT standards.
 - Change the existing westbound right turn phase from permissive to permissive overlap.
 - Add an additional northbound through lane on Marietta Highway as per Georgia DOT standards. This improvement will require a receiving lane to be added on Marietta Highway.
 - Add an additional southbound left turn lane on Marietta Highway per Georgia DOT standards creating dual left turn lanes. This improvement will require a receiving lane to be added on SR 140 (SR 20).
- Riverstone Parkway at I-575 Northbound Ramp
 - Change the existing northbound right turn phase from permissive to permissive overlap.
- Riverstone Parkway at Waleska Road (SR 140) / Waleska Street
 - Add a dedicated eastbound right turn lane with free phasing on Riverstone Parkway as per Georgia DOT standards.
 - Add a dedicated westbound right turn lane on Riverstone Parkway as per Georgia DOT standards.
 - Change the existing southbound right turn phase from permissive to permissive overlap.
- College Street (SR 108) at Reinhardt College Parkway (SR 140)
 - A signal warrant analysis for the AM and PM peak hours were performed to determine if the peak hour warrant is met at this intersection. The traffic conditions warrant at least the peak hour signal warrant required for installation of a traffic signal for the Base 2020 traffic volumes. Hence, a signal is recommended at this intersection. However, a detailed signal

warrant analysis is recommended prior to the installation of a traffic signal at this location.

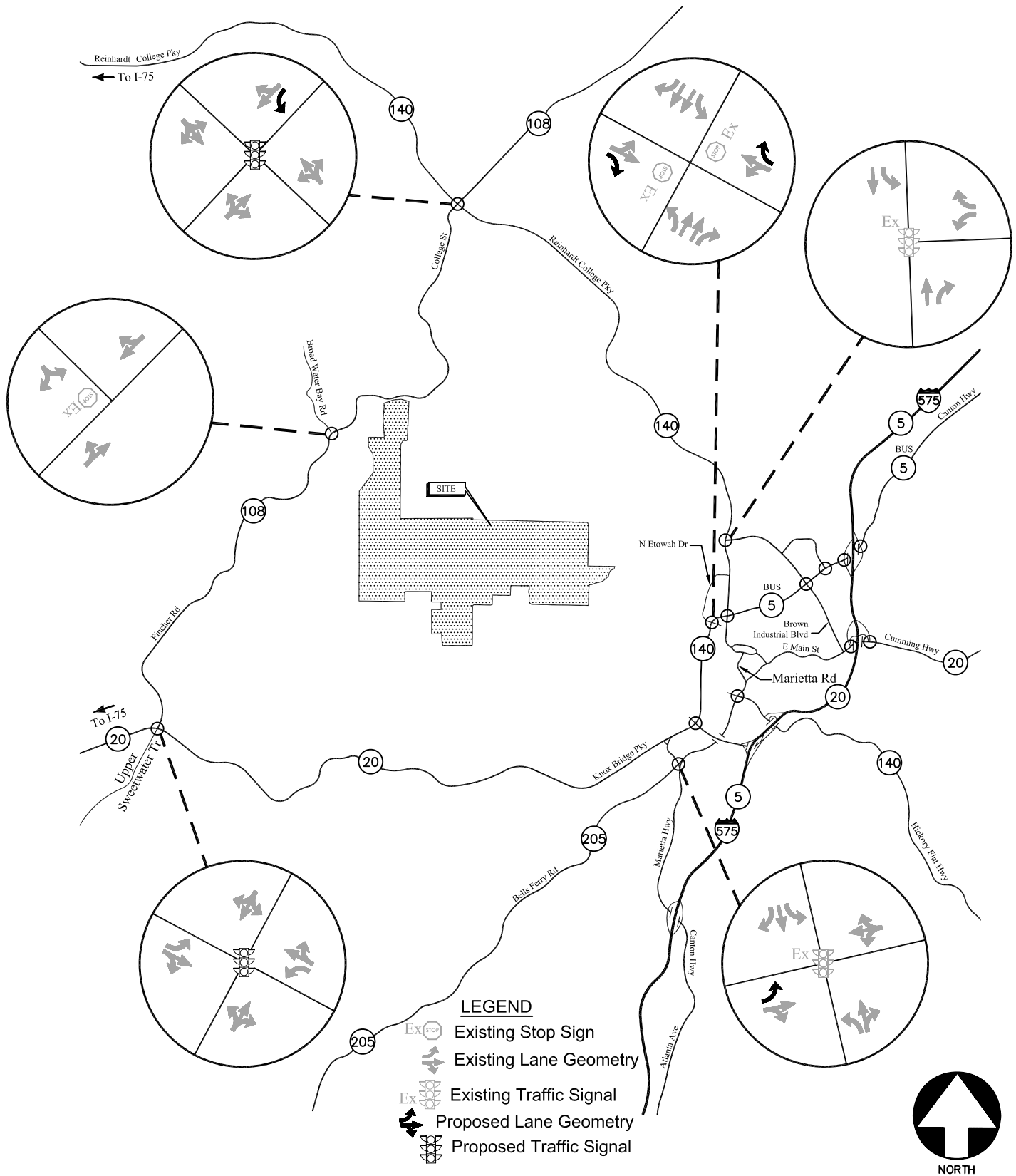
- In addition to the signal, a dedicated southbound left turn lane should be added on Fincher Road as per Georgia DOT standards.
- Knox Bridge Highway (SR 20) at Fincher Road (SR 108) / Upper Sweetwater Trail
 - A signal warrant analysis for the AM and PM peak hours were performed to determine if the peak hour warrant is met at this intersection. The traffic conditions warrant at least the peak hour signal warrant required for installation of a traffic signal for the Base 2020 traffic volumes. Hence, a signal is recommended at this intersection. However, a detailed signal warrant analysis is recommended prior to the installation of a traffic signal at this location.
- Riverstone Parkway (SR 5) at N Etowah Drive
 - The intersection will operate at LOS F during the AM, PM and Saturday peak hours for the eastbound and westbound approaches (N Etowah Drive). A signal warrant analysis for the peak hours was performed to determine if the peak hour warrant is met at this intersection. The traffic conditions do not warrant even the peak hour signal warrant required for installation of a traffic signal for the Base 2020 volumes. Therefore, a traffic signal is not recommended at this intersection for the base 2020 condition.
 - Add dedicated eastbound and westbound right turn lanes on N Etowah Drive. It is seen that further addition of turn lanes will not make any significant decrease in the delays and hence no other improvements are suggested at this intersection.
- Marietta Highway at Bells Ferry Road
 - Add a dedicated eastbound left turn lane on Bells Ferry Road

The LOS at the above intersections in the year 2020 with just background traffic after the above improvements are implemented is shown in Table 5. The recommended base intersection traffic control and lane geometry is shown in Figures 14 and 15.

TABLE 5								
BASE INTERSECTION OPERATIONS WITH IMPROVEMENTS								
Intersection	AM/PM/ SAT LOS Standard	Traffic Control	A.M. Peak Hour		P.M. Peak Hour		SAT Peak Hour	
			LOS (Delay)	v/c*	LOS (Delay)	v/c*	LOS (Delay)	v/c*
Cumming Highway at I-575 Southbound Ramp	D/E/D	Signalized	C (22.7)	0.67	C (23.1)	0.85	C (25.0)	0.58
Marietta Street at Hickory Flay Highway / Bobo Grinding Company Driveway	D/D/D	Signalized	C (33.8)	0.73	D (48.3)	0.98	C (27.8)	0.64
Marietta Highway (SR 20) at SR 140 (SR 20) / Big K-Mart Driveway	D/D/D	Signalized	D (50.2)	0.95	D (44.8)	0.89	C (34.7)	0.69
Riverstone Parkway at I-575 Northbound Ramp	D/D/D	Signalized	C (22.4)	0.59	D (51.0)	1.02	D (39.0)	0.97
Riverstone Parkway at Waleska Road / Waleska Street	D/D/D	Signalized	D (46.6)	0.99	D (49.6)	1.01	C (28.4)	0.83
College Street at Reinhardt College Parkway	D/D/D	Signalized	D (36.0)	0.91	B (19.9)	0.70	C (28.5)	0.41
Knox Bridge Highway at Fincher Road / Upper Sweetwater Trail	D/D/D	Signalized	B (14.7)	0.55	B (11.9)	0.57	B (11.1)	0.38
Riverstone Parkway at N Etowah Drive -Eastbound Approach	D/E/D	Stop Controlled on N Etowah Drive	F (60.9)	-	F (999.0)	-	F (131.7)	-
-Westbound Approach	E/D/E		F (1172.4)	-	F (234.5)	-	F (366.1)	-
-Northbound Left	D/D/D		C (16.8)	-	C (18.0)	-	B (13.7)	-
-Southbound Left	D/D/D		B (13.0)	-	B (14.9)	-	B (14.5)	-
Marietta Highway at Bells Ferry Road	D/D/D	Signalized	C (29.4)	0.79	D (46.8)	1.01	C (28.2)	0.77

* v/c ratios are not calculated for unsignalized intersections.





BASE 2020 TRAFFIC CONTROL AND
LANE GEOMETRY - SHEET 2 OF 2

8. FUTURE YEAR TOTAL TRAFFIC

The traffic volumes that will be generated by the proposed development were then added to the future base year 2020 traffic volumes in order to determine the traffic volumes that will be on the roadway network after completion of the project. The future traffic volumes for the year 2020 including the site-generated volumes for the study intersections are shown in Figures 16 and 17.

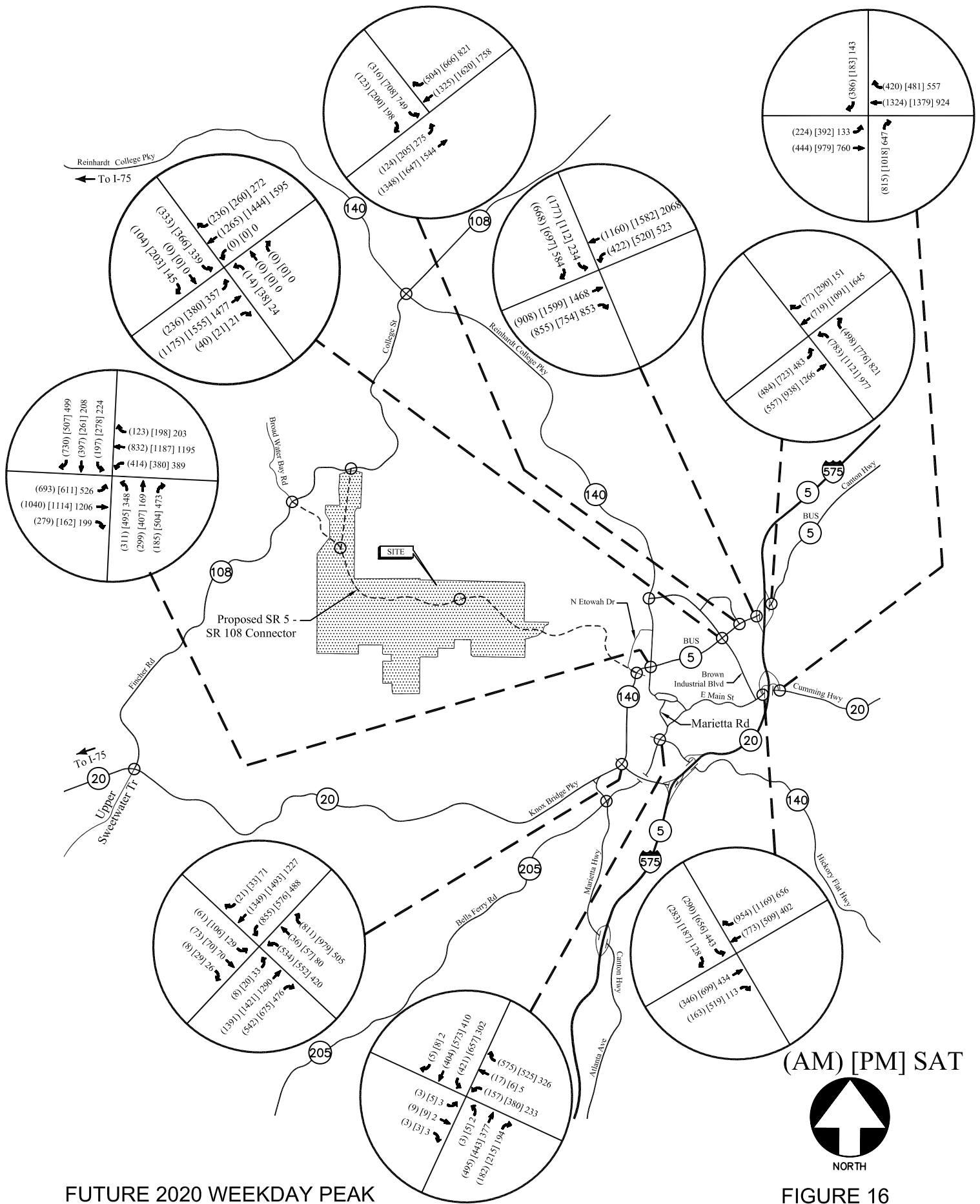
9. FACILITY NEEDS ANALYSIS

9.1 Intersection Analysis

The future year total traffic volumes were used to analyze the study network intersections. Traffic operations analyses for the following scenarios were performed:

- Future Year 2020 Traffic Volumes with site generated traffic and existing lane geometry.
- Future Year 2020 Traffic Volumes with site generated traffic and the recommended improvements to bring all intersections to LOS standard.

The results of the analysis for the above scenarios are shown in Tables 6 and 7. Recommendations to bring the intersections back to the LOS standard are discussed after each appropriate section.



FUTURE 2020 WEEKDAY PEAK
 HOUR VOLUMES - SHEET 1 OF 2

FIGURE 16
 A&R Engineering Inc.

TABLE 6								
FUTURE INTERSECTION OPERATIONS								
Intersection	AM/PM/ SAT LOS Standard	Traffic Control	A.M. Peak Hour		P.M. Peak Hour		SAT Peak Hour	
			LOS (Delay)	v/c*	LOS (Delay)	v/c*	LOS (Delay)	v/c*
Cumming Highway (SR 20) at I-575 Northbound Ramp	D/D/D	Signalized	A (2.6)	0.49	A (8.4)	0.72	A (1.1)	0.35
Cumming Highway (SR 20) at I-575 Southbound Ramp	D/E/D	Signalized	C (33.3)	0.86	F (96.6)	1.17	D (38.7)	0.73
Marietta Street at Hickory Flay Highway / Bobo Grinding Company Driveway	D/D/D	Signalized	C (31.5)	0.74	F (89.5)	1.18	C (22.7)	0.63
Marietta Highway (SR 20) at SR 140 (SR 20) / Big K-Mart Driveway	D/D/D	Signalized	F (255.7)	1.67	F (218.7)	1.55	F (105.6)	1.26
Riverstone Parkway at I-575 Northbound Ramp	D/D/D	Signalized	C (31.2)	0.83	F (106.5)	1.32	F (119.5)	1.37
Riverstone Parkway at I-575 Southbound Ramp	D/D/D	Signalized	A (8.2)	0.75	B (14.0)	0.86	B (15.8)	0.94
Riverstone Parkway at Riverstone Boulevard	D/D/D	Signalized	A (8.6)	0.45	B (16.7)	0.72	B (18.8)	0.77
Riverstone Parkway at Reinhardt College Parkway	D/D/D	Signalized	B (10.4)	0.66	B (13.0)	0.81	B (11.5)	0.83
Riverstone Parkway at Waleska Road (SR 140) / Waleska Street	D/D/D	Signalized	F (138.9)	1.36	F (143.4)	1.39	F (85.6)	1.10
Waleska Road (SR 140) at Reinhardt College Parkway	D/D/D	Signalized	C (23.6)	0.83	E (61.2)	1.07	C (22.5)	0.59
College Street (SR 108) at Reinhardt College Parkway (SR 140)								
-Eastbound Approach	E/D/D	All Ways Stop Controlled	F (443.3)	-	F (225.2)	-	F (146.3)	-
-Westbound Approach	D/D/D		F (116.2)	-	F (461.5)	-	F (83.2)	-
-Northbound Approach	D/D/D		F (214.9)	-	E (35.7)	-	E (46.3)	-
-Southbound Approach	D/D/D		F (306.6)	-	F (61.2)	-	D (33.6)	-
Knox Bridge Highway (SR 20) at Fincher Road (SR 108)								
-Eastbound Left	D/D/D	Stop Controlled on Fincher Road / Upper Sweetwater Trail	A (9.5)	-	B (12.4)	-	A (9.8)	-
-Westbound Left	D/D/D		A (9.1)	-	A (8.6)	-	A (8.3)	-
-Northbound Approach	D/D/D		E (44.2)	-	F (827.8)	-	F (67.7)	-
-Southbound Approach	D/D/D		F (999.0)	-	F (999.0)	-	F (491.4)	-
Riverstone Parkway (SR 5) at N Etowah Drive / SR 5 – SR 108 Connector								
-Eastbound Approach	D/E/D	Stop Controlled on N Etowah Drive	F (999.0)	-	F (999.0)	-	F (999.0)	-
-Westbound Approach	E/D/E		F (999.0)	-	F (999.0)	-	F (999.0)	-
-Northbound Left	D/D/D		F (154.5)	-	F (1607.5)	-	F (655.7)	-
-Southbound Left	D/D/D		B (12.5)	-	B (14.2)	-	B (13.8)	-

Fincher Road (SR 108) at Broad Water Bay Road / SR 5 – SR 108 Connector		Stop						
-Eastbound Approach	D/D/D	Controlled on	C (15.3)	-	D (26.6)	-	D (28.6)	-
-Westbound Approach	D/D/D	Broad Water	D (25.7)	-	F (166.7)	-	F (224.6)	-
-Northbound Left	D/D/D	Bay Road	A (0.4)	-	A (1.0)	-	A (1.4)	-
-Southbound Left	D/D/D		A (2.8)	-	A (4.0)	-	A (3.8)	-
Marietta Highway at Bells Ferry Road	D/D/D	Signalized	E (69.2)	1.08	F (112.9)	1.46	E (74.7)	1.11

* v/c ratios are not calculated for unsignalized intersections.

As shown in Table 6, the following intersections will not operate at LOS D (the LOS standard) for the future condition. A number of these intersections already have planned or programmed improvements through GDOT, the ARC TIP or other DRI Notices of Decision (NOD). If available, the planned or programmed improvements are listed after each intersection:

1. Cumming Highway (SR 20) at I-575 Southbound Ramp
 - GDOT has a planned improvement project to upgrade the I-575 SB on ramp.
 - GDOT Project ID 0007836 includes widening SR 20 from 2 to 4 lanes between I-75 and I-575. Also listed in Attachment A of the NOD for DRI 1186 (Willoughby and Sewell).
2. Marietta Street at Hickory Flat Highway / Bobo Grinding Company Driveway
 - ARC TIP project (CH-202) / GDOT Project ID 0006042 that includes extending Hickory Flat Rd from Marietta Rd to Waleska St
 - GDOT Project ID 0006719 that includes various intersection improvements
3. Marietta Highway (SR 20) SR 140 (SR 20) / Big K-Mart Driveway
 - GDOT Project ID 0007836 includes widening SR 20 from 2 to 4 lanes between I-75 and I-575. Also listed in Attachment A of the NOD for DRI 1186 (Willoughby and Sewell).
4. Riverstone Parkway at I-575 Northbound Ramp
 - Improvement to provide two eastbound left turn lanes from Riverstone Parkway onto I-575 Northbound on ramp listed in Attachment A of the NOD for DRI 1113 (Riverstone)
5. Riverstone Parkway at Waleska Road (SR 140) / Waleska Street
 - ARC TIP project (CH-140C) that includes widening SR 140 from 2 to 4 lanes between Lower Burris Road and Riverstone Parkway (SR 5)
6. Waleska Road (SR 140) at Reinhardt College Parkway
 - ARC TIP project (CH-140C) / GDOT Project ID 641900 that includes widening SR 140 from 2 to 4 lanes between Lower Burris Road and Riverstone Parkway (SR 5)
7. College Street (SR 108) at Reinhardt College Parkway (SR 140)
8. Knox Bridge Highway (SR 20) at Fincher Road (SR 108)
 - GDOT Project ID 662650 that includes various intersection improvements

- Improvement to signalize when warranted and add various turn lanes listed in Attachment A of the NOD for DRI 1186 (Willoughby and Sewell)
- 9. Riverstone Parkway (SR 5) at N. Etowah Drive
- 10. Fincher Road (SR 108) at Broad Water Bay Road / SR 5 – SR 108 Connector
- 11. Marietta Highway at Bells Ferry Road
 - ARC TIP project (CH-010D) / GDOT project ID 0006039 that includes widening Bells Ferry Road from 2 to 4 lanes between Sixes Road and SR 20 (Knox Bridge Road)

Analysis of the future year 2020 traffic volumes indicates that eleven of the study intersections will not operate within the LOS standard. It is recommended that SR 140 be widened to a four-lane roadway from Lower Burris Road in the north to Riverstone Parkway in the south. Following are the other improvements needed to restore all intersections to the LOS standard for the future year 2020 traffic:

- Cumming Highway (SR 20) at I-575 Southbound Ramp
 - Add a dedicated westbound right turn lane with free phasing on Cumming Highway as per Georgia DOT standards.
- Marietta Street at Hickory Flat Highway / Bobo Grinding Company Driveway
 - Add an additional southbound left turn lane on Marietta Street creating dual left turn lanes and change the phasing from protected permissive to protected only phasing. This improvement will require a receiving lane to be added on Hickory Flat Highway westbound.
- Marietta Highway (SR 20) at SR 140 (SR 20) / Big K-Mart Driveway
 - Add a dedicated westbound left turn lane on SR 140 (SR 20) per Georgia DOT standards.
 - Add an additional northbound through lane on Marietta Highway.
 - Add an additional southbound left turn lane on Marietta Highway per Georgia DOT standards creating dual left turn lanes. This improvement will require a receiving lane to be added on SR 140 (SR 20).
- Riverstone Parkway at I-575 Northbound Ramp
 - Add an additional eastbound left turn lane on Riverstone Parkway creating dual left turn lanes as per Georgia DOT standards and change the phasing from protected permissive to protected only.
 - Change the existing northbound right turn phase from permissive to permissive overlap.
- Riverstone Parkway at Waleska Road (SR 140) / Waleska Street

- Add additional eastbound and westbound left turn lanes on Riverstone Parkway creating dual left turn lanes per Georgia DOT standards and change the left turn phasing from protected permissive to protected only.
 - Add a dedicated eastbound right turn lane on Riverstone Parkway per Georgia DOT standards. Provide permissive + overlap phasing for the eastbound right turn movement.
 - Add a dedicated westbound right turn lane on Riverstone Parkway per Georgia DOT standards.
 - Add an additional northbound left turn lane on Waleska Street creating dual left turn lanes and change the phasing from protected permissive to protected only.
 - Provide a dedicated northbound right turn lane with permissive + overlap right turn phasing.
 - Provide permissive + overlap phasing for the southbound right turn movement.
- Waleska Road (SR 140) at Reinhardt College Parkway
 - Add an additional southbound left turn lane on Waleska Road creating dual left turn lanes. Provided protected only southbound left turn phasing for the southbound left turn movement.
 - Provide permissive + overlap phasing for the westbound right turn movement on Reinhardt College Parkway
- College Street (SR 108) at Reinhardt College Parkway (SR 140)
 - A signal warrant analysis for the AM and PM peak hours was performed to determine if the peak hour warrant is met at this intersection. The traffic conditions warrant at least the peak hour signal warrant required for installation of a traffic signal for the Future 2020 traffic volumes with the addition of site-generated traffic. Therefore, a signal is recommended at this intersection. However, a detailed signal warrant analysis is recommended prior to the installation of a traffic signal at this location.
 - In addition to a signal, a dedicated southbound left turn lane should be added on Fincher Road per Georgia DOT standards.
- Knox Bridge Highway (SR 20) at Fincher Road (SR 108) / Upper Sweetwater Trail
 - A signal warrant analysis for the AM and PM peak hours were performed to determine if the peak hour warrant is met at this intersection. The traffic conditions warrant at least the peak hour signal warrant required for installation of a traffic signal for the Future 2020 traffic volumes with the addition of site-generated traffic. Therefore, a signal is recommended at

this intersection. However, a detailed signal warrant analysis is recommended prior to the installation of a traffic signal at this location.

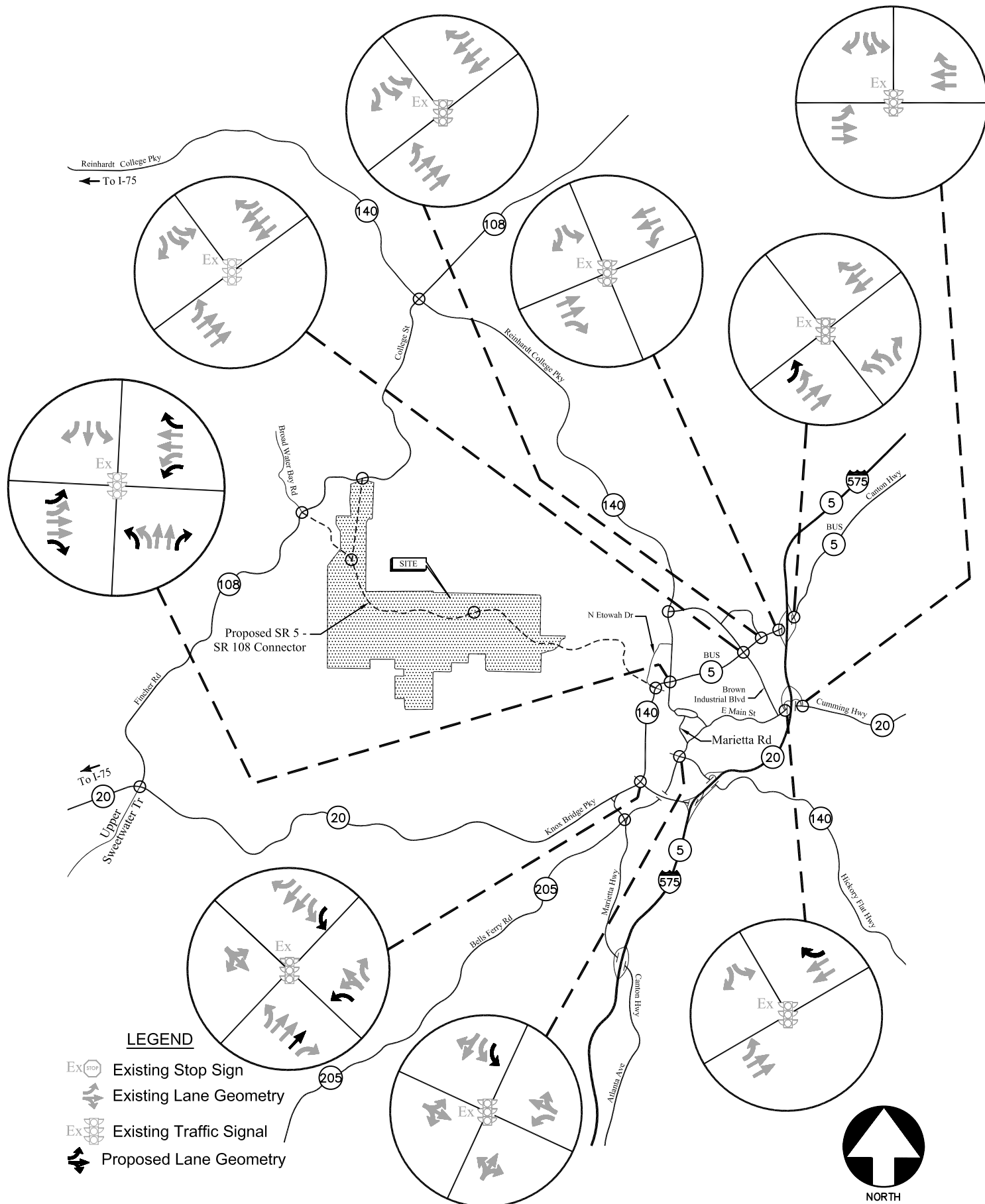
- Riverstone Parkway at SR 5 – SR 108 Connector / N Etowah Drive
 - Is discussed in section 9.2 Site Access Analysis section of the report.
- Fincher Road (SR 108) at Broad Water Bay Road / SR 5- SR 108 Connector
 - Is discussed in section 9.2 Site Access Analysis section of the report.
- Marietta Highway at Bells Ferry Road
 - Add dedicated westbound left and right turn lanes on Bells Ferry Road.
 - Add a dedicated eastbound left turn lane on Bells Ferry Road with protected + permissive left turn phasing.

The LOS for the above listed intersections in the year 2020 with the addition of site-generated traffic after the implementation of above recommended improvements is shown in Table 7.

TABLE 7								
FUTURE INTERSECTION OPERATIONS WITH IMPROVEMENTS								
Intersection	AM/PM/ SAT LOS Standard	Traffic Control	A.M. Peak Hour		P.M. Peak Hour		SAT Peak Hour	
			LOS (Delay)	v/c*	LOS (Delay)	v/c*	LOS (Delay)	v/c*
Cumming Highway (SR 20) at I-575 Southbound Ramp	D/E/D	Signalized	C (22.5)	0.67	C (26.0)	0.85	C (25.5)	0.58
Marietta Street at Hickory Flat Highway / Bobo Grinding Company Driveway	D/D/D	Signalized	D (35.3)	0.78	D (53.0)	1.01	C (28.8)	0.66
Marietta Highway (SR 20) at SR 140 (SR 20) / Big K-Mart Driveway	D/D/D	Signalized	D (49.6)	1.02	D (40.0)	0.92	C (34.6)	0.81
Riverstone Parkway at I-575 Northbound Ramp	D/D/D	Signalized	C (29.3)	0.67	D (39.0)	0.99	D (41.3)	1.01
Riverstone Parkway at Waleska Road (SR 140) / Waleska Street	D/D/D	Signalized	D (35.5)	0.91	D (55.0)	1.07	D (35.9)	0.91
Waleska Road (SR 140) at Reinhardt College Parkway	D/D/D	Signalized	C (21.8)	0.83	C (32.4)	1.0	C (21.9)	0.62
College Street (SR 108) at Reinhardt College Parkway (SR 140)	D/D/D	Signalized	D (44.0)	0.99	C (30.4)	0.83	D (37.9)	0.64
Knox Bridge Highway (SR 20) at Fincher Road (SR 108)	D/D/D	Signalized	C (21.3)	0.63	C (24.4)	0.88	C (20.5)	0.55
Marietta Highway at Bells Ferry Road	D/D/D	Signalized	C (25.9)	0.74	D (48.9)	1.25	C (29.4)	0.73

* v/c ratios are not calculated for unsignalized intersections.

The recommended future intersection traffic control and lane geometry is shown in Figures 18 and 19.



FUTURE 2020 TRAFFIC CONTROL
AND LANE GEOMETRY - SHEET 1 OF 2

FIGURE 18
A&R Engineering Inc.

FIGURE 19

9.2 Site Access Analysis

A total of four main accesses are proposed for the Canton West development; two along Fincher Road and one along Riverstone Parkway and one along SR 5- SR 108 Connector. All the four driveways that will serve the proposed development are full access driveways. The future traffic volumes at the site driveways are shown in Figure 20. The recommended traffic control and lane geometry at these driveways are presented in the following sections.

The site access analysis was performed for the Future Year 2020 traffic volumes with recommended lane geometry. Results of the analysis are shown in Table 8. Traffic control and lane geometry recommended for the intersections to operate at the LOS standard are discussed in the following pages.

TABLE 8								
FUTURE 2020 SITE DRIVEWAY OPERATIONS								
Intersection	AM/PM/ SAT LOS Standard	Traffic Control	A.M. Peak Hour		P.M. Peak Hour		SAT Peak Hour	
			LOS (Delay)	v/c*	LOS (Delay)	v/c*	LOS (Delay)	v/c*
Riverstone Parkway at N Etowah Drive	D/D/D	Signalized	C (30.5)	0.90	D (50.8)	1.02	C (27.6)	0.87
Fincher Road (SR 108) at SR 5 – SR 108 Connector / Broad Water Bay Road	D/D/D	Signalized	A (9.0)	0.29	A (8.0)	0.27	A (9.3)	0.30
Fincher Road at North Site Driveway		Stop Controlled on						
-Westbound Left	D/D/D	North Site	A (7.7)	-	A (8.0)	-	A (7.9)	-
-Northbound Approach	D/D/D	Driveway	B (11.2)	-	B (12.4)	-	B (12.0)	-
SR 5 - SR 108 Connector at Town Main Center Access	D/D/D	Signalized	C (26.9)	0.33	C (30.6)	0.39	C (34.6)	0.41
SR 5 – SR 108 Connector at North Site Driveway		Stop Controlled on						
-Southbound Left	D/D/D	North Site	A (8.1)	-	A (8.4)	-	A (8.5)	-
-Westbound Approach	D/D/D	Driveway	B (12.4)	-	C (19.1)	-	C (21.0)	-

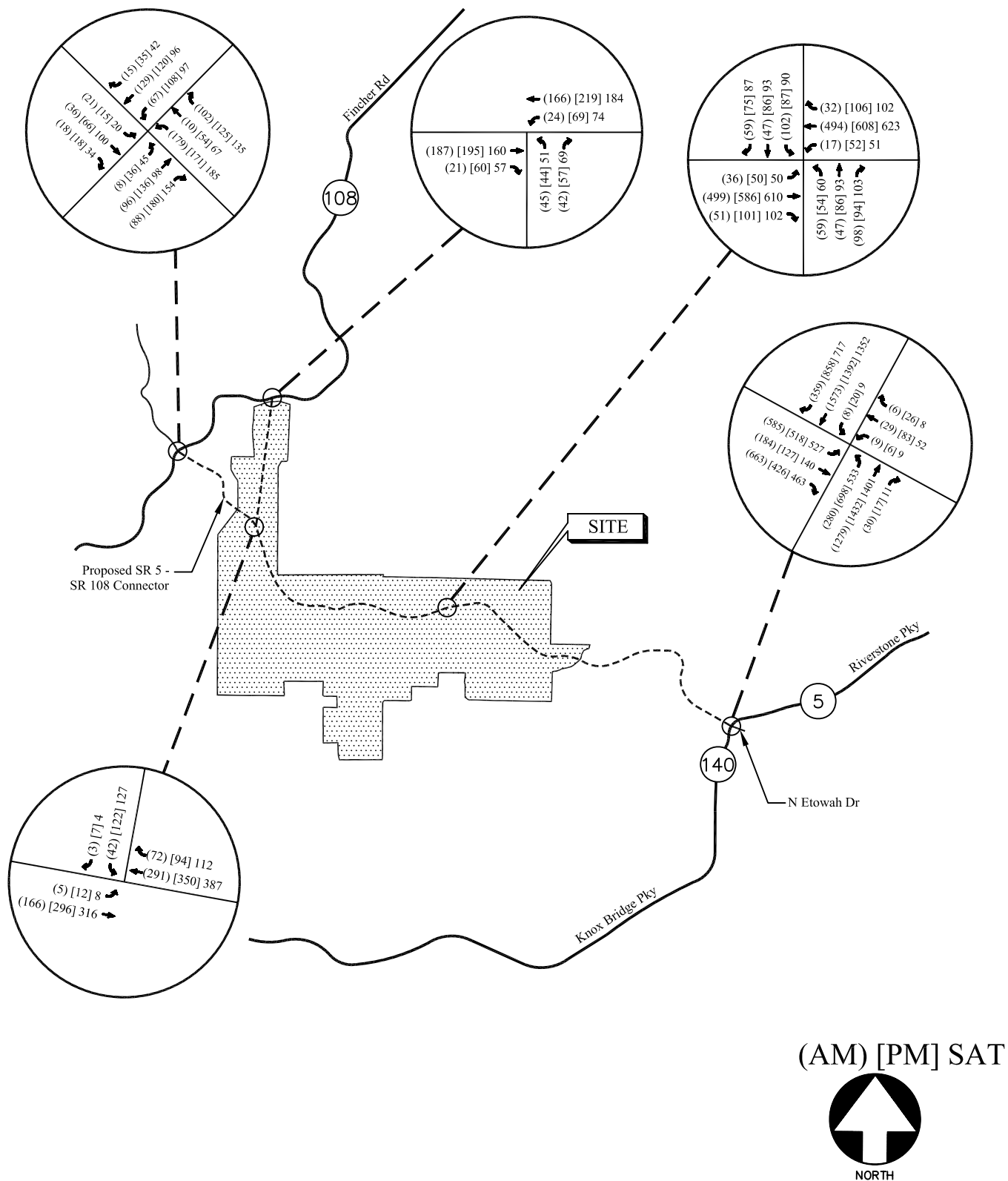
* v/c ratios are not calculated for unsignalized intersections.

The following lists the recommended lane geometry and traffic control for the site driveway intersections.

- Riverstone Parkway at SR 5 – SR 108 Connector / N Etowah Drive
 - A signal warrant analysis for the AM and PM peak hours were performed to determine if the peak hour warrant is met at this intersection. The traffic conditions strongly warrant the peak hour signal warrant required for installation of a traffic signal for the Future 2020 traffic volumes with the addition of site-generated traffic. Therefore, a signal is recommended at this intersection. However, a detailed signal warrant analysis is

- recommended prior to the installation of a traffic signal at this location.
 - Add eastbound dual left turn lanes on SR 5 – SR 108 Connector as per Georgia DOT standards with protected only phasing.
 - Add an eastbound right turn lane on SR 5 – SR 108 Connector as per Georgia DOT standards.
 - Add a dedicated westbound right turn lane on N Etowah Drive.
 - Add an additional northbound left turn lane on Riverstone Parkway creating dual left turn lanes as per Georgia DOT standards with protected only phasing.
- Fincher Road (SR 108) at Broad Water Bay Road / SR 5- SR 108 Connector
 - Install a signal
 - Add dedicated northbound and southbound left and right turn lanes on SR 108 per Georgia DOT standards
 - Separate eastbound left, through and right turn lanes are recommended on the SR 5 – SR 108 Connector
- Fincher Road (SR 108) at North Site Driveway
 - It is recommended that the intersection have a stop controlled side street (North Site Driveway), with Fincher Road remaining free flow.
 - Add a dedicated northbound right turn lane and a dedicated southbound left turn lane on SR 108 per Georgia DOT standards
- SR 5 - SR 108 Connector at Town Main Center Access
 - Install a signal
 - The eastbound and westbound approaches on the SR 5 – SR 108 Connector should each have dedicated left and right turn lanes and two through lanes.
 - The northbound and southbound approaches should each have dedicated left turn lanes and shared through / right turn lanes.
- SR 5 - SR 108 Connector at North Site Driveway
 - It is recommended that the intersection have a stop controlled side street (North Site Driveway), with SR 5 – SR 108 Connector remaining free flow.
 - Add a dedicated northbound right turn lane on the SR 5 – SR 108 Connector
 - Add a dedicated southbound left turn lane on the SR 5 – SR 108 Connector

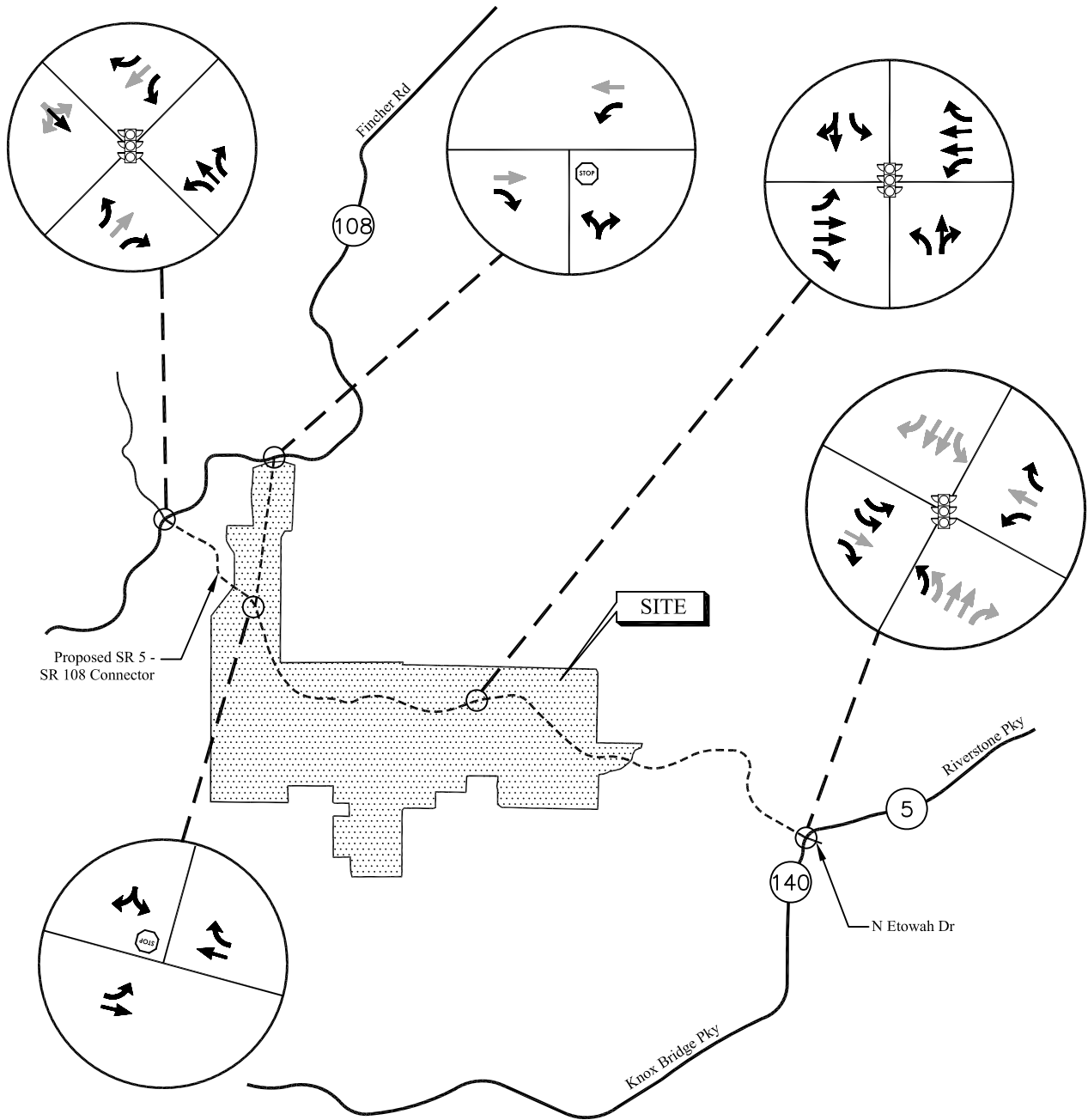
The future driveway traffic control and lane geometry is shown in Figure 21.



FUTURE 2020 SITE ACCESS PEAK HOUR VOLUMES

FIGURE 20

A&R Engineering Inc.



FUTURE 2020 SITE ACCESS TRAFFIC
CONTROL AND LANE GEOMETRY

FIGURE 21
A&R Engineering Inc.

10. NON-EXPEDITED CRITERIA

10.1 Regional Mobility and Location

1. Quality, Character, Convenience, and Flexibility of Transportation Options

There is an existing transit system within the City of Canton (in place since 1998) that travels throughout the city limits stopping at local shops, medical, educational and recreational facilities. These transit facilities are planned to connect into the proposed Canton West DRI development. Details of the City of Canton Transit system can be found in the Appendix. Numerous multi-use trails are also proposed within the development.

2. Vehicle Miles Traveled

The table below displays the reductions in trip generation due to mixed-use and pass-by reductions.

24-hour Trip Generation	45,180
- Mixed Use Reductions (internal capture)	-16,903
- Pass-by reductions	-1,145
Net Trips:	27,132

3. Relationship Between Location of Proposed DRI and Regional Mobility

The existing City of Canton Transit system currently travels within the vicinity of the proposed SR 5 – SR 108 Connector where it is proposed to intersect SR 5 (at North Etowah Drive). The existing transit system will be expanded to serve the proposed Canton West development. The SR 5 – SR 108 Connector will also provide a new vehicular connection between SR 5 and SR 108 thereby increasing regional mobility in the area.

4. Relationship Between Proposed DRI and Existing or Planned Transit Facilities

In addition to the proposed expansion of the City of Canton Transit system, a multi-use trail system is also proposed throughout the site. This trail will promote increased pedestrian and bicycle use within and through the development.

5. Transportation Management Area Designation

The area around the proposed project is not designated as a transportation management area.

6. Offsite Trip Reduction and Trip Reduction Techniques

Due to the nature of the development, there will be significant mixed-use and pass by trip reductions. These reductions have been applied for the AM peak hour, PM peak hour, Saturday peak hour and 24-hour trips projected to be generated by the site.

7. Balance of Land Uses – Jobs/Housing Balance

Please refer to the AOI study submitted along with this report.

8. Relationships Between Proposed DRI and Existing Development and Infrastructure

The proposed DRI is located in an area where adequate public facilities will be available to serve the proposed development. Regarding transportation, the traffic study has identified transportation improvements relating to the site access, along with improvements to the surrounding roadway network, which will allow traffic in the area to operate at the LOS standard.

10.2 Pedestrian and Internal Circulation

The proposed project will provide pedestrian walkways in all directions to connect the site with adjacent pedestrian facilities. The network of sidewalks will provide adequate pedestrian access to the various land uses within the development.

Internal roadways will provide adequate circulation of vehicular traffic as designed in the site plan. Vehicles exiting the site will be able to move internally to the site exit without experiencing excessive delays.

11. OTHER PERTINENT INFORMATION

At this time no other pertinent information is available with regards to this development. All significant characteristics of the proposed development are fully discussed within this report. Additionally, an Area of Influence study has been prepared and submitted along with the traffic analysis.

12. SIGNIFICANT IMPACT ANALYSIS

Due to the annual growth in the county in addition to the site generated traffic a number of intersection improvements will be required to bring the intersections in the vicinity of the site to the LOS standard. Even with the annual growth and the addition of the site generated traffic, the implementation of the recommended improvements will allow all intersections in the study area network to operate at acceptable levels of service.

Appendix

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Existing AM Intersection Analysis

Lanes, Volumes, Timings
1: Cumming Highway & I -575 Northbound Ramp

Existing AM
12/28/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	134	272	897	290	556	254
Act Effct Green (s)	75.0	75.0	61.8	61.8	37.0	37.0
Actuated g/C Ratio	0.62	0.62	0.52	0.52	0.31	0.31
v/c Ratio	0.44	0.12	0.49	0.30	0.53	0.38
Control Delay	13.8	9.3	20.3	2.7	36.4	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.8	9.3	20.3	2.7	36.4	5.5
LOS	B	A	C	A	D	A
Approach Delay	10.8 16.0					
Approach LOS	B B					
Queue Length 50th (ft)	39	42	228	0	182	0
Queue Length 95th (ft)	66	60	298	45	238	60
Internal Link Dist (ft)	1047 677					
Turn Bay Length (ft)	150	2212	1823	956	1059	300
Base Capacity (vph)	461	2212	1823	956	1059	664
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.12	0.49	0.30	0.53	0.38
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBTL, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.53						
Intersection Signal Delay: 18.7						
Intersection Capacity Utilization 56.4%						
Analysis Period (min) 15						
Intersection LOS: B						
ICU Level of Service B						

HCM Signalized Intersection Capacity Analysis
1: Cumming Highway & I -575 Northbound Ramp

Existing AM
12/28/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	3433	1583
Flt Permitted	0.22	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	405	3539	3539	1583	3433	1583
Volume (vph)	130	264	861	278	539	246
Peak-hour factor, PHF	0.97	0.97	0.96	0.96	0.97	0.97
Adj. Flow (vph)	134	272	897	290	556	254
RTOR Reduction (vph)	0	0	0	141	0	176
Lane Group Flow (vph)	134	272	897	149	556	78
Turn Type	pm+pt			Perm		custom
Protected Phases	1	6	2			
Permitted Phases	6			2	8	8
Actuated Green, G (s)	75.0	75.0	61.8	61.8	37.0	37.0
Effective Green, g (s)	75.0	75.0	61.8	61.8	37.0	37.0
Actuated g/C Ratio	0.62	0.62	0.52	0.52	0.31	0.31
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	358	2212	1823	815	1059	488
v/s Ratio Prot	c0.03	0.08	c0.25			
v/s Ratio Perm	0.21			0.09	c0.16	0.05
v/c Ratio	0.37	0.12	0.49	0.18	0.53	0.16
Uniform Delay, d1	11.4	9.1	18.9	15.6	34.2	30.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.1	1.0	0.5	1.9	0.7
Delay (s)	12.1	9.3	19.9	16.1	36.1	30.9
Level of Service	B	A	B	B	D	C
Approach Delay (s)	10.2 18.9					
Approach LOS	B B					
Intersection Summary						
HCM Average Control Delay	22.7 HCM Level of Service C					
HCM Volume to Capacity ratio	0.49					
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 12.0					
Intersection Capacity Utilization	56.4% ICU Level of Service B					
Analysis Period (min)	15					
Critical Lane Group						



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	86	193	1141	213	201
Act Effct Green (s)	34.7	34.7	34.7	11.3	11.3
Actuated g/C Ratio	0.64	0.64	0.64	0.21	0.21
v/c Ratio	0.39	0.08	0.49	0.57	0.41
Control Delay	13.2	4.5	3.2	24.7	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.2	4.5	3.2	24.7	5.7
LOS	B	A	A	C	A
Approach Delay	7.2 3.2 3.2 15.5				
Approach LOS	A A A B				
Queue Length 50th (ft)	11	10	28	62	0
Queue Length 95th (ft)	#55	24	68	103	37
Internal Link Dist (ft)	2177 1047 555				
Turn Bay Length (ft)	275				
Base Capacity (vph)	218	2271	2309	524	610
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.39	0.08	0.49	0.41	0.33

Intersection Summary

Cycle Length: 54	
Actuated Cycle Length: 54	
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 6.6	Intersection LOS: A
Intersection Capacity Utilization 58.9%	ICU Level of Service B
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



Movement	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↔	↔↔	↔↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00
Flt	1.00	1.00	0.92	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3240	1770	1583
Flt Permitted	0.21	1.00	1.00	0.95	1.00
Satd. Flow (perm)	388	3539	3240	1770	1583
Volume (vph)	81	181	487	631	192
Peak-hour factor, PHF	0.94	0.94	0.98	0.98	0.90
Adj. Flow (vph)	86	193	497	644	213
RTOR Reduction (vph)	0	0	230	0	0
Lane Group Flow (vph)	86	193	911	0	213
Turn Type	Perm				
Protected Phases	6 6 2 8				
Permitted Phases	6				
Actuated Green, G (s)	34.7	34.7	34.7	11.3	11.3
Effective Green, g (s)	34.7	34.7	34.7	11.3	11.3
Actuated g/C Ratio	0.64	0.64	0.64	0.21	0.21
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	249	2274	2082	370	331
v/s Ratio Prot	0.22 0.05 0.05 0.12				
v/s Ratio Perm	0.35 0.08 0.44 0.58 0.13				
Uniform Delay, d1	4.4	3.6	4.8	19.2	17.3
Progression Factor	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	0.1	0.7	2.2	0.2
Delay (s)	8.2	3.7	5.5	21.4	17.5
Level of Service	A	A	A	C	B
Approach Delay (s)	5.1 5.5 5.5 19.5				
Approach LOS	A A A B				
Intersection Summary					
HCM Average Control Delay	8.6 HCM Level of Service A				
HCM Volume to Capacity ratio	0.47				
Actuated Cycle Length (s)	54.0 Sum of lost time (s) 8.0				
Intersection Capacity Utilization	58.9% ICU Level of Service B				
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
3: Bobo Grinding Co Driveway & Marietta Street

Existing AM
12/28/2006

Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	16	114	401	472	227	287
Act Effct Green (s)	14.4	14.4	14.4	84.6	97.6	97.6
Actuated g/C Ratio	0.12	0.12	0.12	0.70	0.81	0.81
v/c Ratio	0.08	0.68	0.75	0.37	0.40	0.19
Control Delay	38.7	69.7	14.9	5.8	5.0	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.7	69.7	14.9	5.8	5.0	3.2
LOS	D	E	B	A	A	A
Approach Delay	38.7		27.1	5.8	4.0	
Approach LOS	D		C	A	A	A
Queue Length 50th (ft)	9	86	8	70	29	38
Queue Length 95th (ft)	19	141	105	m169	65	81
Internal Link Dist (ft)	95		1440	3002		1058
Turn Bay Length (ft)	150				90	
Base Capacity (vph)	535	429	760	1269	696	1512
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.27	0.53	0.37	0.33	0.19

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 1 (1%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 12.7
 Intersection Capacity Utilization 71.3%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Baseline
A & R Engineering Inc.

Future PM
Page 5

HCM Signalized Intersection Capacity Analysis
3: Bobo Grinding Co Driveway & Marietta Street

Existing AM
12/28/2006



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.97	0.97	0.97	1.00	0.85	1.00	0.96	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.99	0.99	0.99	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1799	1799	1799	1770	1592	1799	1795	1770	1770	1860	1860	1860
Flt Permitted	0.54	0.54	0.54	0.75	1.00	0.75	1.00	0.45	1.00	0.45	1.00	1.00
Satd. Flow (perm)	979	979	979	1392	1592	979	1794	846	1860	846	1860	1860
Volume (vph)	2	6	2	104	11	354	2	327	120	213	287	3
Peak-hour factor, PHF	0.62	0.62	0.62	0.91	0.91	0.91	0.95	0.95	0.95	0.94	0.94	0.94
Adj. Flow (vph)	3	10	3	114	12	389	2	344	126	227	284	3
RTOR Reduction (vph)	0	3	0	0	342	0	0	5	0	0	0	0
Lane Group Flow (vph)	0	13	0	114	59	0	0	467	0	227	287	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	8	8	8	4	4	6	6	5	2	5	2	2
Permitted Phases	8	8	8	4	4	6	6	5	2	5	2	2
Actuated Green, G (s)	14.4	14.4	14.4	14.4	14.4	84.6	84.6	97.6	97.6	97.6	97.6	97.6
Effective Green, g (s)	14.4	14.4	14.4	14.4	14.4	84.6	84.6	97.6	97.6	97.6	97.6	97.6
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.70	0.70	0.81	0.81	0.81	0.81	0.81
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	117	117	117	167	191	1265	1265	757	1513	757	1513	1513
v/s Ratio Prot	0.01	0.01	0.01	c0.08	0.04	c0.26	c0.26	c0.02	0.15	c0.02	0.15	0.15
v/s Ratio Perm	0.11	0.11	0.11	0.68	0.31	0.37	0.37	0.30	0.19	0.30	0.19	0.19
Uniform Delay, d1	47.1	47.1	47.1	50.6	48.2	7.1	7.1	3.1	2.5	3.1	2.5	2.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	0.63	0.63	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.4	0.4	10.9	0.9	0.8	0.8	0.2	0.3	0.2	0.3	0.3
Delay (s)	47.5	47.5	47.5	61.5	49.2	5.2	5.2	3.3	2.7	3.3	2.7	2.7
Level of Service	D	D	D	E	D	A	A	A	A	A	A	A
Approach Delay (s)	47.5	47.5	47.5	51.9	51.9	5.2	5.2	3.0	3.0	3.0	3.0	3.0
Approach LOS	D	D	D	D	D	A	A	A	A	A	A	A

Intersection Summary

HCM Average Control Delay 20.8 HCM Level of Service C
 HCM Volume to Capacity ratio 0.41
 Actuated Cycle Length (s) 120.0 Sum of lost time (s) 12.0
 Intersection Capacity Utilization 71.3% ICU Level of Service C
 Analysis Period (min) 15
 c Critical Lane Group

Baseline
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Lanes, Volumes, Timings
4: Big K-Mart Driveway & Marietta Highway

Existing AM
12/28/2006

	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group Flow (vph)	133	443	558	5	897	377	435	837	16	
Act Effct Green (s)	13.2	29.0	29.0	5.9	32.8	32.8	29.0	63.6	63.6	
Actuated g/C Ratio	0.11	0.24	0.24	0.05	0.27	0.27	0.24	0.53	0.53	
v/c Ratio	0.66	1.03	0.69	0.06	0.93	0.55	1.02	0.45	0.02	
Control Delay	65.9	96.3	8.2	55.4	59.2	8.5	83.8	13.9	6.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.9	96.3	8.2	55.4	59.2	8.5	83.8	13.9	6.0	
LOS	E	F	A	E	E	A	F	B	A	
Approach Delay	65.9	47.2			44.2			37.4		
Approach LOS	E	D			D			D		
Queue Length 50th (ft)	98	~368	0	4	359	15	~334	186	1	
Queue Length 95th (ft)	123	#521	61	17	#515	103 m#521	281	m4		
Internal Link Dist (ft)	162	491			2132			4585		
Turn Bay Length (ft)	243	430	806	118	967	688	428	1876	843	
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.55	1.03	0.69	0.04	0.93	0.55	1.02	0.45	0.02	
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 8 (7%), Referenced to phase 2:SBT and 6:NBT, Start of Green										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 1.03										
Intersection Signal Delay: 43.4	Intersection LOS: D									
Intersection Capacity Utilization 82.5%	ICU Level of Service E									
Analysis Period (min) 15										
~ Volume exceeds capacity, queue is theoretically infinite.										
Queue shown is maximum after two cycles.										
# 95th percentile volume exceeds capacity, queue may be longer.										
Queue shown is maximum after two cycles.										
m Volume for 95th percentile queue is metered by upstream signal.										

Baseline
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HCM Signalized Intersection Capacity Analysis
4: Big K-Mart Driveway & Marietta Highway

Existing AM
12/28/2006

	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	1811	1779	1583	1779	1583	1779	1583	1779	1583	1583
Flt Permitted	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (perm)	1811	1779	1583	1779	1583	1779	1583	1779	1583	1583
Volume (vph)	40	48	5	353	24	474	5	852	358	745
Peak-hour factor, PHF	0.70	0.70	0.70	0.85	0.85	0.85	0.95	0.95	0.89	0.89
Adj. Flow (vph)	57	69	7	415	28	558	5	897	377	837
RTOR Reduction (vph)	0	2	0	0	0	423	0	264	0	4
Lane Group Flow (vph)	0	131	0	0	443	135	5	897	113	435
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Protected Phases	8	8	8	4	4	4	1	6	5	2
Permitted Phases										
Actuated Green, G (s)	13.2	29.0	29.0	29.0	29.0	29.0	1.4	29.6	29.6	32.2
Effective Green, g (s)	13.2	29.0	29.0	29.0	29.0	29.0	1.4	29.6	29.6	32.2
Actuated g/C Ratio	0.11	0.24	0.24	0.24	0.24	0.24	0.01	0.25	0.25	0.27
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	199	430	383	21	873	390	475	1781	797	
v/s Ratio Prot	c0.07	c0.25	c0.25	c0.25	c0.25	c0.25	c0.25	c0.25	c0.25	0.24
v/s Ratio Perm										
v/c Ratio	0.66	1.03	0.35	0.35	0.24	1.03	0.29	0.92	0.47	0.01
Uniform Delay, d1	51.2	45.5	37.7	58.8	45.2	36.7	42.6	19.4	14.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.71	0.53
Incremental Delay, d2	7.7	51.4	0.6	5.8	37.7	1.9	19.6	0.8	0.0	
Delay (s)	58.9	96.9	38.3	64.6	82.9	38.5	55.9	14.6	8.0	
Level of Service	E	F	D	E	F	D	E	D	B	A
Approach Delay (s)	58.9	64.2			69.7			28.5		
Approach LOS	E	E			E			C		
Intersection Summary										
HCM Average Control Delay	53.5									
HCM Volume to Capacity ratio	0.95									
Actuated Cycle Length (s)	120.0									
Intersection Capacity Utilization	82.5%									
Analysis Period (min)	15									
c Critical Lane Group										

Baseline
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Lanes, Volumes, Timings
5: Riverstone Parkway & I - 575 Northbound Ramp

Existing AM
12/28/2006

	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	166	369	483	53	517	343
Act Effct Green (s)	88.9	88.9	76.0	120.0	23.1	23.1
Actuated g/C Ratio	0.74	0.74	0.63	1.00	0.19	0.19
v/c Ratio	0.32	0.14	0.22	0.03	0.78	0.59
Control Delay	5.2	3.0	10.5	0.0	54.3	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.2	3.0	10.5	0.0	54.3	8.4
LOS	A	A	B	A	D	A
Approach Delay	3.7 9.5					
Approach LOS	A A					
Queue Length 50th (ft)	20	24	78	0	197	0
Queue Length 95th (ft)	m52	51	127	0	241	76
Internal Link Dist (ft)	1330 1370					
Turn Bay Length (ft)	370	2620	2242	1583	1230	787
Base Capacity (vph)	718	2620	2242	1583	1230	787
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.14	0.22	0.03	0.42	0.44

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 13 (11%), Referenced to phase 2:WBT and 6:EBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 19.7
Intersection Capacity Utilization 45.6%
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Baseline
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HCM Signalized Intersection Capacity Analysis
5: Riverstone Parkway & I - 575 Northbound Ramp

Existing AM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	1.00	0.95		0.95	1.00	0.97	1.00		1.00			
Flt	1.00	1.00		1.00	0.85	1.00	0.85		1.00			
Flt Protected	0.95	1.00		1.00	1.00	0.95	1.00		1.00			
Satd. Flow (prot)	1770	3539		3539	1583	3433	1583		3539			
Flt Permitted	0.43	1.00		1.00	1.00	0.95	1.00		1.00			
Satd. Flow (perm)	808	3539		3539	1583	3433	1583		3539			
Volume (vph)	156	347	0	0	464	51	496	0	329	0	0	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	166	369	0	0	483	53	517	0	343	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	277	0	0	0
Lane Group Flow (vph)	166	369	0	0	483	53	517	0	66	0	0	0
Turn Type	pm+pt Free custom custom											
Protected Phases	1	6		2								
Permitted Phases	6					Free	4		4			
Actuated Green, G (s)	88.9	88.9		76.1	120.0	23.1			23.1			
Effective Green, g (s)	88.9	88.9		76.1	120.0	23.1			23.1			
Actuated g/C Ratio	0.74	0.74		0.63	1.00	0.19			0.19			
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0			4.0			
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0			3.0			
Lane Grp Cap (vph)	669	2622		2244	1583	661			305			
v/s Ratio Prot	c0.02	0.10		0.14								
v/s Ratio Perm	c0.17				0.03	c0.15			0.04			
v/c Ratio	0.25	0.14		0.22	0.03	0.78			0.22			
Uniform Delay, d1	4.7	4.5		9.3	0.0	46.1			40.8			
Progression Factor	0.70	0.57		1.00	1.00	1.00			1.00			
Incremental Delay, d2	0.2	0.1		0.2	0.0	6.0			0.4			
Delay (s)	3.5	2.7		9.5	0.0	52.1			41.2			
Level of Service	A	A		A	A	D			D			
Approach Delay (s)		2.9		8.6		47.7			0.0			
Approach LOS		A		A		D			A			
Intersection Summary												
HCM Average Control Delay					24.4	HCM Level of Service				C		
HCM Volume to Capacity ratio					0.36							
Actuated Cycle Length (s)					120.0	Sum of lost time (s)				8.0		
Intersection Capacity Utilization					45.6%	ICU Level of Service				A		
Analysis Period (min)					15							
c Critical Lane Group												

Baseline
A & R Engineering Inc.

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Lanes, Volumes, Timings
6: Riverstone Parkway & I - 575 Southbound Ramp

Existing AM
12/28/2006

	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group						
Lane Group Flow (vph)	446	541	303	798	130	423
Act Effct Green (s)	85.5	120.0	98.6	98.6	13.4	120.0
Actuated g/C Ratio	0.71	1.00	0.82	0.82	0.11	1.00
v/c Ratio	0.18	0.34	0.50	0.27	0.66	0.27
Control Delay	3.5	1.1	5.7	1.6	66.0	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.5	1.1	5.7	1.6	66.0	0.4
LOS	A	A	A	A	E	A
Approach Delay	2.2			2.7		
Approach LOS	A			A		
Queue Length 50th (ft)	13	6	23	27	98	0
Queue Length 95th (ft)	87	34	m32	40	158	0
Internal Link Dist (ft)	752			1330		
Turn Bay Length (ft)	225	375				
Base Capacity (vph)	2521	1583	898	2907	472	1583
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.34	0.34	0.27	0.28	0.27
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 13 (11%), Referenced to phase 2:WBTL and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.66						
Intersection Signal Delay: 5.3						Intersection LOS: A
Intersection Capacity Utilization 45.6%						ICU Level of Service A
Analysis Period (min) 15						
m Volume for 95th percentile queue is metered by upstream signal.						

HCM Signalized Intersection Capacity Analysis
6: Riverstone Parkway & I - 575 Southbound Ramp

Existing AM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔↔	↔	↔	↔↔	↔				↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	1.00	0.95	1.00				1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	1.00				1.00	0.85	1.00
Flt Protected	1.00	1.00	0.95	1.00						0.95	1.00	
Satd. Flow (prot)	3539	1583	1770	3539						1770	1583	
Flt Permitted	1.00	1.00	0.47	1.00						0.95	1.00	
Satd. Flow (perm)	3539	1583	867	3539						1770	1583	
Volume (vph)	0	415	503	279	734	0	0	0	0	117	0	381
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.90	0.90
Adj. Flow (vph)	0	446	541	303	798	0	0	0	0	130	0	423
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	446	541	303	798	0	0	0	0	130	0	423
Turn Type			Free	pm+pt						custom		Free
Protected Phases		6		5	2						8	
Permitted Phases			Free									Free
Actuated Green, G (s)		85.5	120.0	98.6	98.6					13.4		120.0
Effective Green, g (s)		85.5	120.0	98.6	98.6					13.4		120.0
Actuated g/C Ratio		0.71	1.00	0.82	0.82					0.11		1.00
Clearance Time (s)		4.0		4.0	4.0					4.0		
Vehicle Extension (s)		3.0		3.0	3.0					3.0		
Lane Grp Cap (vph)		2522	1583	781	2908					198		1583
v/s Ratio Prot		0.13		0.03	0.23							
v/s Ratio Perm			c0.34	c0.29						c0.07		0.27
v/c Ratio		0.18	0.34	0.39	0.27					0.66		0.27
Uniform Delay, d1		5.7	0.0	2.5	2.5					51.1		0.0
Progression Factor		0.51	1.00	1.13	0.51					1.00		1.00
Incremental Delay, d2		0.1	0.6	0.3	0.2					7.6		0.4
Delay (s)		3.0	0.6	3.1	1.5					58.7		0.4
Level of Service		A	A	A	A					E		A
Approach Delay (s)		1.7			1.9			0.0			14.1	
Approach LOS		A			A			A			B	
Intersection Summary												
HCM Average Control Delay			4.4									A
HCM Volume to Capacity ratio			0.41									
Actuated Cycle Length (s)			120.0									4.0
Intersection Capacity Utilization			45.6%									A
Analysis Period (min)			15									
c Critical Lane Group												



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Lane Flow (vphpl)	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.97	1.00
Flt	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	5085	3433	1583
Flt Permitted	0.31	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	575	5085	5085	5085	3433	1583
Volume (vph)	79	644	782	333	209	76
Peak-hour factor, PHF	0.94	0.94	0.95	0.95	0.86	0.86
Adj. Flow (vph)	84	685	823	351	243	88
RTOR Reduction (vph)	0	0	0	0	0	78
Lane Group Flow (vph)	84	685	823	351	243	10
Turn Type	pm+pt	Free	Free	Free	Perm	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6			Free		8
Actuated Green, G (s)	99.0	99.0	90.4	120.0	13.0	13.0
Effective Green, g (s)	99.0	99.0	90.4	120.0	13.0	13.0
Actuated g/C Ratio	0.82	0.82	0.75	1.00	0.11	0.11
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	520	4195	3831	1583	372	171
v/s Ratio Prot	0.01	0.13	0.16		0.07	
v/s Ratio Perm	0.13			0.22		0.01
v/c Ratio	0.16	0.16	0.21	0.22	0.65	0.06
Uniform Delay, d1	2.1	2.1	4.4	0.0	51.3	48.0
Progression Factor	0.59	0.30	0.57	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1	0.1	0.3	4.1	0.1
Delay (s)	1.4	0.7	2.6	0.3	55.4	48.1
Level of Service	A	A	A	A	E	D
Approach Delay (s)		0.8	1.9		53.5	
Approach LOS		A	A		D	

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Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 8 (7%), Referenced to phase 2:WBT and 6:EBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 8.2
Intersection Capacity Utilization 35.4%
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Lane Flow (vphpl)	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.97	1.00
Flt	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	5085	3433	1583
Flt Permitted	0.31	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	575	5085	5085	5085	3433	1583
Volume (vph)	79	644	782	333	209	76
Peak-hour factor, PHF	0.94	0.94	0.95	0.95	0.86	0.86
Adj. Flow (vph)	84	685	823	351	243	88
RTOR Reduction (vph)	0	0	0	0	0	78
Lane Group Flow (vph)	84	685	823	351	243	10
Turn Type	pm+pt	Free	Free	Free	Perm	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6			Free		8
Actuated Green, G (s)	99.0	99.0	90.4	120.0	13.0	13.0
Effective Green, g (s)	99.0	99.0	90.4	120.0	13.0	13.0
Actuated g/C Ratio	0.82	0.82	0.75	1.00	0.11	0.11
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	520	4195	3831	1583	372	171
v/s Ratio Prot	0.01	0.13	0.16		0.07	
v/s Ratio Perm	0.13			0.22		0.01
v/c Ratio	0.16	0.16	0.21	0.22	0.65	0.06
Uniform Delay, d1	2.1	2.1	4.4	0.0	51.3	48.0
Progression Factor	0.59	0.30	0.57	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1	0.1	0.3	4.1	0.1
Delay (s)	1.4	0.7	2.6	0.3	55.4	48.1
Level of Service	A	A	A	A	E	D
Approach Delay (s)		0.8	1.9		53.5	
Approach LOS		A	A		D	

Intersection Summary
HCM Average Control Delay
HCM Volume to Capacity ratio
Actuated Cycle Length (s)
Intersection Capacity Utilization
Analysis Period (min)
c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	168	566	792	168	232	73
Act Effct Green (s)	98.3	98.3	85.1	120.0	13.7	13.7
Actuated g/C Ratio	0.82	0.82	0.71	1.00	0.11	0.11
v/c Ratio	0.37	0.14	0.22	0.11	0.59	0.30
Control Delay	6.4	3.7	3.3	0.1	53.4	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.4	3.7	3.3	0.1	53.4	12.4
LOS	A	A	A	A	D	B
Approach Delay	4.3 2.8					
Approach LOS	A A					
Queue Length 50th (ft)	12	15	21	0	89	1
Queue Length 95th (ft)	93	91	39	0	105	m22
Internal Link Dist (ft)	1839 1490					
Turn Bay Length (ft)	190	4164	3607	1583	944	488
Base Capacity (vph)	719	4164	3607	1583	944	488
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.14	0.22	0.11	0.25	0.15

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 23 (19%), Referenced to phase 2:WBT and 6:EBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.59
Intersection Signal Delay: 9.6
Intersection Capacity Utilization 39.2%
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.97	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.85	1.00	0.95
Satd. Flow (prot)	1770	5085	5085	1583	3433	1583
Flt Permitted	0.31	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	586	5085	5085	1583	3433	1583
Volume (vph)	156	526	737	156	220	69
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.95	0.95
Adj. Flow (vph)	168	566	792	168	232	73
RTOR Reduction (vph)	0	0	0	0	0	65
Lane Group Flow (vph)	168	566	792	168	232	8
Turn Type	pm+pt Free Perm					
Protected Phases	1	6	2			8
Permitted Phases	6			Free		8
Actuated Green, G (s)	98.3	98.3	85.2	120.0	13.7	13.7
Effective Green, g (s)	98.3	98.3	85.2	120.0	13.7	13.7
Actuated g/C Ratio	0.82	0.82	0.71	1.00	0.11	0.11
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	570	4165	3610	1583	392	181
v/s Ratio Prot	c0.02	0.11	0.16		c0.07	
v/s Ratio Perm	c0.22			0.11		0.01
v/c Ratio	0.29	0.14	0.22	0.11	0.59	0.05
Uniform Delay, d1	2.4	2.2	6.0	0.0	50.5	47.3
Progression Factor	1.55	1.42	0.46	1.00	0.98	0.99
Incremental Delay, d2	0.3	0.1	0.1	0.1	1.9	0.1
Delay (s)	4.0	3.2	2.9	0.1	51.2	47.0
Level of Service	A	A	A	A	D	D
Approach Delay (s)	3.4 2.4 50.2					
Approach LOS	A A D					

Intersection Summary

HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
9: Riverstone Parkway & Waleska Road

Existing AM
12/28/2006

Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	449	593	297	588	160	204	126	138	279	487
Act Effct Green (s)	76.6	58.1	60.4	45.9	31.4	23.4	23.4	31.4	23.4	23.4
Actuated g/C Ratio	0.64	0.48	0.50	0.38	0.26	0.20	0.20	0.26	0.20	0.20
v/c Ratio	0.85	0.36	0.57	0.44	0.63	0.56	0.31	0.46	0.77	0.85
Control Delay	50.8	7.6	10.8	23.0	43.7	48.4	7.9	32.7	53.1	22.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.8	7.6	10.8	23.0	43.7	48.4	7.9	32.7	53.1	22.7
LOS	D	A	B	C	D	D	A	C	D	C
Approach Delay	26.2		18.9		36.4				33.6	
Approach LOS	C		B		D				C	
Queue Length 50th (ft)	220	45	63	177	97	146	0	75	204	74
Queue Length 95th (ft)	m343	m88	34	258	138	201	46	107	229	140
Internal Link Dist (ft)	1240		3515		1145				4852	
Turn Bay Length (ft)	150	150	627	1333	254	512	527	298	512	676
Base Capacity (vph)	628	1668	627	1333	254	512	527	298	512	676
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.36	0.47	0.44	0.63	0.40	0.24	0.46	0.54	0.72

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 27.8	Intersection LOS: C
Intersection Capacity Utilization 74.1%	ICU Level of Service D
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

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HCM Signalized Intersection Capacity Analysis
9: Riverstone Parkway & Waleska Road

Existing AM
12/28/2006

Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.96	1.00	0.98	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3399	1770	3458	1770	1863	1583	1770	1863	1583
Flt Permitted	0.30	1.00	0.43	1.00	0.24	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	554	3399	797	3458	453	1863	1583	755	1863	1583
Volume (vph)	422	410	148	267	448	81	155	198	122	130
Peak-hour factor, PHF	0.94	0.94	0.90	0.90	0.90	0.97	0.97	0.94	0.94	0.94
Adj. Flow (vph)	449	436	157	297	498	90	160	204	126	138
RTOR Reduction (vph)	0	24	0	10	0	0	0	101	0	0
Lane Group Flow (vph)	449	569	0	297	578	0	160	204	25	138
Turn Type	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	1	6	5	2	7	4	3	8	3	8
Permitted Phases	6	6	2	2	4	4	4	8	8	8
Actuated Green, G (s)	76.6	58.1	60.4	45.9	31.4	23.4	23.4	31.4	23.4	23.4
Effective Green, g (s)	76.6	58.1	60.4	45.9	31.4	23.4	23.4	31.4	23.4	23.4
Actuated g/C Ratio	0.64	0.48	0.50	0.38	0.26	0.19	0.19	0.26	0.19	0.19
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	624	1646	519	1323	206	363	309	265	363	309
v/s Ratio Prot	c0.16	0.17	0.07	0.17	c0.05	0.11	0.03	0.03	0.15	0.14
v/s Ratio Perm	c0.30		0.22		c0.15		0.02	0.10	0.14	0.14
v/c Ratio	0.72	0.35	0.57	0.44	0.78	0.56	0.08	0.52	0.77	0.71
Uniform Delay, d1	12.8	19.2	17.8	27.5	38.0	43.7	39.5	35.8	45.7	45.1
Progression Factor	1.91	0.36	0.49	0.73	1.00	1.00	1.00	0.91	0.91	0.75
Incremental Delay, d2	2.6	0.4	1.5	1.0	16.6	2.0	0.1	1.6	8.2	6.5
Delay (s)	26.9	7.3	10.3	21.0	54.6	45.7	39.6	34.0	49.8	40.5
Level of Service	C	A	B	C	D	D	D	C	D	D
Approach Delay (s)	15.7		17.4		47.0		42.4		D	
Approach LOS	B		B		D		D		D	
Intersection Summary										
HCM Average Control Delay	28.0		HCM Level of Service		C					
HCM Volume to Capacity ratio	0.73									
Actuated Cycle Length (s)	120.0		Sum of lost time (s)		12.0					
Intersection Capacity Utilization	74.1%		ICU Level of Service		D					
Analysis Period (min)	15									
c Critical Lane Group										

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Lanes, Volumes, Timings
10: Reinhardt College Parkway & Waleska Road

Existing AM
12/28/2006

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group						
Lane Group Flow (vph)	78	222	462	42	353	845
Act Effct Green (s)	9.5	9.5	88.5	120.0	102.5	102.5
Actuated g/C Ratio	0.08	0.08	0.74	1.00	0.85	0.85
v/c Ratio	0.56	0.67	0.34	0.03	0.68	0.53
Control Delay	69.8	19.4	4.1	0.0	8.7	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.8	19.4	4.1	0.0	8.7	3.9
LOS	E	B	A	A	A	A
Approach Delay	32.5	3.8				5.3
Approach LOS	C	A				A
Queue Length 50th (ft)	59	24	53	0	36	125
Queue Length 95th (ft)	102	41	m82	m0	65	216
Internal Link Dist (ft)	3912	4852				2585
Turn Bay Length (ft)	398	528	1374	1583	767	1592
Base Capacity (vph)	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.42	0.34	0.03	0.46	0.53
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 34 (28%), Referenced to phase 2:SBTL and 6:NBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.68						
Intersection Signal Delay: 9.0	Intersection LOS: A					
Intersection Capacity Utilization 54.2%	ICU Level of Service A					
Analysis Period (min) 15						
m Volume for 95th percentile queue is metered by upstream signal.						

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HCM Signalized Intersection Capacity Analysis
10: Reinhardt College Parkway & Waleska Road

Existing AM
12/28/2006

	WBL	WBR	NBT	NBR	SBL	SBT
Movement						
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt	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)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.44	1.00
Satd. Flow (perm)	1770	1583	1863	1583	817	1863
Volume (vph)	68	193	430	39	321	769
Peak-hour factor, PHF	0.87	0.87	0.93	0.93	0.91	0.91
Adj. Flow (vph)	78	222	462	42	353	845
RTOR Reduction (vph)	0	204	0	0	0	0
Lane Group Flow (vph)	78	18	462	42	353	845
Turn Type	Perm	Perm	Free	Free	pm+pt	
Protected Phases	4	6	5	2		
Permitted Phases	4		Free	2		
Actuated Green, G (s)	9.5	9.5	88.5	120.0	102.5	102.5
Effective Green, g (s)	9.5	9.5	88.5	120.0	102.5	102.5
Actuated g/C Ratio	0.08	0.08	0.74	1.00	0.85	0.85
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	140	125	1374	1583	777	1591
v/s Ratio Prot	c0.04	0.01	0.25	0.03	0.04	c0.45
v/s Ratio Perm						
v/c Ratio	0.56	0.14	0.34	0.03	0.45	0.53
Uniform Delay, d1	53.2	51.4	5.5	0.0	2.4	2.3
Progression Factor	1.04	1.30	0.60	1.00	1.00	1.00
Incremental Delay, d2	4.7	0.5	0.4	0.0	0.4	1.3
Delay (s)	59.9	67.4	3.7	0.0	2.8	3.6
Level of Service	E	E	A	A	A	A
Approach Delay (s)	65.5		3.4		3.4	
Approach LOS	E		A		A	
Intersection Summary						
HCM Average Control Delay	12.7					
HCM Volume to Capacity ratio	0.53					
Actuated Cycle Length (s)	120.0					
Intersection Capacity Utilization	54.2%					
Analysis Period (min)	15					
c Critical Lane Group						

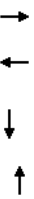
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Lanes, Volumes, Timings
11: Reinhardt College Parkway & College Street

Existing AM
12/28/2006

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	447	251	278	378
Sign Control	Stop	Stop	Stop	Stop
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 65.1%				
Analysis Period (min) 15				



HCM Unsignalized Intersection Capacity Analysis
11: Reinhardt College Parkway & College Street

Existing AM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	Stop			↕			↕	
Sign Control		Stop		Stop	Stop			Stop			Stop	
Volume (vph)	55	315	9	27	99	62	12	113	86	166	71	54
Peak Hour Factor	0.85	0.85	0.85	0.75	0.75	0.75	0.76	0.76	0.76	0.77	0.77	0.77
Hourly flow rate (vph)	65	371	11	36	132	83	16	149	113	216	92	70
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	446	251	278	378								
Volume Left (vph)	65	36	16	216								
Volume Right (vph)	11	83	113	70								
HadJ (s)	0.05	-0.14	-0.20	0.04								
Departure Headway (s)	7.3	7.8	7.7	7.6								
Degree Utilization, x	0.91	0.55	0.59	0.79								
Capacity (veh/h)	446	417	434	453								
Control Delay (s)	48.3	19.8	21.4	33.8								
Approach Delay (s)	48.3	19.8	21.4	33.8								
Approach LOS	E	C	C	D								
Intersection Summary												
Delay	33.5											
HCM Level of Service	D											
Intersection Capacity Utilization	65.1%											
Analysis Period (min)	15											



Lanes, Volumes, Timings
12: Knox Bridge Highway & Fincher Road

Existing AM
12/28/2006

	↖	→	↗	←	↑	↓
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	68	445	28	390	36	167
Sign Control	Free	Free	Free	Free	Stop	Stop
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 49.9%						
Analysis Period (min) 15						
ICU Level of Service A						

HCM Unsignalized Intersection Capacity Analysis
12: Knox Bridge Highway & Fincher Road

Existing AM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱	↰	↱	↰	↱
Sign Control	Free	Free		Free	Free		Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%			0%			0%			0%		
Volume (veh/h)	61	397	4	27	332	42	2	1	23	73	9	70
Peak Hour Factor	0.90	0.90	0.90	0.96	0.96	0.96	0.72	0.72	0.72	0.91	0.91	0.91
Hourly flow rate (vph)	68	441	4	28	346	44	3	1	32	80	10	77
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	390		446				1063	1025	443	1033	1005	368
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCu, unblocked vol	390		446				1063	1025	443	1033	1005	368
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 %	94		97				98	99	95	57	96	89
cM capacity (veh/h)	1169		1115				161	216	614	186	222	678
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	68	446	28	390	36	167						
Volume Left	68	0	28	0	3	80						
Volume Right	0	4	0	44	32	77						
cSH	1169	1700	1115	1700	477	284						
Volume to Capacity	0.06	0.26	0.03	0.23	0.08	0.59						
Queue Length 95th (ft)	5	0	2	0	6	87						
Control Delay (s)	8.3	0.0	8.3	0.0	13.2	34.4						
Lane LOS	A		A		B	D						
Approach Delay (s)	1.1		0.6		13.2	34.4						
Approach LOS			B		D							
Intersection Summary												
Average Delay	6.2											
Intersection Capacity Utilization	49.9%			ICU Level of Service			A					
Analysis Period (min)	15											

Lanes, Volumes, Timings
13: N Etowah Drive & Riverstone Parkway

Existing AM
12/28/2006

	→	←	↔	↑	↗	↘	↓	↙
Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	112	16	17	941	21	5	1197	13
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free
Intersection Summary								
Control Type: Unsignalized								
Intersection Capacity Utilization 41.8%								
Analysis Period (min) 15								
ICU Level of Service A								

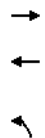
HCM Unsignalized Intersection Capacity Analysis
13: N Etowah Drive & Riverstone Parkway

Existing AM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕	↕	↕	↕	↕
Sign Control		Stop		Stop	Stop		Free	Free	Free	Free	Free	Free
Grade		0%		0%	0%		0%	0%	0%	0%	0%	0%
Volume (veh/h)	4	0	79	6	0	4	16	885	20	5	1089	12
Peak Hour Factor	0.74	0.74	0.74	0.62	0.62	0.62	0.94	0.94	0.94	0.91	0.91	0.91
Hourly flow rate (vph)	5	0	107	10	0	6	17	941	21	5	1197	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1712	2205	598	1585	2196	471	1210			963		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1712	2205	598	1585	2196	471	1210			963		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	100	76	82	100	99	97			99		
cM capacity (veh/h)	56	42	445	54	43	539	572			711		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	112	16	17	471	471	21	5	598	598	13		
Volume Left	5	10	17	0	0	0	5	0	0	0		
Volume Right	107	6	0	0	0	21	0	0	0	13		
cSH	334	84	572	1700	1700	1700	711	1700	1700	1700		
Volume to Capacity	0.34	0.19	0.03	0.28	0.28	0.01	0.01	0.35	0.35	0.01		
Queue Length 95th (ft)	36	17	2	0	0	0	1	0	0	0		
Control Delay (s)	21.2	57.8	11.5	0.0	0.0	0.0	10.1	0.0	0.0	0.0		
Lane LOS	C	F	B				B					
Approach Delay (s)	21.2	57.8	0.2				0.0					
Approach LOS	C	F										
Intersection Summary												
Average Delay	1.5						A					
Intersection Capacity Utilization	41.8%						A					
Analysis Period (min)	15											

Lanes, Volumes, Timings
14: Broad Water Bay Road & Fincher Road

Existing AM
12/28/2006



Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	44	100	108	
Sign Control	Stop	Free	Free	Free
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 18.1%				
ICU Level of Service A				
Analysis Period (min) 15				

HCM Unsignalized Intersection Capacity Analysis
14: Broad Water Bay Road & Fincher Road

Existing AM
12/28/2006



Movement	EBL	EBR	NBL	SBT	SBR
Lane Configurations	Stop	Stop	Free	Free	Free
Sign Control	Stop	Stop	Free	Free	Free
Grade	0%	0%	0%	0%	0%
Volume (veh/h)	21	18	5	75	84
Peak Hour Factor	0.89	0.89	0.80	0.80	0.87
Hourly flow rate (vph)	24	20	6	94	97
Pedestrians					
Lane Width (ft)					
Walking Speed (ft/s)					
Percent Blockage					
Right turn flare (veh)					
Median type	None				
Median storage (veh)					
Upstream signal (ft)					
pX, platoon unblocked					
VC, conflicting volume	209	102	108		
VC1, stage 1 conf vol					
VC2, stage 2 conf vol					
vCu, unblocked vol	209	102	108		
tC, single (s)	6.4	6.2	4.1		
tC, 2 stage (s)					
tF (s)	3.5	3.3	2.2		
p0 queue free %	97	98	100		
cM capacity (veh/h)	777	953	1483		
Direction, Lane #	EB 1	NB 1	SB 1		
Volume Total	44	100	108		
Volume Left	24	6	0		
Volume Right	20	0	11		
cSH	849	1483	1700		
Volume to Capacity	0.05	0.00	0.06		
Queue Length 95th (ft)	4	0	0		
Control Delay (s)	9.5	0.5	0.0		
Lane LOS	A	A			
Approach Delay (s)	9.5	0.5	0.0		
Approach LOS	A				
Intersection Summary					
Average Delay	1.8				
Intersection Capacity Utilization	18.1%				
ICU Level of Service	A				
Analysis Period (min)	15				

Lanes, Volumes, Timings
15: Bells Ferry Road & Marietta Highway

Existing AM
12/28/2006

Lane Group	EBT	WBT	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	405	172	18	384	73	445
Act Effct Green (s)	38.4	38.4	73.6	73.6	73.6	73.6
Actuated g/C Ratio	0.32	0.32	0.61	0.61	0.61	0.61
v/c Ratio	0.94	0.30	0.05	0.34	0.17	0.39
Control Delay	69.3	12.7	13.5	14.2	14.3	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.3	12.7	13.5	14.2	14.3	15.0
LOS	E	B	B	B	B	A
Approach Delay	69.3	12.7	14.2	12.1		
Approach LOS	E	B	B	B		
Queue Length 50th (ft)	304	57	5	135	23	163
Queue Length 95th (ft)	346	72	21	261	60	291
Internal Link Dist (ft)	1761	266		463		416
Turn Bay Length (ft)	692	902	357	1138	427	1142
Base Capacity (vph)	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.19	0.05	0.34	0.17	0.39
Analysis Period (min)	15					

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 24 (20%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 26.7	Intersection LOS: C
Intersection Capacity Utilization 63.1%	ICU Level of Service B
Analysis Period (min) 15	

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
15: Bells Ferry Road & Marietta Highway

Existing AM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔		↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97			1.00	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1803			1733	1733		1770	1856		1770	1863	1583
Flt Permitted	0.66			0.97	0.97		0.43	1.00		0.47	1.00	1.00
Satd. Flow (perm)	1217			1685	1685		797	1856		879	1863	1583
Volume (vph)	196	139	13	8	57	64	17	356	9	63	383	132
Peak-hour factor, PHF	0.86	0.86	0.86	0.75	0.75	0.75	0.95	0.95	0.95	0.86	0.86	0.86
Adj. Flow (vph)	228	162	15	11	76	85	18	375	9	73	445	153
RTOR Reduction (vph)	0	1	0	0	41	0	0	0	0	0	0	59
Lane Group Flow (vph)	0	404	0	0	131	0	18	384	0	73	445	94
Turn Type	Perm	Perm		Perm		Perm	Perm	Perm		Perm	Perm	Perm
Protected Phases	8	8		4		4	6			2		2
Permitted Phases	8			4			6			2		2
Actuated Green, G (s)	38.4			38.4			73.6			73.6		73.6
Effective Green, g (s)	38.4			38.4			73.6			73.6		73.6
Actuated g/C Ratio	0.32			0.32			0.61			0.61		0.61
Clearance Time (s)	4.0			4.0			4.0			4.0		4.0
Vehicle Extension (s)	3.0			3.0			3.0			3.0		3.0
Lane Grp Cap (vph)	389			539			489			539		971
v/s Ratio Prot							0.21					c0.24
v/s Ratio Perm	c0.33			0.08			0.02			0.08		0.06
v/c Ratio	1.04			0.24			0.04			0.14		0.39
Uniform Delay, d1	40.8			30.1			9.2			11.3		9.8
Progression Factor	1.00			0.66			1.00			1.00		1.00
Incremental Delay, d2	55.7			0.2			0.1			0.5		0.2
Delay (s)	96.5			20.2			9.3			12.1		9.7
Level of Service	F			C			A			B		A
Approach Delay (s)	96.5			20.2			12.0			11.8		
Approach LOS	F			C			B					B
Intersection Summary												
HCM Average Control Delay				33.5			HCM Level of Service			C		
HCM Volume to Capacity ratio				0.61								
Actuated Cycle Length (s)				120.0			Sum of lost time (s)			8.0		
Intersection Capacity Utilization				63.1%			ICU Level of Service			B		
Analysis Period (min)				15								
c Critical Lane Group												

Baseline
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Existing PM Intersection Analysis

Lanes, Volumes, Timings
1: Cumming Highway & I -575 Northbound Ramp

Existing PM
12/28/2006

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	272	670	888	324	687	98
Lane Group Flow (vph)	0.77	0.30	0.54	0.36	0.65	0.18
v/c Ratio	31.3	10.9	25.5	3.6	39.3	6.7
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.3	10.9	25.5	3.6	39.3	6.7
Queue Length 50th (ft)	97	117	248	0	236	0
Queue Length 95th (ft)	188	150	356	56	302	39
Internal Link Dist (ft)	1047	677			501	
Turn Bay Length (ft)	150			325		300
Base Capacity (vph)	512	2212	1639	907	1059	556
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.30	0.54	0.36	0.65	0.18

Intersection Summary

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
1: Cumming Highway & I -575 Northbound Ramp

Existing PM
12/28/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.85
Flt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	3433	1583
Flt Permitted	0.20	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	371	3539	3539	1583	3433	1583
Volume (vph)	250	616	870	318	673	96
Peak-hour factor, PHF	0.92	0.92	0.98	0.98	0.98	0.98
Adj. Flow (vph)	272	670	888	324	687	98
RTOR Reduction (vph)	0	0	0	174	0	68
Lane Group Flow (vph)	272	670	888	150	687	30
Turn Type	pm+pt		Perm		custom	
Protected Phases	1	6	2			
Permitted Phases	6			2	8	8
Actuated Green, G (s)	75.0	75.0	55.6	55.6	37.0	37.0
Effective Green, g (s)	75.0	75.0	55.6	55.6	37.0	37.0
Actuated g/C Ratio	0.62	0.62	0.46	0.46	0.31	0.31
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	411	2212	1640	733	1059	488
v/s Ratio Prot	c0.08	0.19	0.25			
v/s Ratio Perm	c0.33			0.09	c0.20	0.02
v/c Ratio	0.66	0.30	0.54	0.20	0.65	0.06
Uniform Delay, d1	13.9	10.4	23.1	19.1	35.9	29.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.0	0.4	1.3	0.6	3.1	0.2
Delay (s)	17.9	10.8	24.4	19.7	39.0	29.5
Level of Service	B	B	C	B	D	C
Approach Delay (s)		12.8	23.1		37.8	
Approach LOS		B	C		D	
Intersection Summary						
HCM Average Control Delay			23.7		HCM Level of Service	C
HCM Volume to Capacity ratio			0.65			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			67.1%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Baseline
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Future PM
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Lanes, Volumes, Timings
2: Cumming Highway & I-575 Southbound Ramp

Existing PM
12/28/2006



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	367	469	1098	447	110
v/c Ratio	1.36	0.20	0.47	1.24	0.27
Control Delay	204.7	4.1	1.8	153.9	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	204.7	4.1	1.8	153.9	6.7
Queue Length 50th (ft)	~162	25	14	~185	0
Queue Length 95th (ft)	#216	40	33	#332	32
Internal Link Dist (ft)	2177	1047	555		
Turn Bay Length (ft)	275			320	
Base Capacity (vph)	269	2294	2325	361	410
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.36	0.20	0.47	1.24	0.27

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
2: Cumming Highway & I-575 Southbound Ramp

Existing PM
12/28/2006



Movement	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00
Flt Protected	1.00	1.00	0.89	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3146	1770	1583
Flt Permitted	0.22	1.00	1.00	0.95	1.00
Satd. Flow (perm)	415	3539	3146	1770	1583
Volume (vph)	330	422	270	773	434
Peak-hour factor, PHF	0.90	0.90	0.95	0.95	0.97
Adj. Flow (vph)	367	469	284	814	447
RTOR Reduction (vph)	0	0	286	0	0
Lane Group Flow (vph)	367	469	812	0	447
Turn Type	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	2	8	8
Permitted Phases	6	6	2	8	8
Actuated Green, G (s)	35.0	35.0	35.0	11.0	11.0
Effective Green, g (s)	35.0	35.0	35.0	11.0	11.0
Actuated g/C Ratio	0.65	0.65	0.65	0.20	0.20
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	269	2294	2039	361	322
v/s Ratio Prot	c0.88	0.13	0.26	c0.25	0.01
v/s Ratio Perm	1.36	0.20	0.40	1.24	0.07
Uniform Delay, d1	9.5	3.9	4.5	21.5	17.4
Progression Factor	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	186.0	0.2	0.6	128.8	0.1
Delay (s)	195.5	4.1	5.1	150.3	17.5
Level of Service	F	A	A	F	B
Approach Delay (s)	88.1	5.1	124.0		
Approach LOS	F	A	F		

Intersection Summary

HCM Average Control Delay	59.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.33		
Actuated Cycle Length (s)	54.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Baseline
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Future PM
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Lanes, Volumes, Timings
3: Bobo Grinding Co Driveway & Marietta Street

Existing PM
12/28/2006

	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	20	259	284	466	464	463
v/c Ratio	0.05	0.85	0.50	0.50	0.80	0.35
Control Delay	28.9	69.5	7.5	21.2	20.1	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	69.5	7.5	21.2	20.1	8.2
Queue Length 50th (ft)	10	193	2	217	126	123
Queue Length 95th (ft)	17	278	68	m393	199	187
Internal Link Dist (ft)	95	1440	3002			1058
Turn Bay Length (ft)		150			90	
Base Capacity (vph)	469	381	639	937	699	1329
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.68	0.44	0.50	0.66	0.35
Intersection Summary						
m Volume for 95th percentile queue is metered by upstream signal.						

Baseline
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Future PM
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HCM Signalized Intersection Capacity Analysis
3: Bobo Grinding Co Driveway & Marietta Street

Existing PM
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	1790	1790	1790	1790	1790	1790	1790	1790	1790	1790	1790	1790
Flt Permitted	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Satd. Flow (perm)	1687	1687	1687	1687	1687	1687	1687	1687	1687	1687	1687	1687
Volume (vph)	3	6	2	251	4	272	3	293	142	385	379	5
Peak-hour factor, PHF	0.55	0.55	0.55	0.97	0.97	0.97	0.94	0.94	0.94	0.94	0.83	0.83
Adj. Flow (vph)	5	11	4	259	4	280	3	312	151	464	457	6
RTOR Reduction (vph)	0	3	0	0	219	0	0	11	0	0	0	0
Lane Group Flow (vph)	0	17	0	259	65	0	0	455	0	464	463	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	8	8	4	4	4	4	6	6	5	5	2	2
Permitted Phases	8	8	4	4	4	4	6	6	5	5	2	2
Actuated Green, G (s)	26.2	26.2	26.2	26.2	26.2	26.2	62.5	62.5	85.8	85.8	85.8	85.8
Effective Green, g (s)	26.2	26.2	26.2	26.2	26.2	26.2	62.5	62.5	85.8	85.8	85.8	85.8
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22	0.22	0.52	0.52	0.72	0.72	0.72	0.72
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	368	368	303	346	346	346	926	926	687	1329	1329	1329
v/s Ratio Prot	0.01	0.01	c0.19	0.04	0.04	0.04	0.26	0.26	c0.11	0.25	0.25	0.25
v/s Ratio Perm	0.05	0.05	0.85	0.19	0.19	0.19	0.49	0.49	0.68	0.35	0.35	0.35
Uniform Delay, d1	37.0	37.0	45.1	38.2	38.2	38.2	18.5	18.5	9.2	6.5	6.5	6.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1	20.3	0.3	0.3	0.3	1.8	1.8	2.6	0.7	0.7	0.7
Delay (s)	37.1	37.1	65.4	38.5	38.5	38.5	18.7	18.7	11.8	7.2	7.2	7.2
Level of Service	D	D	E	D	D	D	B	B	B	B	B	B
Approach Delay (s)	37.1	37.1	51.3	18.7	18.7	18.7	9.5	9.5	9.5	9.5	9.5	9.5
Approach LOS	D	D	D	D	D	D	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	23.6				HCM Level of Service				C			
HCM Volume to Capacity ratio	0.71											
Actuated Cycle Length (s)	120.0				Sum of lost time (s)				8.0			
Intersection Capacity Utilization	76.1%				ICU Level of Service				D			
Analysis Period (min)	15											
c Critical Lane Group												

Baseline
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[illegible]

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBL	SBT	SBL	SBT
Lane Configurations		4			4										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. 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	1.00	1.00	1.00
Frt	0.98	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.97	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1781	1782	1583	1770	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770
Flt Permitted	0.97	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1781	1782	1583	1770	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770
Volume (vph)	70	46	19	365	38	479	13	747	446	291	848	22	848	22	848
Peak-hour factor, PHF	0.82	0.82	0.82	0.94	0.94	0.94	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	56	23	388	40	510	13	770	460	316	922	24	922	24	922
RTOR Reduction (vph)	0	5	0	0	0	377	0	0	341	0	0	6	0	6	0
Lane Group Flow (vph)	0	159	0	0	428	133	13	770	119	316	922	18	922	18	922
Turn Type	Split	Split	Split	Perm	Perm	Perm	Prot	Prot	Perm	Prot	Prot	Perm	Prot	Perm	Perm
Protected Phases	8	8	4	4	4	4	1	6	6	5	2	2	5	2	2
Permitted Phases	8	8	4	4	4	4	1	6	6	5	2	2	5	2	2
Actuated Green, G (s)	14.3	14.3	31.3	31.3	31.3	31.3	3.0	31.0	31.0	27.4	55.4	55.4	55.4	55.4	55.4
Effective Green, g (s)	14.3	14.3	31.3	31.3	31.3	31.3	3.0	31.0	31.0	27.4	55.4	55.4	55.4	55.4	55.4
Actuated g/C Ratio	0.12	0.12	0.26	0.26	0.26	0.26	0.02	0.26	0.26	0.26	0.23	0.46	0.46	0.46	0.46
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	212	465	413	44	914	409	404	1634	731	731	731	731	731	731	731
v/s Ratio Prot	0.09	0.24	0.08	0.01	0.22	0.08	0.01	0.22	0.08	0.18	0.26	0.01	0.26	0.01	0.26
v/s Ratio Perm	0.75	0.92	0.32	0.30	0.84	0.29	0.78	0.56	0.02	0.02	0.02	0.02	0.02	0.02	0.02
v/c Ratio	51.1	43.1	35.8	57.5	42.2	35.7	43.5	23.5	17.6	17.6	17.6	17.6	17.6	17.6	17.6
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.73	0.51	0.51	0.51	0.51	0.51
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.73	0.51	0.51	0.51	0.51	0.51
Incremental Delay, d2	13.5	23.6	0.5	3.7	9.3	1.8	8.9	1.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Delay (s)	64.6	66.7	36.2	61.2	51.5	37.5	45.8	18.4	8.9	8.9	8.9	8.9	8.9	8.9	8.9
Level of Service	E	E	D	E	D	D	D	D	D	D	D	B	B	A	A
Approach Delay (s)	64.6	50.1	46.4	28.1	50.1	46.4	28.1	50.1	46.4	28.1	50.1	46.4	28.1	50.1	46.4
Approach LOS	E	D	D	D	D	D	D	D	D	D	C	C	C	C	C
Intersection Summary															
HCM Average Control Delay	40.8	HCM Level of Service													
HCM Volume to Capacity ratio	0.84	D													
Actuated Cycle Length (s)	120.0	Sum of lost time (s)													
Intersection Capacity Utilization	75.7%	16.0													
Analysis Period (min)	15	D													
Critical Lane Group															

Lanes, Volumes, Timings
5: Riverstone Parkway & I - 575 Northbound Ramp

Existing PM
12/28/2006

	EBL	EBT	WBT	WBR	NBL	NBR	
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR	
Lane Group Flow (vph)	395	618	732	204	710	534	
v/c Ratio	0.85	0.27	0.48	0.13	0.75	0.85	
Control Delay	27.4	3.4	29.3	0.2	44.5	32.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	27.4	3.4	29.3	0.2	44.5	32.4	
Queue Length 50th (ft)	149	101	213	0	263	212	
Queue Length 95th (ft)	179	19	346	0	289	321	
Internal Link Dist (ft)	1330	1370					
Turn Bay Length (ft)	370		300	490			
Base Capacity (vph)	570	2330	1515	1583	1230	740	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.69	0.27	0.48	0.13	0.58	0.72	
Intersection Summary							

Baseline
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HCM Signalized Intersection Capacity Analysis
5: Riverstone Parkway & I - 575 Northbound Ramp

Existing PM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔		↔↔	↔↔	↔	↔↔	↔↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	1.00	0.95		0.95	1.00	0.97	1.00					
Flt	1.00	1.00		1.00	0.85	1.00	0.85					
Flt Protected	0.95	1.00		1.00	1.00	0.95	1.00					
Satd. Flow (prot)	1770	3539		3539	1583	3433	1583					
Flt Permitted	0.25	1.00		1.00	1.00	0.95	1.00					
Satd. Flow (perm)	461	3539		3539	1583	3433	1583					
Volume (vph)	379	593	0	0	688	192	682	0	513	0	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.94	0.94	0.94	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	395	618	0	0	732	204	710	0	534	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	195	0	0	0
Lane Group Flow (vph)	395	618	0	0	732	204	710	0	339	0	0	0
Turn Type	pm+pt					Free	custom		custom			
Protected Phases	1	6		2								
Permitted Phases	6					Free	4		4			
Actuated Green, G (s)	79.0	79.0		51.4	120.0	33.0	33.0		33.0			
Effective Green, g (s)	79.0	79.0		51.4	120.0	33.0	33.0		33.0			
Actuated g/C Ratio	0.66	0.66		0.43	1.00	0.28	0.28		0.28			
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	561	2330		1516	1583	944	435		435			
v/s Ratio Prot	c0.14	0.17		0.21								
v/s Ratio Perm	c0.32			0.13	0.21				c0.21			
v/c Ratio	0.70	0.27		0.48	0.13	0.75	0.78		0.78			
Uniform Delay, d1	12.4	8.5		24.7	0.0	39.8	40.1		40.1			
Progression Factor	0.48	0.33		1.00	1.00	1.00	1.00		1.00			
Incremental Delay, d2	3.7	0.3		1.1	0.2	3.4	8.6		8.6			
Delay (s)	9.6	3.1		25.8	0.2	43.2	48.7		48.7			
Level of Service	A	A		C	A	D	D		D			
Approach Delay (s)	5.6			20.2			45.6		D		0.0	
Approach LOS	A			C			D		A		A	
Intersection Summary												
HCM Average Control Delay	25.5			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.72			Sum of lost time (s)			8.0					
Actuated Cycle Length (s)	120.0			ICU Level of Service			C					
Intersection Capacity Utilization	69.5%			Analysis Period (min)			15					
Critical Lane Group												

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Lanes, Volumes, Timings
6: Riverstone Parkway & I - 575 Southbound Ramp

Existing PM
12/28/2006

	EBT	EBR	WBL	WBT	SBL	SBR	
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR	
Lane Group Flow (vph)	980	492	358	994	80	318	
v/c Ratio	0.43	0.31	0.77	0.33	0.52	0.20	
Control Delay	6.3	0.5	28.7	1.7	63.3	0.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	6.3	0.5	28.7	1.7	63.3	0.3	
Queue Length 50th (ft)	30	0	156	161	60	0	
Queue Length 95th (ft)	255	m1	129	0	109	0	
Internal Link Dist (ft)	752		1330				
Turn Bay Length (ft)	225	375					
Base Capacity (vph)	2288	1583	681	2993	325	1583	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.43	0.31	0.53	0.33	0.25	0.20	
Intersection Summary							
m	Volume for 95th percentile queue is metered by upstream signal.						

HCM Signalized Intersection Capacity Analysis
6: Riverstone Parkway & I - 575 Southbound Ramp

Existing PM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.85
Flt Protected	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3539	3539	1770	1770	1770	1583	1583	1583
Flt Permitted	1.00	1.00	0.23	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3539	1583	431	3539	3539	3539	1770	1770	1770	1583	1583	1583
Volume (vph)	0	931	467	344	954	0	0	0	0	74	0	293
Peak-hour factor, PHF	0.95	0.95	0.95	0.96	0.96	0.96	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	980	492	358	994	0	0	0	0	80	0	318
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	980	492	358	994	0	0	0	0	80	0	318
Turn Type		6	Free	pm+pt			custom					Free
Protected Phases			5	2								
Permitted Phases			Free	2						8		Free
Actuated Green, G (s)		77.6	120.0	101.5	101.5					10.5		120.0
Effective Green, g (s)		77.6	120.0	101.5	101.5					10.5		120.0
Actuated g/C Ratio		0.65	1.00	0.85	0.85					0.09		1.00
Clearance Time (s)		4.0	1.00	4.0	4.0					4.0		4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		2289	1583	587	2993					155		1583
v/s Ratio Prot		0.28		c0.10	0.28					c0.05		0.20
v/s Ratio Perm		0.43	0.31	0.61	0.33					0.52		0.20
Uniform Delay, d1		10.4	0.0	5.3	2.0					52.3		0.0
Progression Factor		0.47	1.00	1.25	0.68					1.00		1.00
Incremental Delay, d2		0.5	0.5	1.4	0.2					2.9		0.3
Delay (s)		5.4	0.5	8.1	1.6					55.2		0.3
Level of Service		A	A	A	A					E		A
Approach Delay (s)		3.8			3.3		0.0			11.3		
Approach LOS		A			A		A			B		
Intersection Summary												
HCM Average Control Delay	4.5				HCM Level of Service				A			
HCM Volume to Capacity ratio	0.60											
Actuated Cycle Length (s)	120.0				Sum of lost time (s)				8.0			
Intersection Capacity Utilization	69.5%				ICU Level of Service				C			
Analysis Period (min)	15											
Critical Lane Group												

Lanes, Volumes, Timings
7: Riverstone Parkway & Riverstone Boulevard

Existing PM
12/28/2006

	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Group	127	1001	845	458	526	130	
Lane Group Flow (vph)	0.35	0.26	0.26	0.29	0.81	0.33	
v/c Ratio	6.3	3.0	6.3	0.4	56.7	10.9	
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Queue Delay	6.3	3.0	6.3	0.4	56.7	10.9	
Total Delay	18	55	103	0	202	8	
Queue Length 50th (ft)	m25	35	87	0	245	56	
Queue Length 95th (ft)	1490	547			375		
Internal Link Dist (ft)	165		290			110	
Turn Bay Length (ft)	592	3785	3296	1583	1173	619	
Base Capacity (vph)	0	0	0	0	0	0	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.21	0.26	0.26	0.29	0.45	0.21	
Intersection Summary							
m	Volume for 95th percentile queue is metered by upstream signal.						

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
7: Riverstone Parkway & Riverstone Boulevard

Existing PM
12/28/2006

	EBL	EBT	WBT	WBR	SBL	SBR	
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations	AAA	AAA	AAA	AAA	AAA	AAA	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.97	1.00	
Flt	1.00	1.00	1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5085	5085	1583	3433	1583	
Flt Permitted	0.29	1.00	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	536	5085	5085	1583	3433	1583	
Volume (vph)	118	931	811	440	468	116	
Peak-hour factor, PHF	0.93	0.93	0.96	0.96	0.89	0.89	
Adj. Flow (vph)	127	1001	845	458	526	130	
RTOR Reduction (vph)	0	0	0	0	0	0	
Lane Group Flow (vph)	127	1001	845	458	526	34	
Turn Type	pm+pt	Free	Free	Free	Perm	Perm	
Protected Phases	1	6	2		8		
Permitted Phases	6					8	
Actuated Green, G (s)	89.3	89.3	77.8	120.0	22.7	22.7	
Effective Green, g (s)	89.3	89.3	77.8	120.0	22.7	22.7	
Actuated g/C Ratio	0.74	0.74	0.65	1.00	0.19	0.19	
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	476	3784	3297	1583	649	299	
v/s Ratio Prot	0.02	0.20	0.17		c0.15		
v/s Ratio Perm	0.18			c0.29		0.02	
v/c Ratio	0.27	0.26	0.26	0.29	0.81	0.11	
Uniform Delay, d1	4.6	4.9	8.9	0.0	46.6	40.3	
Progression Factor	0.78	0.54	0.64	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.2	0.4	7.6	0.2	
Delay (s)	3.9	2.8	5.9	0.4	54.2	40.5	
Level of Service	A	A	A	A	D	D	
Approach Delay (s)		2.9	4.0		51.5		
Approach LOS		A	A		D		
Intersection Summary							
HCM Average Control Delay			13.7		HCM Level of Service	B	
HCM Volume to Capacity ratio			0.39				
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	4.0	
Intersection Capacity Utilization			45.6%		ICU Level of Service	A	
Analysis Period (min)			15				
c	Critical Lane Group						

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
8: Riverstone Parkway & Reinhardt College Parkway

Existing PM
12/28/2006

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	264	897	699	177	247	137
v/c Ratio	0.51	0.22	0.20	0.11	0.63	0.45
Control Delay	8.0	3.9	3.3	0.1	58.3	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.0	3.9	3.3	0.1	58.3	14.1
Queue Length 50th (ft)	32	42	17	0	98	8
Queue Length 95th (ft)	139	132	40	0	119	54
Internal Link Dist (ft)	1839	1490			2482	
Turn Bay Length (ft)	190					
Base Capacity (vph)	805	4166	3462	1583	915	523
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.22	0.20	0.11	0.27	0.26

Intersection Summary

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
8: Riverstone Parkway & Reinhardt College Parkway

Existing PM
12/28/2006

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.97	1.00	0.85
Flt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	3433	1583
Flt Permitted	0.35	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	646	5085	5085	1583	3433	1583
Volume (vph)	251	852	678	172	242	134
Peak-hour factor, PHF	0.95	0.95	0.97	0.97	0.98	0.98
Adj. Flow (vph)	264	897	699	177	247	137
RTOR Reduction (vph)	0	0	0	0	0	121
Lane Group Flow (vph)	264	897	699	177	247	16

Turn Type

Turn Type	pm+pt	Free	Perm

Protected Phases	1	6	2	8

Permitted Phases	6			Free	8

Actuated Green, G (s)	98.3	98.3	81.7	120.0	13.7	13.7

Effective Green, g (s)	98.3	98.3	81.7	120.0	13.7	13.7

Actuated g/C Ratio	0.82	0.82	0.68	1.00	0.11	0.11

Clearance Time (s)	4.0	4.0	4.0		4.0	4.0

Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0

Lane Grp Cap (vph)	647	4165	3462	1583	392	181

v/s Ratio Prot	c0.04	0.18	0.14		c0.07	

v/s Ratio Perm	c0.29			0.11		0.01

v/c Ratio	0.41	0.22	0.20	0.11	0.63	0.09

Uniform Delay, d1	2.6	2.4	7.1	0.0	50.7	47.6

Progression Factor	1.83	1.46	0.39	1.00	1.02	1.25

Incremental Delay, d2	0.4	0.1	0.1	0.1	3.1	0.2

Delay (s)	5.1	3.6	2.9	0.1	55.0	59.7

Level of Service	A	A	A	A	D	E

Approach Delay (s)		3.9	2.3		56.6	

Approach LOS		A		A	E	

Intersection Summary

HCM Average Control Delay		11.7			HCM Level of Service	B

HCM Volume to Capacity ratio		0.43				

Actuated Cycle Length (s)		120.0			Sum of lost time (s)	8.0

Intersection Capacity Utilization		43.9%			ICU Level of Service	A

Analysis Period (min)		15				

c Critical Lane Group						

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
9: Riverstone Parkway & Waleska Road

Existing PM
12/28/2006

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group Flow (vph)	356	661	253	687	201	292	362	194	179	278	
v/c Ratio	0.82	0.41	0.58	0.51	0.54	0.81	0.61	0.64	0.47	0.51	
Control Delay	50.9	8.7	20.2	19.1	34.9	63.9	8.6	36.0	40.7	6.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	50.9	8.7	20.2	19.1	34.9	63.9	8.6	36.0	40.7	6.0	
Queue Length 50th (ft)	190	59	61	174	113	217	0	104	125	0	
Queue Length 95th (ft)	m289	110	111	298	168	305	80	140	158	33	
Internal Link Dist (ft)	1240		3515		1145				4852		
Turn Bay Length (ft)	150		150		160			80		90	
Base Capacity (vph)	540	1629	531	1337	376	435	647	312	466	604	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.66	0.41	0.48	0.51	0.53	0.67	0.56	0.62	0.38	0.46	
Intersection Summary											
m	Volume for 95th percentile queue is metered by upstream signal.										

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
9: Riverstone Parkway & Waleska Road

Existing PM
12/28/2006

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	0.85	1.00	1.00	
Flt	1.00	0.98	1.00	0.97	1.00	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	3472	1770	3429	1770	1863	1583	1770	1863	1583	
Flt Permitted	0.25	1.00	0.39	1.00	0.50	1.00	1.00	0.20	1.00	1.00	
Satd. Flow (perm)	458	3472	721	3429	939	1863	1583	367	1863	1583	
Volume (vph)	338	548	80	233	501	131	185	269	333	184	
Peak-hour factor, PHF	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.95	0.95	
Adj. Flow (vph)	356	577	84	253	545	142	201	292	362	194	
RTOR Reduction (vph)	0	8	0	0	16	0	0	0	292	0	
Lane Group Flow (vph)	356	663	0	253	671	0	201	292	70	194	
Turn Type	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	
Protected Phases	1	6	5	2	7	4	3	8			
Permitted Phases	6		2		4		4		8		
Actuated Green, G (s)	71.6	56.0	57.8	46.2	34.9	23.1	23.1	37.9	24.6	24.6	
Effective Green, g (s)	71.6	56.0	57.8	46.2	34.9	23.1	23.1	37.9	24.6	24.6	
Actuated g/C Ratio	0.60	0.47	0.48	0.38	0.29	0.19	0.19	0.32	0.20	0.20	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	507	1620	449	1320	355	359	305	271	382	325	
v/s Ratio Prot	c0.13	0.19	0.05	0.20	0.06	c0.16		c0.08	0.10		
v/s Ratio Perm	c0.29		0.22		0.11		0.04	0.15		0.04	
v/c Ratio	0.70	0.40	0.56	0.51	0.57	0.81	0.23	0.72	0.47	0.18	
Uniform Delay, d1	15.0	21.0	18.8	28.2	34.2	46.4	40.9	32.9	42.0	39.3	
Progression Factor	1.85	0.37	1.04	0.59	1.00	1.00	1.00	0.90	0.90	0.62	
Incremental Delay, d2	3.2	0.5	1.6	1.4	2.1	13.1	0.4	8.6	0.9	0.3	
Delay (s)	31.0	8.2	21.1	18.0	36.2	59.5	41.3	38.3	38.5	24.7	
Level of Service	C	A	C	B	D	E	D	D	D	C	
Approach Delay (s)	16.2		18.8		46.3				32.5		
Approach LOS	B		B		D				C		
Intersection Summary											
HCM Average Control Delay	27.4				HCM Level of Service				C		
HCM Volume to Capacity ratio	0.72										
Actuated Cycle Length (s)	120.0				Sum of lost time (s)				12.0		
Intersection Capacity Utilization	74.4%				ICU Level of Service				D		
Analysis Period (min)	15										
c	Critical Lane Group										

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
10: Reinhardt College Parkway & Waleska Road

Existing PM
12/28/2006

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group	85	420	645	128	232	413
Lane Group Flow (vph)	0.46	0.79	0.48	0.08	0.59	0.27
v/c Ratio	54.2	16.7	6.0	0.1	9.1	3.2
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	54.2	16.7	6.0	0.1	9.1	3.2
Total Delay	62	24	91	0	26	51
Queue Length 50th (ft)	94	64	m168	m0	65	120
Queue Length 95th (ft)	3912	4852	250	275	2585	
Internal Link Dist (ft)						
Turn Bay Length (ft)						
Base Capacity (vph)	457	715	1343	1583	512	1543
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.59	0.48	0.08	0.45	0.27

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

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
10: Reinhardt College Parkway & Waleska Road

Existing PM
12/28/2006

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt	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)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.93	1.00
Satd. Flow (perm)	1770	1583	1863	1583	620	1863
Volume (vph)	78	386	639	127	213	380
Peak-hour factor, PHF	0.92	0.92	0.99	0.99	0.92	0.92
Adj. Flow (vph)	85	420	645	128	232	413
RTOR Reduction (vph)	0	369	0	0	0	0
Lane Group Flow (vph)	85	51	645	128	232	413
Turn Type	Perm	Free	Free	pm+pt		
Protected Phases	4	6	6	5	2	
Permitted Phases		4	Free	Free	2	
Actuated Green, G (s)	12.6	12.6	86.5	120.0	99.4	99.4
Effective Green, g (s)	12.6	12.6	86.5	120.0	99.4	99.4
Actuated g/C Ratio	0.10	0.10	0.72	1.00	0.83	0.83
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	186	166	1343	1583	599	1543
v/s Ratio Prot	c0.05		c0.35		c0.03	0.22
v/s Ratio Perm		0.03		0.08		0.29
v/c Ratio	0.46	0.31	0.48	0.08	0.39	0.27
Uniform Delay, d1	50.5	49.7	7.2	0.0	4.1	2.3
Progression Factor	0.96	1.16	0.60	1.00	1.00	1.00
Incremental Delay, d2	1.7	1.0	0.8	0.1	0.4	0.4
Delay (s)	50.0	58.8	5.1	0.1	4.5	2.7
Level of Service	D	E	A	A	A	A
Approach Delay (s)	57.3		4.2		3.4	
Approach LOS	E		A		A	
Intersection Summary						
HCM Average Control Delay			17.9			B
HCM Volume to Capacity ratio			0.47			
Actuated Cycle Length (s)			120.0			12.0
Intersection Capacity Utilization			64.2%			C
Analysis Period (min)			15			
c Critical Lane Group						

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
11: Reinhardt College Parkway & College Street

Existing PM
12/28/2006

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	303	521	107	203
Intersection Summary				



HCM Unsignalized Intersection Capacity Analysis
11: Reinhardt College Parkway & College Street

Existing PM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Volume (vph)	52	211	10	65	319	95	14	59	27	76	48	53
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.93	0.93	0.93	0.87	0.87	0.87
Hourly flow rate (vph)	58	234	11	71	347	103	15	63	29	87	55	61
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	303	521	108	203								
Volume Left (vph)	58	71	15	87								
Volume Right (vph)	11	103	29	61								
HadJ (s)	0.05	-0.06	-0.10	-0.06								
Departure Headway (s)	5.9	5.4	6.7	6.4								
Degree Utilization, x	0.50	0.79	0.20	0.36								
Capacity (veh/h)	572	646	467	505								
Control Delay (s)	14.5	25.5	11.3	13.0								
Approach Delay (s)	14.5	25.5	11.3	13.0								
Approach LOS	B	D	B	B								
Intersection Summary												
Delay	19.0											
HCM Level of Service	C											
Intersection Capacity Utilization	55.3%											
Analysis Period (min)	15											

Lanes, Volumes, Timings
12: Knox Bridge Highway & Fincher Road

Existing PM
12/28/2006

	↖	→	↗	←	↑	↓
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	74	348	23	539	48	104
Intersection Summary						

HCM Unsignalized Intersection Capacity Analysis
12: Knox Bridge Highway & Fincher Road

Existing PM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷		↶	↷		↶	↷	
Sign Control	Free	Free		Free	Free		Stop	Stop		Stop	Stop	
Grade	0%	0%		0%	0%		0%	0%		0%	0%	
Volume (veh/h)	67	313	4	22	460	58	5	12	14	40	3	50
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.96	0.65	0.65	0.65	0.89	0.89	0.89
Hourly flow rate (vph)	74	344	4	23	479	60	8	18	22	45	3	56
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	540			348			1076	1079	346	1077	1051	509
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCu, unblocked vol	540			348			1076	1079	346	1077	1051	509
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 %	93			98			95	91	97	73	98	90
cM capacity (veh/h)	1029			1211			163	199	697	165	207	564
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	74	348	23	540	48	104						
Volume Left	74	0	23	0	8	45						
Volume Right	0	4	0	60	22	56						
cSH	1029	1700	1211	1700	279	269						
Volume to Capacity	0.07	0.20	0.02	0.32	0.17	0.39						
Queue Length 95th (ft)	6	0	1	0	15	44						
Control Delay (s)	8.8	0.0	8.0	0.0	20.5	26.6						
Lane LOS	A		A		C	D						
Approach Delay (s)	1.5		0.3		20.5	26.6						
Approach LOS			C		C	D						
Intersection Summary												
Average Delay	4.0						A					
Intersection Capacity Utilization	53.4%						A					
Analysis Period (min)	15											

Lanes, Volumes, Timings
13: N Etowah Drive & Riverstone Parkway

Existing PM
12/28/2006

	→	←	↔	↑	↗	↘	↓	↖
Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	68	32	61	1078	12	15	1101	25
Intersection Summary								

Baseline
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Future PM
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HCM Unsignalized Intersection Capacity Analysis
13: N Etowah Drive & Riverstone Parkway

Existing PM
12/28/2006

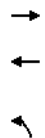
	↖	→	↗	↘	↙	←	↖	↗	↘	↙	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕	↕	↕	↕	↕
Sign Control		Stop		Stop	Stop			Free		↕	Free	↕
Grade		0%			0%			0%			0%	
Volume (veh/h)	29	0	22	4	0	17	56	992	11	13	969	22
Peak Hour Factor	0.75	0.75	0.75	0.66	0.66	0.66	0.92	0.92	0.92	0.88	0.88	0.88
Hourly flow rate (vph)	39	0	29	6	0	26	61	1078	12	15	1101	25
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	1792	2343	551	1780	2356	539	1126			1090		
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
vCu, unblocked vol	1792	2343	551	1780	2356	539	1126			1090		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	12	100	94	86	100	95	90			98		
cM capacity (veh/h)	44	32	478	44	31	487	616			636		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	68	32	61	539	539	12	15	551	551	25		
Volume Left	39	6	61	0	0	0	15	0	0	0		
Volume Right	29	26	0	0	0	12	0	0	0	25		
cSH	72	168	616	1700	1700	636	1700	1700	1700	1700		
Volume to Capacity	0.95	0.19	0.10	0.32	0.32	0.01	0.02	0.32	0.32	0.01		
Queue Length 95th (ft)	120	17	8	0	0	0	2	0	0	0		
Control Delay (s)	189.1	31.5	11.5	0.0	0.0	0.0	10.8	0.0	0.0	0.0		
Lane LOS	F	D	B				B					
Approach Delay (s)	189.1	31.5	0.6				0.1					
Approach LOS	F	D										
Intersection Summary												
Average Delay							6.2					
Intersection Capacity Utilization							48.0%				A	
Analysis Period (min)							15					

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
14: Broad Water Bay Road & Fincher Road

Existing PM
12/28/2006



Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	36	116	108
Intersection Summary			

Baseline
A & R Engineering Inc.

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HCM Unsignalized Intersection Capacity Analysis
14: Broad Water Bay Road & Fincher Road

Existing PM
12/28/2006



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W	W	W	W	W	W
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	15	17	24	76	76	23
Peak Hour Factor	0.89	0.89	0.86	0.86	0.92	0.92
Hourly flow rate (vph)	17	19	28	88	83	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
VC, conflicting volume		239	95	108		
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol		239	95	108		
tC, single (s)		6.4	6.2	4.1		
tC, 2 stage (s)						
tF (s)		3.5	3.3	2.2		
p0 queue free %		98	98	98		
cM capacity (veh/h)		735	962	1483		
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	36	116	108			
Volume Left	17	28	0			
Volume Right	19	0	25			
cSH	840	1483	1700			
Volume to Capacity	0.04	0.02	0.06			
Queue Length 95th (ft)	3	1	0			
Control Delay (s)	9.5	1.9	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.5	1.9	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization			22.0%			A
Analysis Period (min)			15			

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
15: Bells Ferry Road & Marietta Highway

Existing PM
12/28/2006

	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group	283	316	25	561	59	459	172
Lane Group Flow (vph)	0.92	0.63	0.06	0.47	0.20	0.38	0.16
v/c Ratio	73.9	25.2	11.9	14.5	14.1	13.1	2.3
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	73.9	25.2	11.9	14.5	14.1	13.1	2.3
Total Delay	210	165	7	203	17	154	0
Queue Length 50th (ft)	278	m159	25	396	54	305	34
Queue Length 95th (ft)	1761	266	463	416			
Internal Link Dist (ft)			150	150			250
Turn Bay Length (ft)			492	793	406	1197	301
Base Capacity (vph)	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.40	0.06	0.47	0.20	0.38	0.16
Intersection Summary							
m	Volume for 95th percentile queue is metered by upstream signal.						

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
15: Bells Ferry Road & Marietta Highway

Existing PM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.99	0.99	0.99	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.85
Flt Protected	0.97	0.97	0.99	0.99	0.99	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1784	1784	1758	1770	1770	1858	1770	1858	1770	1863	1583	1583
Flt Permitted	0.45	0.45	0.94	0.94	0.94	1.00	0.36	1.00	0.36	1.00	1.00	1.00
Satd. Flow (perm)	829	829	1664	801	801	1858	678	1858	678	1863	1583	1583
Volume (vph)	165	71	22	30	135	100	23	513	8	55	427	160
Peak-hour factor, PHF	0.91	0.91	0.91	0.84	0.84	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	181	78	24	36	161	119	25	552	9	59	459	172
RTOR Reduction (vph)	0	4	0	0	24	0	0	0	0	0	0	61
Lane Group Flow (vph)	0	279	0	0	292	0	25	561	0	59	459	111
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	8	8	4	4	4	6	6	6	2	2	2	2
Permitted Phases	34.7	34.7	34.7	34.7	34.7	77.3	77.3	77.3	77.3	77.3	77.3	77.3
Actuated Green, G (s)	34.7	34.7	34.7	34.7	34.7	77.3	77.3	77.3	77.3	77.3	77.3	77.3
Effective Green, g (s)	0.29	0.29	0.29	0.29	0.29	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Actuated g/C Ratio	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	240	481	516	1197	437	1200	1020					
Lane Grp Cap (vph)	0.34	1.16	0.61	0.61	0.05	0.47	0.09	0.07	0.14	0.38	0.11	0.11
v/s Ratio Prot	42.6	36.8	7.8	10.9	8.3	10.1	8.2	10.1	8.2	10.1	8.2	10.1
v/s Ratio Perm	1.00	0.65	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay, d1	109.8	152.4	25.7	8.0	12.2	9.0	11.0	8.4	10.2	10.2	10.2	10.2
Progression Factor	F	F	C	C	C	B	B	B	A	A	A	A
Incremental Delay, d2	152.4	152.4	25.7	8.0	12.2	9.0	11.0	8.4	10.2	10.2	10.2	10.2
Delay (s)	152.4	152.4	25.7	8.0	12.2	9.0	11.0	8.4	10.2	10.2	10.2	10.2
Level of Service	F	F	C	C	C	B	B	B	A	A	A	A
Approach Delay (s)	152.4	152.4	25.7	8.0	12.2	9.0	11.0	8.4	10.2	10.2	10.2	10.2
Approach LOS	F	F	C	C	C	B	B	B	A	A	A	A
Intersection Summary												
HCM Average Control Delay	34.8											
HCM Volume to Capacity ratio	0.68											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	73.2%											
Analysis Period (min)	15											
c Critical Lane Group												

Baseline
A & R Engineering Inc.

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Existing Saturday Intersection Analysis

Lanes, Volumes, Timings
1: Cumming Highway & I -575 Northbound Ramp

Existing SAT
12/28/2006

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	83	491	595	383	455	84
Lane Group Flow (vph)	0.20	0.23	0.31	0.37	0.42	0.15
v/c Ratio	10.4	10.6	16.8	2.7	33.8	6.8
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.4	10.6	16.8	2.7	33.8	6.8
Queue Length 50th (ft)	24	83	135	0	142	0
Queue Length 95th (ft)	45	110	181	48	190	36
Internal Link Dist (ft)	1047	677			501	
Turn Bay Length (ft)	150			325		300
Base Capacity (vph)	575	2182	1894	1025	1087	559
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.23	0.31	0.37	0.42	0.15

Intersection Summary

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
1: Cumming Highway & I -575 Northbound Ramp

Existing SAT
12/28/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	0.85
Flt Protected	1.00	1.00	1.00	1.00	1.00	0.95
Satd. Flow (prot)	1770	3539	3539	1583	3433	1583
Flt Permitted	0.35	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	655	3539	3539	1583	3433	1583
Volume (vph)	79	486	571	368	428	79
Peak-hour factor, PHF	0.95	0.95	0.96	0.96	0.94	0.94
Adj. Flow (vph)	83	491	595	383	455	84
RTOR Reduction (vph)	0	0	0	181	0	57
Lane Group Flow (vph)	83	491	595	202	455	27

Turn Type

Turn Type	pm+pt	Perm	custom

Protected Phases	1	6	2	
Permitted Phases	6		2	8
Actuated Green, G (s)	74.0	74.0	63.4	38.0
Effective Green, g (s)	74.0	74.0	63.4	38.0
Actuated g/C Ratio	0.62	0.62	0.53	0.32
Clearance Time (s)	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	465	2182	1870	836
v/s Ratio Prot	0.01	c0.14	c0.17	
v/s Ratio Perm	0.10		0.13	c0.13
v/c Ratio	0.18	0.23	0.32	0.42
Uniform Delay, d1	9.9	10.2	16.0	15.3
Progression Factor	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.2	0.4	0.7
Delay (s)	10.1	10.5	16.5	16.0
Level of Service	B	B	B	C
Approach Delay (s)		10.4	16.3	32.7
Approach LOS		B	B	C

Intersection Summary

HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
2: Cumming Highway & I-575 Southbound Ramp

Existing SAT
12/28/2006



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	65	256	685	299	76
v/c Ratio	0.18	0.12	0.33	0.68	0.17
Control Delay	7.9	5.6	2.6	25.8	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.9	5.6	2.6	25.8	4.9
Queue Length 50th (ft)	8	15	13	87	0
Queue Length 95th (ft)	31	36	42	133	21
Internal Link Dist (ft)	2177	1047	555		
Turn Bay Length (ft)	275			320	
Base Capacity (vph)	359	2134	2102	787	746
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.18	0.12	0.33	0.38	0.10

Intersection Summary

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
2: Cumming Highway & I-575 Southbound Ramp

Existing SAT
12/28/2006



Movement	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00
Flt	1.00	1.00	0.90	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3181	1770	1583
Flt Permitted	0.37	1.00	1.00	0.95	1.00
Satd. Flow (perm)	698	3539	3181	1770	1583
Volume (vph)	61	241	210	434	293
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.98
Adj. Flow (vph)	65	256	223	462	299
RTOR Reduction (vph)	0	0	183	0	0
Lane Group Flow (vph)	65	256	502	0	299
Turn Type	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	2	8	8
Permitted Phases					
Actuated Green, G (s)	32.6	32.6	32.6	13.4	13.4
Effective Green, g (s)	32.6	32.6	32.6	13.4	13.4
Actuated g/C Ratio	0.60	0.60	0.60	0.25	0.25
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	421	2137	1920	439	393
v/s Ratio Prot		0.07	c0.16		c0.17
v/s Ratio Perm	0.09	0.15	0.12	0.26	0.01
v/c Ratio	0.15	0.12	0.26	0.68	0.05
Uniform Delay, d1	4.7	4.6	5.0	18.4	15.4
Progression Factor	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.1	0.3	4.3	0.1
Delay (s)	5.5	4.7	5.4	22.7	15.5
Level of Service	A	A	A	C	B
Approach Delay (s)		4.8	5.4	21.2	
Approach LOS		A	A	C	
Intersection Summary					
HCM Average Control Delay			9.6	HCM Level of Service	A
HCM Volume to Capacity ratio			0.38		
Actuated Cycle Length (s)			54.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization			49.4%	ICU Level of Service	A
Analysis Period (min)			15		
c Critical Lane Group					

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
3: Bobo Grinding Co Driveway & Marietta Street

Existing SAT
12/28/2006

	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	8	162	165	393	153	289
Lane Group Flow (vph)	0.03	0.77	0.44	0.32	0.26	0.20
v/c Ratio	32.8	70.9	10.3	8.0	4.8	4.3
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.8	70.9	10.3	8.0	4.8	4.3
Queue Length 50th (ft)	3	122	2	99	23	48
Queue Length 95th (ft)	11	186	59	m187	53	97
Internal Link Dist (ft)	95	1440	3002			1058
Turn Bay Length (ft)	150				90	
Base Capacity (vph)	502	420	590	1218	745	1456
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.39	0.28	0.32	0.21	0.20
Intersection Summary						
m Volume for 95th percentile queue is metered by upstream signal.						

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
3: Bobo Grinding Co Driveway & Marietta Street

Existing SAT
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.95	1.00	0.85	1.00	0.85	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.98	0.95	1.00	0.98	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1736	1736	1770	1588	1770	1588	1777	1777	1770	1862	1770	1862
Flt Permitted	0.92	0.75	1.00	0.75	1.00	1.00	1.00	1.00	0.49	1.00	0.49	1.00
Satd. Flow (perm)	1631	1402	1588	1402	1588	1777	1777	1777	910	1862	910	1862
Volume (vph)	2	1	2	154	3	154	1	249	128	144	271	1
Peak-hour factor, PHF	0.62	0.62	0.62	0.95	0.95	0.95	0.96	0.96	0.96	0.94	0.94	0.94
Adj. Flow (vph)	3	2	3	162	3	162	1	259	133	153	288	1
RTOR Reduction (vph)	0	3	0	0	138	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	5	0	162	27	0	0	385	0	153	289	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	8	8	4	4	4	4	6	6	5	5	2	2
Permitted Phases	8	8	4	4	4	4	6	6	5	5	2	2
Actuated Green, G (s)	18.1	18.1	18.1	18.1	18.1	18.1	81.7	81.7	93.9	93.9	93.9	93.9
Effective Green, g (s)	18.1	18.1	18.1	18.1	18.1	18.1	81.7	81.7	93.9	93.9	93.9	93.9
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15	0.15	0.68	0.68	0.78	0.78	0.78	0.78
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	246	246	211	240	240	240	1210	1210	771	1457	771	1457
v/s Ratio Prot	0.00	0.00	c0.12	0.02	0.02	0.02	0.22	0.22	0.01	c0.16	0.01	c0.16
v/s Ratio Perm	0.02	0.02	0.77	0.11	0.11	0.11	0.32	0.32	0.20	0.20	0.20	0.20
Uniform Delay, d1	43.4	43.4	48.9	44.0	44.0	44.0	7.8	7.8	3.6	3.4	3.6	3.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.87	0.87	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.0	15.3	0.2	0.2	0.2	0.7	0.7	0.1	0.3	0.1	0.3
Delay (s)	43.4	43.4	64.3	44.2	44.2	44.2	7.4	7.4	3.8	3.7	3.8	3.7
Level of Service	D	D	E	D	D	D	A	A	A	A	A	A
Approach Delay (s)	43.4	43.4	54.2	54.2	54.2	54.2	7.4	7.4	3.7	3.7	3.7	3.7
Approach LOS	D	D	D	D	D	D	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	19.3						HCM Level of Service					
HCM Volume to Capacity ratio	0.39						B					
Actuated Cycle Length (s)	120.0						Sum of lost time (s)					
Intersection Capacity Utilization	60.5%						ICU Level of Service					
Analysis Period (min)	15						B					
Critical Lane Group												

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
5: Riverstone Parkway & I - 575 Northbound Ramp

Existing SAT
12/28/2006

	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group	223	847	1064	101	627	560
Lane Group Flow (vph)	0.75	0.40	0.68	0.06	0.55	0.91
v/c Ratio	29.0	11.5	31.6	0.1	34.0	47.4
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	29.0	11.5	31.6	0.1	34.0	47.4
Total Delay	129	240	360	0	196	315
Queue Length 50th (ft)	m141	298	484	0	237	452
Queue Length 95th (ft)	1330	1370				
Internal Link Dist (ft)	370		300	490		
Turn Bay Length (ft)	337	2131	1571	1583	1345	705
Base Capacity (vph)	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.40	0.68	0.06	0.47	0.79
Intersection Summary						
m	Volume for 95th percentile queue is metered by upstream signal.					

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
5: Riverstone Parkway & I - 575 Northbound Ramp

Existing SAT
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		
Lane Util. Factor	1.00	0.95		0.95	1.00		0.97	1.00		1.00		
Flt	1.00	1.00		1.00	0.85		1.00	0.85		1.00		
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		1.00		
Satd. Flow (prot)	1770	3539		3539	1583		3433	1583				
Flt Permitted	0.13	1.00		1.00	1.00		0.95	1.00		1.00		
Satd. Flow (perm)	238	3539		3539	1583		3433	1583				
Volume (vph)	212	805	0	0	1053	100	608	0	543	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.99	0.99	0.99	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	223	847	0	0	1064	101	627	0	560	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	93	0	0	0
Lane Group Flow (vph)	223	847	0	0	1064	101	627	0	467	0	0	0
Turn Type	pm+pt						Free custom					
Protected Phases	1	6			2							
Permitted Phases	6					Free	4		4			
Actuated Green, G (s)	72.3	72.3			53.3	120.0	39.7		39.7			
Effective Green, g (s)	72.3	72.3			53.3	120.0	39.7		39.7			
Actuated g/C Ratio	0.60	0.60			0.44	1.00	0.33		0.33			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	335	2132			1572	1583	1136		524			
v/s Ratio Prot	c0.08	0.24			0.30							
v/s Ratio Perm					0.06	0.18			c0.29			
v/c Ratio	0.67	0.40			0.68	0.06	0.55		0.89			
Uniform Delay, d1	17.7	12.5			26.5	0.0	32.9		38.1			
Progression Factor	0.57	0.80			1.00	1.00	1.00		1.00			
Incremental Delay, d2	4.6	0.5			2.4	0.1	0.6		17.2			
Delay (s)	14.7	10.5			28.9	0.1	33.5		55.3			
Level of Service	B	B			C	A	C		E			
Approach Delay (s)		11.4			26.4		43.7		0.0			
Approach LOS		B			C		D		A			
Intersection Summary												
HCM Average Control Delay							27.7	HCM Level of Service				
HCM Volume to Capacity ratio							0.74	C				
Actuated Cycle Length (s)							120.0	Sum of lost time (s)				
Intersection Capacity Utilization							68.2%	ICU Level of Service				
Analysis Period (min)							15	C				
Critical Lane Group												

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Lanes, Volumes, Timings
6: Riverstone Parkway & I - 575 Southbound Ramp

Existing SAT
12/28/2006

	EBT	EBR	WBL	WBT	SBL	SBR	
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR	
Lane Group Flow (vph)	858	547	353	1321	163	280	
v/c Ratio	0.39	0.35	0.77	0.47	0.70	0.18	
Control Delay	7.9	0.8	20.9	4.3	64.7	0.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	7.9	0.8	20.9	4.3	64.7	0.2	
Queue Length 50th (ft)	47	0	45	214	122	0	
Queue Length 95th (ft)	317	m13	84	164	186	0	
Internal Link Dist (ft)	752		1330				
Turn Bay Length (ft)	225	375					
Base Capacity (vph)	2178	1583	701	2835	384	1583	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.39	0.35	0.50	0.47	0.42	0.18	
Intersection Summary							
m Volume for 95th percentile queue is metered by upstream signal.							

HCM Signalized Intersection Capacity Analysis
6: Riverstone Parkway & I - 575 Southbound Ramp

Existing SAT
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3539	1583	1770	3539						1770	1583	1583
Flt Permitted	1.00	1.00	0.26	1.00						0.95	1.00	1.00
Satd. Flow (perm)	3539	1583	492	3539						1770	1583	1583
Volume (vph)	0	832	531	346	1295	0	0	0	0	155	0	266
Peak-hour factor, PHF	0.97	0.97	0.97	0.98	0.98	0.98	0.92	0.92	0.92	0.95	0.95	0.95
Adj. Flow (vph)	0	858	547	353	1321	0	0	0	0	163	0	280
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	858	547	353	1321	0	0	0	0	163	0	280
Turn Type		Free pm+pt								custom		Free
Protected Phases	6	5	2									
Permitted Phases		Free	2							8		Free
Actuated Green, G (s)	73.8	120.0	96.1	96.1						15.9		120.0
Effective Green, g (s)	73.8	120.0	96.1	96.1						15.9		120.0
Actuated g/C Ratio	0.62	1.00	0.80	0.80						0.13		1.00
Clearance Time (s)	4.0	4.0	4.0	4.0						4.0		4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0						3.0		3.0
Lane Grp Cap (vph)	2176	1583	589	2834						235		1583
v/s Ratio Prot	0.24		c0.09	0.37								
v/s Ratio Perm	0.39	0.35	c0.39	0.47						c0.09		0.18
Uniform Delay, d1	11.7	0.0	5.3	3.8						49.7		0.0
Progression Factor	0.54	1.00	0.90	0.90						1.00		1.00
Incremental Delay, d2	0.5	0.5	1.3	0.4						8.6		0.2
Delay (s)	6.8	0.5	6.1	3.9						58.3		0.2
Level of Service	A	A	A	A						E		A
Approach Delay (s)	4.4			4.3			0.0			21.6		
Approach LOS	A			A			A			C		
Intersection Summary												
HCM Average Control Delay			6.5							A		
HCM Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			120.0							8.0		
Intersection Capacity Utilization			68.2%							C		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
7: Riverstone Parkway & Riverstone Boulevard

Existing SAT
12/28/2006

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	162	866	1000	560	516	111
v/c Ratio	0.48	0.23	0.31	0.35	0.80	0.30
Control Delay	11.3	3.3	5.4	0.6	56.5	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	3.3	5.4	0.6	56.5	11.7
Queue Length 50th (ft)	21	42	71	0	200	8
Queue Length 95th (ft)	m37	64	112	0	244	55
Internal Link Dist (ft)	1490	547			375	
Turn Bay Length (ft)	165		290			110
Base Capacity (vph)	566	3795	3224	1583	1059	556
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.23	0.31	0.35	0.49	0.20

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

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HCM Signalized Intersection Capacity Analysis
7: Riverstone Parkway & Riverstone Boulevard

Existing SAT
12/28/2006

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.97	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.85	1.00	0.95
Satd. Flow (prot)	1770	5085	5085	1583	3433	1583
Flt Permitted	0.24	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	439	5085	5085	1583	3433	1583
Volume (vph)	159	849	970	543	495	107
Peak-hour factor, PHF	0.98	0.98	0.97	0.97	0.96	0.96
Adj. Flow (vph)	162	866	1000	560	516	111
RTOR Reduction (vph)	0	0	0	0	0	80
Lane Group Flow (vph)	162	866	1000	560	516	31
Turn Type	pm+pt	Free	Free	Perm		
Protected Phases	1	6	2	8		
Permitted Phases	6			Free	8	
Actuated Green, G (s)	89.6	89.6	76.1	120.0	22.4	22.4
Effective Green, g (s)	89.6	89.6	76.1	120.0	22.4	22.4
Actuated g/C Ratio	0.75	0.75	0.63	1.00	0.19	0.19
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	433	3797	3225	1583	641	295
v/s Ratio Prot	0.03	0.17	0.20		c0.15	
v/s Ratio Perm	c0.25			c0.35		0.02
v/c Ratio	0.37	0.23	0.31	0.35	0.80	0.11
Uniform Delay, d1	5.0	4.6	10.0	0.0	46.7	40.5
Progression Factor	1.36	0.64	0.48	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.1	0.2	0.6	7.3	0.2
Delay (s)	7.3	3.1	5.0	0.6	54.0	40.7
Level of Service	A	A	A	A	D	D
Approach Delay (s)		3.8	3.4		51.6	
Approach LOS		A	A		D	

Intersection Summary
HCM Average Control Delay
HCM Volume to Capacity ratio
Actuated Cycle Length (s)
Intersection Capacity Utilization
Analysis Period (min)
c Critical Lane Group

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Lanes, Volumes, Timings
8: Riverstone Parkway & Reinhardt College Parkway

Existing SAT
12/28/2006



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	251	832	882	189	246	105
v/c Ratio	0.59	0.20	0.25	0.12	0.67	0.40
Control Delay	9.5	2.9	2.8	0.2	59.7	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.5	2.9	2.8	0.2	59.7	13.7
Queue Length 50th (ft)	51	67	27	0	96	2
Queue Length 95th (ft)	m93	56	42	0	112	44
Internal Link Dist (ft)	1839 1490 2482					
Turn Bay Length (ft)	190					
Base Capacity (vph)	730	4200	3550	1583	858	475
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.20	0.25	0.12	0.29	0.22
Intersection Summary						
m Volume for 95th percentile queue is metered by upstream signal.						

Baseline
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HCM Signalized Intersection Capacity Analysis
8: Riverstone Parkway & Reinhardt College Parkway

Existing SAT
12/28/2006



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.97	1.00	0.85
Flt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	3433	1583
Flt Permitted	0.28	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	525	5085	5085	1583	3433	1583
Volume (vph)	236	782	838	180	224	96
Peak-hour factor, PHF	0.94	0.94	0.95	0.95	0.91	0.91
Adj. Flow (vph)	251	832	882	189	246	105
RTOR Reduction (vph)	0	0	0	0	0	94
Lane Group Flow (vph)	251	832	882	189	246	11
Turn Type	pm+pt Free Perm					
Protected Phases	1	6	2		8	
Permitted Phases	6			Free		8
Actuated Green, G (s)	99.1	99.1	83.8	120.0	12.9	12.9
Effective Green, g (s)	99.1	99.1	83.8	120.0	12.9	12.9
Actuated g/C Ratio	0.83	0.83	0.70	1.00	0.11	0.11
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	551	4199	3551	1583	369	170
v/s Ratio Prot	c0.04	0.16	0.17		c0.07	
v/s Ratio Perm	c0.33			0.12		0.01
v/c Ratio	0.46	0.20	0.25	0.12	0.67	0.07
Uniform Delay, d1	2.6	2.2	6.6	0.0	51.5	48.1
Progression Factor	1.68	1.23	0.37	1.00	1.00	1.04
Incremental Delay, d2	0.5	0.1	0.2	0.1	4.3	0.2
Delay (s)	4.9	2.8	2.6	0.1	55.6	50.3
Level of Service	A	A	A	A	E	D
Approach Delay (s)		3.3	2.2		54.0	
Approach LOS		A	A		D	
Intersection Summary						
HCM Average Control Delay			9.9		HCM Level of Service	A
HCM Volume to Capacity ratio			0.48			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			45.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Baseline
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Lanes, Volumes, Timings
9: Riverstone Parkway & Waleska Road

Existing SAT
12/28/2006

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	275	710	255	733	115	115	323	172	158	283
v/c Ratio	0.69	0.36	0.65	0.41	0.43	0.59	0.71	0.52	0.66	0.63
Control Delay	37.2	4.6	24.5	6.2	40.4	63.2	14.5	39.0	58.4	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	4.6	24.5	6.2	40.4	63.2	14.5	39.0	58.4	10.0
Queue Length 50th (ft)	97	35	50	48	72	87	0	109	120	0
Queue Length 95th (ft)	m207	70	150	144	116	142	86	142	149	26
Internal Link Dist (ft)	1240		3515		1145				4852	
Turn Bay Length (ft)	150		150		160			80		90
Base Capacity (vph)	541	1947	565	1776	282	419	607	337	466	608
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.36	0.45	0.41	0.41	0.27	0.53	0.51	0.34	0.47

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

Baseline
A & R Engineering Inc.

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HCM Signalized Intersection Capacity Analysis
9: Riverstone Parkway & Waleska Road

Existing SAT
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3462	1770	3438	1770	3438	1770	1863	1583	1770	1863	1583
Flt Permitted	0.28	1.00	0.36	1.00	0.36	1.00	0.50	1.00	1.00	0.40	1.00	1.00
Satd. Flow (perm)	526	3462	662	3438	662	3438	924	1863	1583	752	1863	1583
Volume (vph)	267	589	100	245	569	134	112	112	313	148	136	243
Peak-hour factor, PHF	0.97	0.97	0.97	0.96	0.96	0.96	0.97	0.97	0.97	0.86	0.86	0.86
Adj. Flow (vph)	275	607	103	255	593	140	115	115	323	172	158	283
RTOR Reduction (vph)	0	7	0	0	12	0	0	0	289	0	0	246
Lane Group Flow (vph)	275	703	0	255	721	0	115	115	34	172	158	37
Turn Type	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	1	6	5	2	7	4	7	4	3	8	8	8
Permitted Phases	6		2		4		4		4		8	
Actuated Green, G (s)	82.4	67.2	72.8	61.6	72.8	61.6	22.6	12.5	12.5	28.6	15.5	15.5
Effective Green, g (s)	82.4	67.2	72.8	61.6	72.8	61.6	22.6	12.5	12.5	28.6	15.5	15.5
Actuated g/C Ratio	0.69	0.56	0.61	0.51	0.61	0.51	0.19	0.10	0.10	0.24	0.13	0.13
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	535	1939	505	1765	245	194	165	290	241	204		
v/s Ratio Prot	c0.07	0.20	0.05	0.21	0.04	0.06	0.04	0.06	c0.06	c0.08		
v/s Ratio Perm	c0.28		0.26		0.05		0.05		0.02	0.08		
v/c Ratio	0.51	0.36	0.50	0.41	0.47	0.59	0.20	0.59	0.20	0.59	0.66	0.18
Uniform Delay, d1	8.7	14.6	11.0	18.0	42.3	51.3	49.2	38.7	49.7	46.6		
Progression Factor	2.45	0.26	1.74	0.28	1.00	1.00	1.00	1.00	0.90	0.92	0.68	
Incremental Delay, d2	0.7	0.5	0.8	0.7	1.4	4.8	0.6	3.2	6.2	0.4		
Delay (s)	22.1	4.3	19.9	5.8	43.7	56.1	49.8	38.1	51.9	32.1		
Level of Service	C	A	B	A	D	E	D	D	D	D	C	
Approach Delay (s)	9.3		9.4				49.9			38.9		
Approach LOS	A		A				D			D		

Intersection Summary												
HCM Average Control Delay	22.3											
HCM Volume to Capacity ratio	0.55											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	62.2%											
Analysis Period (min)	15											
c Critical Lane Group												

Baseline
A & R Engineering Inc.

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Lanes, Volumes, Timings
10: Reinhardt College Parkway & Waleska Road

Existing SAT
12/28/2006

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group	64	280	352	77	277	447
Lane Group Flow (vph)	0.40	0.70	0.26	0.05	0.45	0.28
v/c Ratio	53.6	17.3	5.5	0.0	4.5	2.9
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	53.6	17.3	5.5	0.0	4.5	2.9
Total Delay	41	28	51	0	26	47
Queue Length 50th (ft)	m/72	68	100	m0	68	114
Internal Link Dist (ft)	3912	4852	250	275		2585
Turn Bay Length (ft)						
Base Capacity (vph)	502	649	1363	1583	816	1569
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.43	0.26	0.05	0.34	0.28
Intersection Summary						
m Volume for 95th percentile queue is metered by upstream signal.						

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HCM Signalized Intersection Capacity Analysis
10: Reinhardt College Parkway & Waleska Road

Existing SAT
12/28/2006

	WBL	WBR	NBT	NBR	SBL	SBT
Movement						
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt	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)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.50	1.00
Satd. Flow (perm)	1770	1583	1863	1583	937	1863
Volume (vph)	61	269	334	73	258	416
Peak-hour factor, PHF	0.96	0.96	0.95	0.95	0.93	0.93
Adj. Flow (vph)	64	280	352	77	277	447
RTOR Reduction (vph)	0	255	0	0	0	0
Lane Group Flow (vph)	64	25	352	77	277	447
Turn Type	Perm	Perm	Free	Free	pm+pt	
Protected Phases	4	6	6	5	2	
Permitted Phases		4		Free	2	
Actuated Green, G (s)	10.9	10.9	87.8	120.0	101.1	101.1
Effective Green, g (s)	10.9	10.9	87.8	120.0	101.1	101.1
Actuated g/C Ratio	0.09	0.09	0.73	1.00	0.84	0.84
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	161	144	1363	1583	854	1570
v/s Ratio Prot	c0.04	0.02	0.19	0.05	c0.03	0.24
v/s Ratio Perm						
v/c Ratio	0.40	0.18	0.26	0.05	0.32	0.28
Uniform Delay, d1	51.5	50.4	5.3	0.0	2.1	2.0
Progression Factor	0.94	1.41	0.81	1.00	1.00	1.00
Incremental Delay, d2	1.5	0.6	0.4	0.0	0.2	0.5
Delay (s)	50.1	71.5	4.7	0.0	2.3	2.4
Level of Service	D	E	A	A	A	A
Approach Delay (s)	67.5	3.9			2.4	
Approach LOS	E	A			A	
Intersection Summary						
HCM Average Control Delay			17.8			B
HCM Volume to Capacity ratio			0.33			
Actuated Cycle Length (s)			120.0			8.0
Intersection Capacity Utilization			45.3%			A
Analysis Period (min)			15			
c Critical Lane Group						

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Lanes, Volumes, Timings	Existing SAT 12/28/2006
11: Reinhardt College Parkway & College Street	

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	264	277	117	147
Intersection Summary				



Existing SAT	12/28/2006
HCM Unsignalized Intersection Capacity Analysis	
11: Reinhardt College Parkway & College Street	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	26	205	12	30	190	40	15	50	29	49	36	46
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.81	0.81	0.81	0.89	0.89	0.89
Hourly flow rate (vph)	28	223	13	32	202	43	19	62	36	55	40	52
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	264	277	116	147								
Volume Left (vph)	28	32	19	55								
Volume Right (vph)	13	43	36	52								
Had'j (s)	0.03	-0.04	-0.12	-0.10								
Departure Headway (s)	5.1	5.0	5.4	5.4								
Degree Utilization, x	0.37	0.38	0.17	0.22								
Capacity (veh/h)	688	681	583	600								
Control Delay (s)	11.0	11.0	9.6	9.9								
Approach Delay (s)	11.0	11.0	9.6	9.9								
Approach LOS	B	B	A	A								
Intersection Summary												
Delay			10.6									
HCM Level of Service			B									
Intersection Capacity Utilization			39.8%							A		
Analysis Period (min)			15									

Lanes, Volumes, Timings
12: Knox Bridge Highway & Fincher Road

Existing SAT
12/28/2006

	↖	→	↗	←	↑	↓
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	60	285	15	337	28	101
Intersection Summary						

Baseline
A & R Engineering Inc.

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HCM Unsignalized Intersection Capacity Analysis
12: Knox Bridge Highway & Fincher Road

Existing SAT
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷		↶	↷		↶	↷	↶↷
Sign Control	Free	Free		Free	Free		Stop	Stop		Stop	Stop	0%
Grade		0%			0%		0%				0%	
Volume (veh/h)	53	245	6	14	270	54	6	4	14	39	7	47
Peak Hour Factor	0.88	0.88	0.88	0.96	0.96	0.96	0.86	0.86	0.86	0.93	0.93	0.93
Hourly flow rate (vph)	60	278	7	15	281	56	7	5	16	42	8	51
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	338		285				767	769	282	756	744	309
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
vCu, unblocked vol	338		285				767	769	282	756	744	309
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 %	95		99				97	99	98	86	98	93
cM capacity (veh/h)	1222		1277				278	312	757	300	322	731
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	60	285	15	338	28	100						
Volume Left	60	0	15	0	7	42						
Volume Right	0	7	0	56	16	51						
cSH	1222	1700	1277	1700	454	430						
Volume to Capacity	0.05	0.17	0.01	0.20	0.06	0.23						
Queue Length 95th (ft)	4	0	1	0	5	22						
Control Delay (s)	8.1	0.0	7.9	0.0	13.5	15.9						
Lane LOS	A		A		B	C						
Approach Delay (s)	1.4		0.3		13.5	15.9						
Approach LOS			B		C							
Intersection Summary												
Average Delay	3.1						A					
Intersection Capacity Utilization	39.9%						A					
Analysis Period (min)	15											

Baseline
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Lanes, Volumes, Timings
13: N Etowah Drive & Riverstone Parkway
Existing SAT
12/28/2006

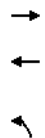
EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
40	16	28	1078	8	6	965	6

Project Name	Existing SAT
HCM Unsignalized Intersection Capacity Analysis 13: N Etowah Drive & Riverstone Parkway	12/28/2006

[illegible]

Lanes, Volumes, Timings
14: Broad Water Bay Road & Fincher Road

Existing SAT
12/28/2006



Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	60	79	84
Intersection Summary			

HCM Unsignalized Intersection Capacity Analysis
14: Broad Water Bay Road & Fincher Road

Existing SAT
12/28/2006



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Left	Right	Through	Through	Through	Right
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	20	34	30	40	45	28
Peak Hour Factor	0.90	0.90	0.88	0.88	0.87	0.87
Hourly flow rate (vph)	22	38	34	45	52	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
VC, conflicting volume	181	68	84			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
vCu, unblocked vol	181	68	84			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	96	98			
cM capacity (veh/h)	790	995	1513			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	60	80	84			
Volume Left	22	34	0			
Volume Right	38	0	32			
cSH	908	1513	1700			
Volume to Capacity	0.07	0.02	0.05			
Queue Length 95th (ft)	5	2	0			
Control Delay (s)	9.2	3.3	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.2	3.3	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay	3.7					
Intersection Capacity Utilization	20.4%					
ICU Level of Service	A					
Analysis Period (min)	15					

Lanes, Volumes, Timings
15: Bells Ferry Road & Marietta Highway

Existing SAT
12/28/2006

	EBT	WBT	NBL	NBT	SBL	SBT	SBR	
Lane Group	296	239	19	403	65	402	139	
Lane Group Flow (vph)	0.93	0.47	0.04	0.33	0.15	0.33	0.13	
v/c Ratio	77.4	10.4	10.5	11.2	11.2	11.2	2.2	
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Queue Delay	77.4	10.4	10.5	11.2	11.2	11.2	2.2	
Total Delay	223	35	5	122	17	122	0	
Queue Length 50th (ft)	294	m67	19	243	51	243	29	
Queue Length 95th (ft)	1761	266	463	416	150	416	250	
Internal Link Dist (ft)								
Turn Bay Length (ft)								
Base Capacity (vph)	590	874	446	1230	445	1233	1094	
Starvation Cap Reductn	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.50	0.27	0.04	0.33	0.15	0.33	0.13	
Intersection Summary								
m Volume for 95th percentile queue is metered by upstream signal.								

Baseline
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HCM Signalized Intersection Capacity Analysis
15: Bells Ferry Road & Marietta Highway

Existing SAT
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. 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
Flt Protected	0.99	0.92		0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85
Flt Protected	0.97	1.00		1.00	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1791	1698		1698	1770	1859	1770	1859	1770	1863	1583	1583
Flt Permitted	0.50	0.95		0.95	0.47	1.00	0.47	1.00	0.47	1.00	1.00	1.00
Satd. Flow (perm)	925	1629		1629	884	1859	884	1859	883	1863	1583	1583
Volume (vph)	188	75	12	23	63	139	18	377	6	61	378	131
Peak-hour factor, PHF	0.93	0.93	0.93	0.94	0.94	0.94	0.95	0.95	0.95	0.94	0.94	0.94
Adj. Flow (vph)	202	81	13	24	67	148	19	397	6	65	402	139
RTOR Reduction (vph)	0	2	0	0	72	0	0	0	0	0	0	47
Lane Group Flow (vph)	0	294	0	0	167	0	19	403	0	65	402	92
Turn Type	Perm	Perm		Perm	Perm		Perm	Perm		Perm	Perm	Perm
Protected Phases	8	8		4	4		6	6		2	2	2
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	32.6			32.6	32.6		79.4	79.4		79.4	79.4	79.4
Effective Green, g (s)	32.6			32.6	32.6		79.4	79.4		79.4	79.4	79.4
Actuated g/C Ratio	0.27			0.27	0.27		0.66	0.66		0.66	0.66	0.66
Clearance Time (s)	4.0			4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0			3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	251			443			585	1230		584	1233	1047
v/s Ratio Prot								c0.22			0.22	
v/s Ratio Perm	c0.32			0.10			0.02			0.07		0.06
v/c Ratio	1.17			0.38			0.03	0.33		0.11	0.33	0.09
Uniform Delay, d1	43.7			35.5			7.0	8.8		7.4	8.8	7.3
Progression Factor	1.00			0.40			1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	110.8			0.5			0.1	0.7		0.4	0.7	0.2
Delay (s)	154.5			14.8			7.1	9.5		7.8	9.5	7.5
Level of Service	F			B			A	A		A	A	A
Approach Delay (s)	154.5			14.8			9.4			8.8		
Approach LOS	F			B			A			A		
Intersection Summary												
HCM Average Control Delay	37.5			HCM Level of Service			D					
HCM Volume to Capacity ratio	0.57											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	65.1%			ICU Level of Service			C					
Analysis Period (min)	15											
Critical Lane Group												

Baseline
A & R Engineering Inc.

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Base AM Intersection Analysis

Base 2020 AM

Lanes, Volumes, Timings

1: Cumming Highway & I -575 Northbound Ramp

Base AM
12/28/2006

Lane Group	EBL	EBT	WBT	WBR	NBR	SBR
Lane Group Flow (vph)	203	411	1356	438	886	384
v/c Ratio	0.55	0.12	0.46	0.31	0.35	0.24
Control Delay	11.0	0.0	3.4	0.9	0.4	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.0	0.0	3.4	0.9	0.4	0.3
Queue Length 50th (ft)	45	0	92	0	0	0
Queue Length 95th (ft)	m/70	m/0	205	20	0	0
Internal Link Dist (ft)	1047	677				
Turn Bay Length (ft)	150		325			
Base Capacity (vph)	700	3539	2968	1398	2520	1611
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.12	0.46	0.31	0.35	0.24
Intersection Summary						
m	Volume for 95th percentile queue is metered by upstream signal.					

HCM Signalized Intersection Capacity Analysis

1: Cumming Highway & I -575 Northbound Ramp

Base AM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰		↰	↰	↰	↰		↰	↰	↰	↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00		0.88	1.00	0.86	1.00
Flt	1.00	1.00		1.00	1.00	0.85	1.00		0.85	1.00	0.86	1.00
Flt Protected	0.95	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	3539		3539	3539	1583	2787		2787	1611	1611	1611
Flt Permitted	0.18	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Satd. Flow (perm)	328	3539		3539	3539	1583	2787		2787	1611	1611	1611
Volume (vph)	197	399	0	0	1302	420	0	0	815	0	372	6
Peak-hour factor, PHF	0.97	0.97	0.97	0.96	0.96	0.96	0.92	0.92	0.92	0.97	0.97	0.97
Adj. Flow (vph)	203	411	0	0	1356	438	0	0	886	0	384	6
RTOR Reduction (vph)	0	0	0	0	0	71	0	0	143	0	0	0
Lane Group Flow (vph)	203	411	0	0	1356	367	0	0	743	0	384	6
Turn Type	pm+pt											
Protected Phases	1	6		2					custom			custom
Permitted Phases	6			2					2			6
Actuated Green, G (s)	116.0	120.0		100.6	100.6	100.6	100.6		100.6		120.0	120.0
Effective Green, g (s)	116.0	120.0		100.6	100.6	100.6	100.6		100.6		120.0	120.0
Actuated g/C Ratio	0.97	1.00		0.84	0.84	0.84	0.84		0.84		1.00	1.00
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	454	3539		2967	1327				2336		1611	1611
v/s Ratio Prot	c0.04	0.12		0.38								
v/s Ratio Perm	c0.39			0.23					0.27		0.24	0.24
v/c Ratio	0.45	0.12		0.46	0.28				0.32		0.24	0.24
Uniform Delay, d1	1.6	0.0		2.5	2.0				2.1		0.0	0.0
Progression Factor	2.01	1.00		1.00	1.00	1.00	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.5	0.0		0.5	0.5	0.5	0.5		0.4		0.3	0.3
Delay (s)	3.6	0.0		3.1	2.6				2.5		0.3	0.3
Level of Service	A	A		A	A	A	A		A		A	A
Approach Delay (s)		1.2		2.9			2.5				0.3	
Approach LOS		A		A			A				A	
Intersection Summary												
HCM Average Control Delay			2.3	HCM Level of Service		A						
HCM Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			120.0	Sum of lost time (s)		4.0						
Intersection Capacity Utilization			65.7%	ICU Level of Service		C						
Analysis Period (min)			15									
Critical Lane Group												

Lane Group	EBT	EBR	WBT	SBL	SBR
Lane Group Flow (vph)	291	131	1725	322	304
v/c Ratio	0.54	0.08	0.91dr	0.88	0.61
Control Delay	47.9	0.1	22.1	71.8	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	47.9	0.1	22.1	71.8	11.0
Queue Length 50th (ft)	114	0	478	238	0
Queue Length 95th (ft)	m138	m0	353	#382	85
Internal Link Dist (ft)	2177		1047		
Turn Bay Length (ft)	150				320
Base Capacity (vph)	540	1583	1949	398	500
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.54	0.08	0.89	0.81	0.61
Intersection Summary					
#	95th percentile volume exceeds capacity, queue may be longer.				
m	Queue shown is maximum after two cycles.				
dr	Volume for 95th percentile queue is metered by upstream signal.				
	Defacto Right Lane. Recode with 1 though lane as a right lane.				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔↔	↔	↔↔	↔↔	↔↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.85	0.95	1.00	0.92	1.00	0.85	1.00	0.95	1.00	0.85
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)	3539	1583	3240	3539	1583	3240	1770	1770	1770	1583	1770	1583
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95
Satd. Flow (perm)	3539	1583	3240	3539	1583	3240	1770	1770	1770	1583	1770	1583
Volume (vph)	0	274	123	0	737	954	0	0	0	290	0	274
Peak-hour factor, PHF	0.94	0.94	0.94	0.98	0.98	0.98	0.92	0.92	0.92	0.90	0.90	0.90
Adj. Flow (vph)	0	291	131	0	752	973	0	0	0	322	0	304
RTOR Reduction (vph)	0	0	0	0	195	0	0	0	0	0	0	258
Lane Group Flow (vph)	0	291	131	0	1530	0	0	0	0	322	0	46
Turn Type	Free					Prot					custom	
Protected Phases	6					2					1	
Permitted Phases	Free					Free					6	
Actuated Green, G (s)	18.3					65.0					24.7	
Effective Green, g (s)	18.3					65.0					24.7	
Actuated g/C Ratio	0.15					0.54					0.21	
Clearance Time (s)	4.0					4.0					4.0	
Vehicle Extension (s)	3.0					3.0					3.0	
Lane Grp Cap (vph)	540					1755					364	
v/s Ratio Prot	c0.08					c0.47					c0.18	
v/s Ratio Perm	0.54					0.08					0.03	
Uniform Delay, d1	47.0					23.9					46.3	
Progression Factor	0.95					0.88					1.00	
Incremental Delay, d2	2.3					5.9					21.6	
Delay (s)	46.8					26.9					67.9	
Level of Service	D					C					E	
Approach Delay (s)	32.3					26.9					57.3	
Approach LOS	C					C					E	
Intersection Summary												
HCM Average Control Delay	34.6					HCM Level of Service					C	
HCM Volume to Capacity ratio	0.82					Sum of lost time (s)					12.0	
Actuated Cycle Length (s)	120.0					ICU Level of Service					D	
Intersection Capacity Utilization	74.7%					Analysis Period (min)					15	
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
Critical Lane Group												

Lanes, Volumes, Timings
3: Bobo Grinding Co Driveway & Marietta Street

Base AM
12/28/2006

	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	25	173	607	716	343	435
v/c Ratio	0.11	0.66	0.91	0.64	0.73	0.31
Control Delay	31.1	55.3	30.4	17.5	11.8	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.1	55.3	30.4	17.5	11.8	3.9
Queue Length 50th (ft)	13	126	133	231	29	38
Queue Length 95th (ft)	22	183	280	m515	m98	m135
Internal Link Dist (ft)	95	1440	3002			1058
Turn Bay Length (ft)		150			90	
Base Capacity (vph)	321	380	764	1123	528	1381
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.46	0.79	0.64	0.65	0.31
Intersection Summary						
m Volume for 95th percentile queue is metered by upstream signal.						

Baseline
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Future PM
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HCM Signalized Intersection Capacity Analysis
3: Bobo Grinding Co Driveway & Marietta Street

Base AM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.97	1.00	1.00	0.85	1.00	0.85	0.96	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.99	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1795	1795	1770	1592	1795	1795	1795	1795	1770	1860	1770	1860
Flt Permitted	0.58	0.74	1.00	0.74	1.00	0.74	1.00	1.00	0.32	1.00	0.32	1.00
Satd. Flow (perm)	1055	1380	1592				1793		596	1860		
Volume (vph)	3	9	3	157	17	535	3	495	182	322	404	5
Peak-hour factor, PHF	0.62	0.62	0.62	0.91	0.91	0.91	0.95	0.95	0.95	0.94	0.94	0.94
Adj. Flow (vph)	5	15	5	173	19	588	3	521	192	343	430	5
RTOR Reduction (vph)	0	4	0	0	363	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	21	0	173	244	0	0	708	0	343	435	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	8	8	4	4	4	4	6	6	5	2	5	2
Permitted Phases	8	8	4	4	4	4	6	6	5	2	5	2
Actuated Green, G (s)	22.9	22.9	22.9	22.9	22.9	22.9	74.6	74.6	89.1	89.1	89.1	89.1
Effective Green, g (s)	22.9	22.9	22.9	22.9	22.9	22.9	74.6	74.6	89.1	89.1	89.1	89.1
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19	0.19	0.62	0.62	0.74	0.74	0.74	0.74
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	201	263	304				1115		545	1381		
v/s Ratio Prot				0.13			0.39		0.06	0.23		
v/s Ratio Perm	0.02	0.10	0.66	0.80	0.80	0.80	0.63	0.63	0.63	0.31		
Uniform Delay, d1	40.1	44.9	46.4				14.2		7.8	5.2		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.87	1.01	0.56	0.56		
Incremental Delay, d2	0.2	5.8	14.1				2.5		1.3	0.3		
Delay (s)	40.3	50.8	60.4				14.8		9.1	3.3		
Level of Service	D	D	E				B		A	A		
Approach Delay (s)	40.3		58.3				14.8		5.8			
Approach LOS	D		E				B		A			
Intersection Summary												
HCM Average Control Delay	26.8			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.66											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	102.9%			ICU Level of Service			G					
Analysis Period (min)	15											
Critical Lane Group												

Baseline
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Lanes, Volumes, Timings
4: Big K-Mart Driveway & Marietta Highway

Base AM
12/28/2006



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	202	670	844	8	1357	571	657	1266
v/c Ratio	0.86	1.51	1.08	0.09	1.41	0.83	1.71	0.71
Control Delay	82.9	272.2	73.9	56.1	226.0	26.2	351.7	19.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.9	272.2	73.9	56.1	226.0	26.2	351.7	19.7
Queue Length 50th (ft)	153	~722	~412	6	~751	165	~750	227
Queue Length 95th (ft)	178	#879	#570	23	#888	#367	m#692	m297
Internal Link Dist (ft)	162	491		2132			4585	
Turn Bay Length (ft)			395	150		150		90
Base Capacity (vph)	243	445	781	118	961	692	384	1779
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	1.51	1.08	0.07	1.41	0.83	1.71	0.71

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Baseline
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HCM Signalized Intersection Capacity Analysis
4: Big K-Mart Driveway & Marietta Highway

Base AM
12/28/2006



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00			1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Fit	0.99			1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00
Fit Protected	0.98			0.96	1.00	0.95	1.00	1.00	1.00	0.95	1.00	0.85
Satd. Flow (prot)	1810			1779	1583	1770	3539	1583	1770	3539	1583	1583
Fit Permitted	0.98			0.96	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1810			1779	1583	1770	3539	1583	1770	3539	1583	1583
Volume (vph)	61	73	8	534	36	717	8	1289	542	585	1127	2
Peak-hour factor, PHF	0.70	0.70	0.70	0.85	0.85	0.85	0.95	0.95	0.95	0.89	0.89	0.89
Adj. Flow (vph)	87	104	11	628	42	844	8	1357	571	657	1266	24
RTOR Reduction (vph)	0	2	0	0	0	385	0	0	272	0	0	5
Lane Group Flow (vph)	0	200	0	0	670	459	8	1357	299	657	1266	19
Turn Type	Split	Split	Split	Split	Split	Perm	Prot	Perm	Prot	Prot	Perm	Perm
Protected Phases	8	8	8	4	4	4	1	6	6	5	2	2
Permitted Phases												
Actuated Green, G (s)	15.4			30.0	30.0	30.0	1.5	29.4	29.4	29.2	57.1	57.1
Effective Green, g (s)	15.4			30.0	30.0	30.0	1.5	29.4	29.4	29.2	57.1	57.1
Actuated g/C Ratio	0.13			0.25	0.25	0.25	0.01	0.24	0.24	0.24	0.48	0.48
Clearance Time (s)	4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	232			445	396	22	867	388	431	1684	753	753
v/s Ratio Prot	c0.11			c0.38			0.00	c0.38		c0.37	0.36	
v/s Ratio Perm		0.86		1.51	1.16	0.36	1.57	0.77	1.52	0.75	0.03	0.01
Uniform Delay, d1	51.3			45.0	45.0	58.8	45.3	42.2	45.4	25.7	16.7	16.7
Progression Factor	1.00			1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.77	0.86
Incremental Delay, d2	26.5			239.0	96.5	9.9	260.0	13.8	239.8	1.0	0.0	0.0
Delay (s)	77.8			284.0	141.5	68.7	305.3	56.0	278.2	20.9	14.4	14.4
Level of Service	E			F	F	F	E	F	E	F	C	B
Approach Delay (s)	77.8			204.5			230.7			107.6		
Approach LOS	E			F			F			F		
Intersection Summary												
HCM Average Control Delay	175.3			HCM Level of Service			F					
HCM Volume to Capacity ratio	1.43											
Actuated Cycle Length (s)	120.0			16.0								
Intersection Capacity Utilization	116.2%			H								
Analysis Period (min)	15											
Critical Lane Group												

Baseline
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Lanes, Volumes, Timings
5: Riverstone Parkway & I - 575 Northbound Ramp

Base AM
12/28/2006

	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	251	559	731	80	781	519
v/c Ratio	0.67	0.25	0.43	0.05	0.78	0.79
Control Delay	21.9	4.4	24.5	0.1	44.6	26.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.9	4.4	24.5	0.1	44.6	26.0
Queue Length 50th (ft)	78	80	186	0	290	182
Queue Length 95th (ft)	m194	74	326	0	308	278
Internal Link Dist (ft)	1330	1370				
Turn Bay Length (ft)	370		300	490		
Base Capacity (vph)	498	2277	1682	1583	1373	801
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.25	0.43	0.05	0.57	0.65
Intersection Summary						
m	Volume for 95th percentile queue is metered by upstream signal.					

Baseline
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Future PM
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HCM Signalized Intersection Capacity Analysis
5: Riverstone Parkway & I - 575 Northbound Ramp

Base AM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	1.00	1.00			
Flt	1.00	1.00		1.00	0.85	1.00	1.00	0.85	1.00			
Flt Protected	0.95	1.00		1.00	1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)	1770	3539		3539	1583	3433	3433	1583				
Flt Permitted	0.27	1.00		1.00	1.00	0.95	1.00	1.00	1.00			
Satd. Flow (perm)	501	3539		3539	1583	3433	3433	1583				
Volume (vph)	236	525	0	0	702	77	750	0	498	0	0	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	251	559	0	0	731	80	781	0	519	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	198	0	0	0
Lane Group Flow (vph)	251	559	0	0	731	80	781	0	321	0	0	0
Turn Type	pm+pt											
Protected Phases	1	6			2				custom			
Permitted Phases	6					Free	4		4			
Actuated Green, G (s)	77.2	77.2			57.0	120.0	34.8		34.8			
Effective Green, g (s)	77.2	77.2			57.0	120.0	34.8		34.8			
Actuated g/C Ratio	0.64	0.64			0.48	1.00	0.29		0.29			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	494	2277			1681	1583	996		459			
v/s Ratio Prot	c0.07	0.16			0.21							
v/s Ratio Perm	c0.26					0.05	c0.23		0.20			
v/c Ratio	0.51	0.25			0.43	0.05	0.78		0.70			
Uniform Delay, d1	10.8	9.1			20.8	0.0	39.1		37.9			
Progression Factor	0.99	0.41			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.8	0.2			0.8	0.1	4.1		4.6			
Delay (s)	11.5	4.0			21.7	0.1	43.3		42.6			
Level of Service	B	A			C	A	D		D			
Approach Delay (s)		6.3			19.5				43.0			0.0
Approach LOS		A			B				D			A
Intersection Summary												
HCM Average Control Delay					26.3	HCM Level of Service				C		
HCM Volume to Capacity ratio					0.59							
Actuated Cycle Length (s)					120.0	Sum of lost time (s)				8.0		
Intersection Capacity Utilization					63.9%	ICU Level of Service				B		
Analysis Period (min)					15							
Critical Lane Group												

Baseline
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	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	127	1036	1245	531	367	134
Lane Group Flow (vph)	0.50	0.26	0.35	0.34	0.74	0.39
v/c Ratio	16.9	0.8	4.4	0.5	57.9	10.5
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	0.8	4.4	0.5	57.9	10.5
Queue Length 50th (ft)	23	10	112	0	142	0
Queue Length 95th (ft)	m43	13	118	0	175	47
Internal Link Dist (ft)	1490	547			375	
Turn Bay Length (ft)	165			290		110
Base Capacity (vph)	510	4007	3571	1583	915	520
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.26	0.35	0.34	0.40	0.26

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

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	AAA	AAA	AAA	AAA	AAA	AAA
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.97	1.00
Flt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	3433	1583
Flt Permitted	0.18	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	341	5085	5085	1583	3433	1583
Volume (vph)	119	974	1183	504	316	115
Peak-hour factor, PHF	0.94	0.94	0.95	0.95	0.86	0.86
Adj. Flow (vph)	127	1036	1245	531	367	134
RTOR Reduction (vph)	0	0	0	0	0	115
Lane Group Flow (vph)	127	1036	1245	531	367	19
Turn Type	pm+pt	Free	Free	Free	Perm	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6			Free		8
Actuated Green, G (s)	94.6	94.6	84.3	120.0	17.4	17.4
Effective Green, g (s)	94.6	94.6	84.3	120.0	17.4	17.4
Actuated g/C Ratio	0.79	0.79	0.70	1.00	0.14	0.14
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	344	4009	3572	1583	498	230
v/s Ratio Prot	0.02	0.20	0.24		c0.11	
v/s Ratio Perm	c0.27			c0.34		0.01
v/c Ratio	0.37	0.26	0.35	0.34	0.74	0.08
Uniform Delay, d1	3.8	3.4	7.0	0.0	49.1	44.4
Progression Factor	3.14	0.17	0.56	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.1	0.2	0.5	5.6	0.2
Delay (s)	12.6	0.7	4.2	0.5	54.7	44.6
Level of Service	B	A	A	A	D	D
Approach Delay (s)		2.0	3.1		52.0	
Approach LOS		A	A		D	

Intersection Summary
HCM Average Control Delay
HCM Volume to Capacity ratio
Actuated Cycle Length (s)
Intersection Capacity Utilization
Analysis Period (min)
c Critical Lane Group

Lanes, Volumes, Timings
8: Riverstone Parkway & Reinhardt College Parkway

Base AM
12/28/2006



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	254	856	1199	254	351	109
v/c Ratio	0.71	0.21	0.38	0.16	0.68	0.33
Control Delay	15.9	5.3	5.8	0.2	29.6	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	5.3	5.8	0.2	29.6	2.6
Queue Length 50th (ft)	60	81	42	0	111	7
Queue Length 95th (ft)	m120	142	81	0	m101	m7
Internal Link Dist (ft)	1839	1490			2482	
Turn Bay Length (ft)	190					
Base Capacity (vph)	607	3984	3179	1583	830	465
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.21	0.38	0.16	0.42	0.23

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

Baseline
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HCM Signalized Intersection Capacity Analysis
8: Riverstone Parkway & Reinhardt College Parkway

Base AM
12/28/2006



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	1.00
Flt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	3433	1583
Flt Permitted	0.18	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	339	5085	5085	1583	3433	1583
Volume (vph)	236	796	1115	236	333	104
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.95	0.95
Adj. Flow (vph)	254	856	1199	254	351	109
RTOR Reduction (vph)	0	0	0	0	0	93
Lane Group Flow (vph)	254	856	1199	254	351	16
Turn Type	pm+pt	Free	Free	Free	Perm	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6			Free		8
Actuated Green, G (s)	94.0	94.0	75.0	120.0	18.0	18.0
Effective Green, g (s)	94.0	94.0	75.0	120.0	18.0	18.0
Actuated g/C Ratio	0.78	0.78	0.62	1.00	0.15	0.15
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	444	3983	3178	1583	515	237
v/s Ratio Prot	c0.07	0.17	0.24		c0.10	
v/s Ratio Perm	c0.38			0.16		0.01
v/c Ratio	0.57	0.21	0.38	0.16	0.68	0.07
Uniform Delay, d1	5.6	3.4	11.0	0.0	48.3	43.8
Progression Factor	0.57	1.39	0.44	1.00	0.52	0.12
Incremental Delay, d2	1.3	0.1	0.3	0.2	2.4	0.1
Delay (s)	4.4	4.8	5.2	0.2	27.7	5.4
Level of Service	A	A	A	A	C	A
Approach Delay (s)		4.7	4.3		22.4	
Approach LOS		A	A		C	

Intersection Summary
HCM Average Control Delay
HCM Volume to Capacity ratio
Actuated Cycle Length (s)
Intersection Capacity Utilization
Analysis Period (min)
c Critical Lane Group

Baseline
A & R Engineering Inc.

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	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group Flow (vph)	679	898	449	890	241	308	191	210	421	737	
v/c Ratio	1.17	0.83	0.98	1.05	1.15	0.68	0.36	0.73	0.90	1.16	
Control Delay	113.8	24.4	64.9	75.0	137.6	50.2	7.2	38.1	60.0	106.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	113.8	24.4	64.9	75.0	137.6	50.2	7.2	38.1	60.0	106.0	
Queue Length 50th (ft)	~555	366	303	~388	~167	218	0	125	330	~475	
Queue Length 95th (ft)	m302	m247	#485	#520	#336	319	58	m147	m#453	#725	
Internal Link Dist (ft)	1240		3515		1145				4852		
Turn Bay Length (ft)	150		150		160			80		90	
Base Capacity (vph)	578	1078	460	848	210	451	528	289	466	637	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	1.17	0.83	0.98	1.05	1.15	0.68	0.36	0.73	0.90	1.16	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Intersection Summary

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	0.85	1.00	1.00	
Flt	1.00	0.96	1.00	0.98	1.00	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	3399	1770	3457	1770	1863	1583	1770	1863	1583	
Flt Permitted	0.12	1.00	0.14	1.00	0.14	1.00	1.00	0.27	1.00	1.00	
Satd. Flow (perm)	226	3399	257	3457	257	1863	1583	506	1863	1583	
Volume (vph)	638	620	224	404	678	123	234	299	185	197	
Peak-hour factor, PHF	0.94	0.94	0.94	0.90	0.90	0.97	0.97	0.97	0.94	0.94	
Adj. Flow (vph)	679	660	238	449	753	137	241	308	191	210	
RTOR Reduction (vph)	0	30	0	0	12	0	0	145	0	0	
Lane Group Flow (vph)	679	868	0	449	878	0	241	308	46	210	
Turn Type	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	
Protected Phases	1	6	5	2	7	4	4	3	8	8	
Permitted Phases	6		2		4		4		8		
Actuated Green, G (s)	68.0	37.0	56.0	29.0	39.0	29.0	29.0	41.0	30.0	30.0	
Effective Green, g (s)	68.0	37.0	56.0	29.0	39.0	29.0	29.0	41.0	30.0	30.0	
Actuated g/C Ratio	0.57	0.31	0.47	0.24	0.32	0.24	0.24	0.34	0.25	0.25	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	578	1048	460	835	210	450	383	289	466	396	
v/s Ratio Prot	c0.34	0.26	0.22	0.25	c0.10	0.17	0.07	0.18	0.23	0.31	
v/s Ratio Perm	c0.32		0.24		0.28		0.03	0.12	0.73	0.90	
v/c Ratio	1.17	0.83	0.98	1.05	1.15	0.68	0.12	0.73	0.90	1.25	
Uniform Delay, d1	35.0	38.5	34.7	45.5	35.2	41.3	35.5	30.8	43.6	45.0	
Progression Factor	1.07	0.64	0.80	0.68	1.00	1.00	1.00	1.00	1.00	1.02	
Incremental Delay, d2	80.5	0.7	34.4	44.7	107.6	4.3	0.1	5.0	13.0	124.5	
Delay (s)	117.9	25.2	62.2	75.5	142.7	45.6	35.7	35.9	57.4	173.9	
Level of Service	F	C	E	E	F	D	D	D	D	F	
Approach Delay (s)	65.1		71.0		74.7				116.8		
Approach LOS	E		E		E				F		

Intersection Summary

HCM Average Control Delay	82.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	105.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group	118	336	699	63	534	1278
Lane Group Flow (vph)	0.62	0.71	0.71	0.04	0.84	0.83
v/c Ratio	58.9	17.5	14.2	0.0	39.7	12.9
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	58.9	17.5	14.2	0.0	39.7	12.9
Total Delay	91	63	256	0	234	425
Queue Length 50th (ft)	m139	130	m249	m0	#403	838
Queue Length 95th (ft)	3912	4852	250	275	2585	
Internal Link Dist (ft)						
Turn Bay Length (ft)						
Base Capacity (vph)	251	513	982	1583	679	1539
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.65	0.71	0.04	0.79	0.83
Intersection Summary						
#	95th percentile volume exceeds capacity, queue may be longer.					
m	Queue shown is maximum after two cycles.					
	Volume for 95th percentile queue is metered by upstream signal.					

	WBL	WBR	NBT	NBR	SBL	SBT
Movement	1900	1900	1900	1900	1900	1900
Lane Configurations	4.0	4.0	4.0	4.0	4.0	4.0
Ideal Flow (vphpl)	1.00	1.00	1.00	1.00	1.00	1.00
Total Lost time (s)	1.00	0.85	1.00	0.85	1.00	1.00
Lane Util. Factor	0.95	1.00	1.00	1.00	0.95	1.00
Flt Protected	1770	1583	1863	1583	1770	1863
Satd. Flow (prot)	0.95	1.00	1.00	1.00	0.21	1.00
Flt Permitted	1770	1583	1863	1583	389	1863
Satd. Flow (perm)	103	292	650	59	486	1163
Volume (vph)	0.87	0.87	0.93	0.93	0.91	0.91
Peak-hour factor, PHF	118	336	699	63	534	1278
Adj. Flow (vph)	0	300	0	0	0	0
RTOR Reduction (vph)	118	36	699	63	534	1278
Lane Group Flow (vph)	Perm Free pm+pt					
Turn Type	4	6	6	5	2	
Protected Phases	12.9	12.9	63.2	120.0	99.1	99.1
Permitted Phases	12.9	12.9	63.2	120.0	99.1	99.1
Actuated Green, G (s)	0.11	0.11	0.53	1.00	0.83	0.83
Effective Green, g (s)	4.0	4.0	4.0	4.0	4.0	4.0
Actuated g/C Ratio	3.0	3.0	3.0	3.0	3.0	3.0
Clearance Time (s)	190	170	981	1583	688	1539
Vehicle Extension (s)	c0.07	0.02	0.38	0.04	0.21	c0.69
Lane Grp Cap (vph)	0.62	0.21	0.71	0.04	0.78	0.83
v/s Ratio Prot	51.2	48.9	21.5	0.0	22.3	5.8
v/s Ratio Perm	0.90	1.74	0.56	1.00	1.00	1.00
Uniform Delay, d1	5.7	0.6	0.4	0.0	5.5	5.4
Progression Factor	51.9	85.5	12.6	0.0	27.8	11.1
Incremental Delay, d2	D	F	B	A	C	B
Delay (s)	76.8	E	11.5	B	16.1	B
Level of Service	Approach Delay (s)					
Approach Delay (s)	Approach LOS					
Approach LOS	Intersection Summary					
	HCM Average Control Delay					
	HCM Volume to Capacity ratio					
	Actuated Cycle Length (s)					
	Intersection Capacity Utilization					
	Analysis Period (min)					
	Critical Lane Group					

Lanes, Volumes, Timings
11: Reinhardt College Parkway & College Street

Base AM
12/28/2006

	→	←	↑	↓	
Lane Group	EBT	WBT	NBT	SBT	
Lane Group Flow (vph)	674	380	420	571	
Intersection Summary					

HCM Unsignalized Intersection Capacity Analysis
11: Reinhardt College Parkway & College Street

Base AM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	83	476	14	41	150	94	18	171	130	251	107	82
Peak Hour Factor	0.85	0.85	0.85	0.75	0.75	0.75	0.76	0.76	0.76	0.77	0.77	0.77
Hourly flow rate (vph)	98	560	16	55	200	125	24	225	171	326	139	106
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	674	380	420	571								
Volume Left (vph)	98	55	24	326								
Volume Right (vph)	16	125	171	106								
HadJ (s)	0.05	-0.14	-0.20	0.04								
Departure Headway (s)	9.6	9.4	9.4	9.6								
Degree Utilization, x	1.80	1.00	1.09	1.52								
Capacity (veh/h)	380	380	394	388								
Control Delay (s)	392.3	76.4	103.6	272.9								
Approach Delay (s)	392.3	76.4	103.6	272.9								
Approach LOS	F	F	F	F								
Intersection Summary												
Delay			241.0									
HCM Level of Service			F									
Intersection Capacity Utilization			93.3%							F		
Analysis Period (min)			15									

Lanes, Volumes, Timings
12: Knox Bridge Highway & Fincher Road

Base AM
12/28/2006

	↖	→	↗	←	↑	↓
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	102	674	43	590	56	252
Intersection Summary						

Baseline
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HCM Unsignalized Intersection Capacity Analysis
12: Knox Bridge Highway & Fincher Road

Base AM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↰	↱		↰	↱		↰	↱	↰	↱	↰	↱	
Sign Control	Free	Free		Free	Free		Stop	Stop	Stop	Stop	Stop	Stop	
Grade		0%			0%		0%				0%		
Volume (veh/h)	92	600	6	41	502	64	3	2	35	110	14	106	
Peak Hour Factor	0.90	0.90	0.90	0.96	0.96	0.96	0.72	0.72	0.72	0.91	0.91	0.91	
Hourly flow rate (vph)	102	667	7	43	523	67	4	3	49	121	15	116	
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	590		673				1607	1549	670	1563	1519	556	
VC1, stage 1 conf vol													
VC2, stage 2 conf vol													
VCu, unblocked vol	590		673				1607	1549	670	1563	1519	556	
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 %	90		95				92	97	89	0	85	78	
cM capacity (veh/h)	986		918				52	97	457	71	101	530	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1							
Volume Total	102	673	43	590	56	253							
Volume Left	102	0	43	0	4	121							
Volume Right	0	7	0	67	49	116							
cSH	986	1700	918	1700	258	121							
Volume to Capacity	0.10	0.40	0.05	0.35	0.22	2.09							
Queue Length 95th (ft)	9	0	4	0	20	524							
Control Delay (s)	9.1	0.0	9.1	0.0	22.7	574.7							
Lane LOS	A	A	A	C	C	F							
Approach Delay (s)	1.2		0.6		22.7	574.7							
Approach LOS			C		C	F							
Intersection Summary													
Average Delay	86.1						ICU Level of Service						C
Intersection Capacity Utilization	65.4%						Analysis Period (min)						15

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
13: N Etowah Drive & Riverstone Parkway

Base AM
12/28/2006

	→	←	↖	↗	↑	↘	↙	↓	↕
Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group Flow (vph)	169	25	26	1424	32	9	1810	20	
Intersection Summary									

Future PM
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Baseline
A & R Engineering Inc.

HCM Unsignalized Intersection Capacity Analysis
13: N Etowah Drive & Riverstone Parkway

Base AM
12/28/2006

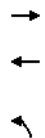
	↖	→	↗	↘	←	↖	↗	↑	↘	↙	↓	↕
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕	↕	↕	↕	↕
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	6	0	119	9	0	6	24	1339	30	8	1647	18
Peak Hour Factor	0.74	0.74	0.74	0.62	0.62	0.62	0.94	0.94	0.94	0.94	0.91	0.91
Hourly flow rate (vph)	8	0	161	15	0	10	26	1424	32	9	1810	20
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	2591	3335	905	2398	3323	712	1830			1456		
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCu, unblocked vol	2591	3335	905	2398	3323	712	1830			1456		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	28	100	42	0	100	97	92			98		
cM capacity (veh/h)	11	7	279	7	7	375	330			460		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	169	24	26	712	712	32	9	905	905	20		
Volume Left	8	15	26	0	0	0	9	0	0	0		
Volume Right	161	10	0	0	0	32	0	0	0	20		
cSH	130	11	330	1700	1700	460	1700	1700	1700	1700		
Volume to Capacity	1.30	2.14	0.08	0.42	0.42	0.02	0.02	0.53	0.53	0.01		
Queue Length 95th (ft)	269	98	6	0	0	1	0	0	0	0		
Control Delay (s)	244.5	1188.0	16.8	0.0	0.0	0.0	13.0	0.0	0.0	0.0		
Lane LOS	F	F	C			B						
Approach Delay (s)	244.5	1188.0	0.3			0.1						
Approach LOS	F	F										
Intersection Summary												
Average Delay	20.1											
Intersection Capacity Utilization	59.8%					ICU Level of Service						
Analysis Period (min)	15					B						

Future PM
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Baseline
A & R Engineering Inc.

Lanes, Volumes, Timings
14: Broad Water Bay Road & Fincher Road

Base AM
12/28/2006



Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	66	151	163
Intersection Summary			

Baseline
A & R Engineering Inc.

Future PM
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HCM Unsignalized Intersection Capacity Analysis
14: Broad Water Bay Road & Fincher Road

Base AM
12/28/2006



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			4	1	
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	32	27	8	113	127	15
Peak Hour Factor	0.89	0.89	0.80	0.80	0.87	0.87
Hourly flow rate (vph)	36	30	10	141	146	17
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
VC, conflicting volume	316	155	163			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	316	155	163			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	97	99			
cM capacity (veh/h)	672	891	1415			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	66	151	163			
Volume Left	36	10	0			
Volume Right	30	0	17			
cSH	757	1415	1700			
Volume to Capacity	0.09	0.01	0.10			
Queue Length 95th (ft)	7	1	0			
Control Delay (s)	10.2	0.6	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.2	0.6	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay	2.0					
Intersection Capacity Utilization	22.6%					
ICU Level of Service	A					
Analysis Period (min)	15					

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
15: Bells Ferry Road & Marietta Highway

Base AM
12/28/2006

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	611	260	27	581	110	673	233
v/c Ratio	1.00	0.30	0.31	0.74	0.72	0.85	0.30
Control Delay	65.4	9.8	34.5	35.6	57.2	43.0	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.4	9.8	34.5	35.6	57.2	43.0	5.6
Queue Length 50th (ft)	455	84	14	370	69	461	15
Queue Length 95th (ft)	#663	61	43	512	#159	587	57
Internal Link Dist (ft)	1761	266	463			416	
Turn Bay Length (ft)			150			150	250
Base Capacity (vph)	614	874	88	789	153	792	787
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.30	0.31	0.74	0.72	0.85	0.30
Intersection Summary							
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.							

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
15: Bells Ferry Road & Marietta Highway

Base AM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.99	0.99	0.99	0.93	0.93	0.93	1.00	1.00	1.00	1.00	1.00	0.85
Satd. Flow (prot)	1803	1803	1803	1733	1733	1733	1770	1856	1770	1863	1583	1583
Flt Permitted	0.65	0.65	0.65	0.96	0.96	0.96	0.11	1.00	0.19	1.00	1.00	1.00
Satd. Flow (perm)	1204	1204	1204	1661	1661	1661	206	1856	360	1863	1583	1583
Volume (vph)	296	210	20	12	86	97	26	538	14	95	579	200
Peak-hour factor, PHF	0.86	0.86	0.86	0.75	0.75	0.75	0.95	0.95	0.95	0.86	0.86	0.86
Adj. Flow (vph)	344	244	23	16	115	129	27	566	15	110	673	233
RTOR Reduction (vph)	0	1	0	0	30	0	0	0	1	0	0	114
Lane Group Flow (vph)	0	610	0	0	231	0	27	580	0	110	673	119
Turn Type												
Protected Phases	8	8	8	4	4	4	6	6	6	2	2	2
Permitted Phases	8	8	8	4	4	4	6	6	6	2	2	2
Actuated Green, G (s)	61.0	61.0	61.0	61.0	61.0	61.0	51.0	51.0	51.0	51.0	51.0	51.0
Effective Green, g (s)	61.0	61.0	61.0	61.0	61.0	61.0	51.0	51.0	51.0	51.0	51.0	51.0
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.51	0.42	0.42	0.42	0.42	0.42	0.42
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	612	612	612	844	844	844	88	789	153	792	673	673
v/s Ratio Prot								0.31		c0.36		
v/s Ratio Perm	0.51	0.51	0.51	0.14	0.14	0.14	0.13	0.31	0.31	0.31	0.07	0.07
v/c Ratio	1.00	1.00	1.00	0.27	0.27	0.27	0.31	0.74	0.72	0.85	0.18	0.18
Uniform Delay, d1	29.4	29.4	29.4	16.8	16.8	16.8	22.8	28.9	28.6	31.1	21.4	21.4
Progression Factor	1.00	1.00	1.00	0.69	0.69	0.69	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	35.3	35.3	35.3	0.2	0.2	0.2	8.8	6.0	25.1	11.0	0.6	0.6
Delay (s)	64.7	64.7	64.7	11.7	11.7	11.7	31.6	34.9	53.7	42.1	22.0	22.0
Level of Service	E	E	E	B	B	B	C	C	D	D	C	C
Approach Delay (s)	64.7	64.7	64.7	11.7	11.7	11.7	34.8	34.8	38.7	38.7	38.7	38.7
Approach LOS	E	E	E	B	B	B	C	C	D	D	D	D
Intersection Summary												
HCM Average Control Delay	41.3						HCM Level of Service					
HCM Volume to Capacity ratio	0.93						D					
Actuated Cycle Length (s)	120.0						Sum of lost time (s)					
Intersection Capacity Utilization	87.5%						ICU Level of Service					
Analysis Period (min)	15						E					
Critical Lane Group												

Baseline
A & R Engineering Inc.

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Base 2020 AM Improved

Lanes, Volumes, Timings
2: Cumming Highway & I-575 Southbound Ramp

Base AM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	291	131	752	973	322	304		
Act Effct Green (s)	42.2	120.0	40.0	120.0	25.8	42.2		
Actuated g/C Ratio	0.35	1.00	0.33	1.00	0.22	0.35		
v/c Ratio	0.23	0.08	0.64	0.61	0.85	0.40		
Control Delay	25.6	0.1	35.1	2.5	64.4	5.3		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	25.6	0.1	35.1	2.5	64.4	5.3		
LOS	C	A	D	A	E	A		
Approach Delay	17.7		16.7					
Approach LOS	B		B					
Queue Length 50th (ft)	71	0	257	33	241	0		
Queue Length 95th (ft)	m105	m0	325	60	319	67		
Internal Link Dist (ft)	2177		1047					
Turn Bay Length (ft)	1243	1583	1180	1583	575	753		
Base Capacity (vph)	0	0	0	0	0	0		
Starvation Cap Reductn	0	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0		
Reduced v/c Ratio	0.23	0.08	0.64	0.61	0.56	0.40		

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 39 (33%), Referenced to phase 2:WBT, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 21.1	Intersection LOS: C
Intersection Capacity Utilization 44.0%	ICU Level of Service A
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
2: Cumming Highway & I-575 Southbound Ramp

Base AM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔↔	↔	↔↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.85	1.00	0.95	1.00
Flt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3539	1583	3539	1583	3539	1583	1770	1770	1770	1583	1583	1583
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3539	1583	3539	1583	3539	1583	1770	1770	1770	1583	1583	1583
Volume (vph)	0	274	123	0	737	954	0	0	0	290	0	274
Peak-hour factor, PHF	0.94	0.94	0.94	0.98	0.98	0.98	0.92	0.92	0.92	0.90	0.90	0.90
Adj. Flow (vph)	0	291	131	0	752	973	0	0	0	322	0	304
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	197
Lane Group Flow (vph)	0	291	131	0	752	973	0	0	0	322	0	107
Turn Type		Free	Free		Free	Free				Prot		custom
Protected Phases		6			2					1		6
Permitted Phases			Free			Free						
Actuated Green, G (s)		42.2	120.0		40.0	120.0				25.8		42.2
Effective Green, g (s)		42.2	120.0		40.0	120.0				25.8		42.2
Actuated g/C Ratio		0.35	1.00		0.33	1.00				0.22		0.35
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		1245	1583		1180	1583				381		557
v/s Ratio Prot		0.08			0.21					c0.18		
v/s Ratio Perm		0.23	0.08		0.64	0.61				0.85		0.07
Uniform Delay, d1		27.5	0.0		33.9	0.0				45.2		27.0
Progression Factor		0.87	1.00		0.95	1.00				1.00		1.00
Incremental Delay, d2		0.2	0.1		2.5	1.7				15.7		0.8
Delay (s)		24.1	0.1		34.8	1.7				60.8		27.8
Level of Service		C	A		C	A				E		C
Approach Delay (s)		16.7			16.1					44.8		
Approach LOS		B			B					A		D
Intersection Summary												
HCM Average Control Delay			22.7							C		
HCM Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			120.0							4.0		
Intersection Capacity Utilization			44.0%							A		
Analysis Period (min)			15									
c Critical Lane Group												

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
3: Bobo Grinding Co Driveway & Marietta Street

Base AM - Improved
12/28/2006

Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	25	173	607	716	343	435
Act Effct Green (s)	23.6	23.6	23.6	67.3	17.1	88.4
Actuated g/C Ratio	0.20	0.20	0.20	0.56	0.14	0.74
v/c Ratio	0.11	0.64	0.91	0.71	0.70	0.32
Control Delay	30.2	53.3	31.5	24.5	41.0	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.2	53.3	31.5	24.5	41.0	7.0
LOS	C	D	C	C	D	A
Approach Delay	30.2		36.3	24.5		22.0
Approach LOS	C		D	C		C
Queue Length 50th (ft)	13	125	145	423	48	23
Queue Length 95th (ft)	22	178	285	647	#190	393
Internal Link Dist (ft)	95		148	3002		1058
Turn Bay Length (ft)		150			90	
Base Capacity (vph)	343	403	774	1015	506	1370
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.43	0.78	0.71	0.68	0.32

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 28 (23%), Referenced to phase 2:SBT and 6:NBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 27.7
Intersection Capacity Utilization 102.9%
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
3: Bobo Grinding Co Driveway & Marietta Street

Base AM - Improved
12/28/2006



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔		↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0		4.0
Lane Util. Factor		1.00		1.00	1.00		1.00		1.00		1.00
Frt		0.97		1.00	1.00		0.96		1.00		1.00
Flt Protected		0.99		1.00	0.95		1.00		0.95		1.00
Satd. Flow (prot)		1795		1770	1592		1795		3433		1860
Flt Permitted		0.59		0.74	1.00		1.00		0.95		1.00
Satd. Flow (perm)		1064		1380	1592		1793		3433		1860
Volume (vph)	3	9	3	157	17	535	3	495	182	322	404
Peak-hour factor, PHF	0.62	0.62	0.62	0.91	0.91	0.91	0.95	0.95	0.95	0.94	0.94
Adj. Flow (vph)	5	15	5	173	19	588	3	521	192	343	430
RTOR Reduction (vph)	0	4	0	0	351	0	0	9	0	0	0
Lane Group Flow (vph)	0	21	0	173	256	0	0	707	0	343	435
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	8	8		4	4		6	6	5	2	
Permitted Phases											
Actuated Green, G (s)		23.6		23.6	23.6		67.3	67.3	17.1	88.4	
Effective Green, g (s)		23.6		23.6	23.6		67.3	67.3	17.1	88.4	
Actuated g/C Ratio		0.20		0.20	0.20		0.56	0.56	0.14	0.74	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		209		271	313		1006	1006	489	1370	
v/s Ratio Prot					0.16				0.10	0.23	
v/s Ratio Perm		0.02		0.13			0.39	0.39			
v/c Ratio		0.10		0.64	0.82		0.70	0.70	0.70	0.32	
Uniform Delay, d1		39.5		44.3	46.1		19.1	19.1	49.0	5.4	
Progression Factor		1.00		1.00	1.00		0.94	0.94	0.69	0.96	
Incremental Delay, d2		0.2		4.9	15.2		4.1	4.1	3.8	0.5	
Delay (s)		39.7		49.2	61.3		22.0	22.0	37.4	5.7	
Level of Service		D		D	E		C	C	D	A	
Approach Delay (s)		39.7			58.6		22.0	22.0		19.7	
Approach LOS		D			E		C	C		B	
Intersection Summary											
HCM Average Control Delay				33.8			HCM Level of Service				
HCM Volume to Capacity ratio				0.73			C				
Actuated Cycle Length (s)				120.0			Sum of lost time (s)				
Intersection Capacity Utilization				102.9%			ICU Level of Service				
Analysis Period (min)				15			G				
c Critical Lane Group											

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
4: Big K-Mart Driveway & Marietta Highway

HCM Signalized Intersection Capacity Analysis
4: Big K-Mart Driveway & Marietta Highway

Base AM - Improved
12/28/2006

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	202	326	344	844	8	1357	571	657	1266	24
Act Effct Green (s)	15.4	25.0	25.0	58.0	6.1	34.6	34.6	29.0	65.3	65.3
Actuated g/C Ratio	0.13	0.21	0.21	0.48	0.05	0.29	0.29	0.24	0.54	0.54
v/c Ratio	0.86	0.93	0.97	0.99	0.09	0.93	0.71	0.79	0.66	0.03
Control Delay	82.9	80.8	89.6	54.8	56.1	53.3	11.5	39.2	16.5	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.9	80.8	89.6	54.8	56.1	53.3	11.5	39.2	16.5	8.1
LOS	F	F	F	D	E	D	B	D	B	A
Approach Delay	82.9	68.3			41.0				24.0	
Approach LOS	F	E			D				C	
Queue Length 50th (ft)	153	263	281	552	6	376	46	200	258	4
Queue Length 95th (ft)	178	#408	#436	#762	23	#472	179	m236	m326	m7
Internal Link Dist (ft)	162		491		424				418	
Turn Bay Length (ft)	243	150	395	150	118	1466	806	150	1926	866
Base Capacity (vph)	243	350	353	850	118	1466	806	830	1926	866
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.93	0.97	0.99	0.07	0.93	0.71	0.79	0.66	0.03

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 116 (97%). Referenced to phase 2: SBT and 6: NBT, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 44.0	Intersection LOS: D
Intersection Capacity Utilization 87.0%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Baseline
A & R Engineering Inc.

Future PM
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.85
Flt Protected	0.98	0.98	1.00	0.95	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1810	1681	1695	1583	1770	1583	1770	1583	1583	1583	3539	1583
Flt Permitted	0.98	0.95	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1810	1681	1695	1583	1770	1583	1770	1583	1583	1583	3539	1583
Volume (vph)	61	73	8	534	36	717	8	1289	542	585	1127	21
Peak-hour factor, PHF	0.70	0.70	0.70	0.85	0.85	0.85	0.95	0.95	0.95	0.89	0.89	0.89
Adj. Flow (vph)	87	104	11	628	42	844	8	1357	571	657	1266	24
RTOR Reduction (vph)	0	2	0	0	0	86	0	0	363	0	0	4
Lane Group Flow (vph)	0	200	0	326	344	758	8	1357	208	657	1266	20
Turn Type	Split	Split		Split	pm+ov	Prot	Prot	Perm	Prot	Perm	Perm	Perm
Protected Phases	8	8		4	4	5	1	6		5	2	
Permitted Phases										6		
Actuated Green, G (s)	15.4	25.0	25.0	57.2	1.5	31.4	1.5	31.4	32.2	62.1	62.1	62.1
Effective Green, g (s)	15.4	25.0	25.0	57.2	1.5	31.4	1.5	31.4	32.2	62.1	62.1	62.1
Actuated g/C Ratio	0.13	0.21	0.21	0.48	0.01	0.26	0.01	0.26	0.26	0.27	0.52	0.52
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	232	350	353	807	22	1331	414	921	1831	819		
v/s Ratio Prot	c0.11			0.19	0.20	c0.25	0.00	c0.27	0.13	0.19	0.36	0.01
v/s Ratio Perm				0.93	0.97	0.94	0.36	1.02	0.50	0.71	0.69	0.02
Uniform Delay, d1	51.3	46.7	47.2	29.8	58.8	44.3	37.7	39.7	21.8	14.1		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.75	0.75
Incremental Delay, d2	26.5	31.0	40.8	18.4	9.9	29.7	4.3	1.6	1.3	0.0		
Delay (s)	77.8	77.6	87.9	48.1	68.7	74.0	41.9	33.3	17.7	10.6		
Level of Service	E	E	F	D	E	E	D	C	B	B		
Approach Delay (s)	77.8			63.5			64.5		22.8			
Approach LOS	E			E			E		C			

Intersection Summary

HCM Average Control Delay	50.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Baseline
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Lanes, Volumes, Timings
5: Riverstone Parkway & I - 575 Northbound Ramp

Base AM - Improved
12/28/2006

	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	251	559	731	80	781	519
Act Effct Green (s)	79.8	79.8	60.8	120.0	32.2	60.8
Actuated g/C Ratio	0.66	0.66	0.51	1.00	0.27	0.51
v/c Ratio	0.60	0.24	0.41	0.05	0.85	0.49
Control Delay	12.4	3.4	21.0	0.1	50.7	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.4	3.4	21.0	0.1	50.7	3.7
LOS	B	A	C	A	D	A
Approach Delay	6.2 19.0					
Approach LOS	A B					
Queue Length 50th (ft)	69	81	178	0	296	0
Queue Length 95th (ft)	m28	0	285	0	338	68
Internal Link Dist (ft)	1330 1370					
Turn Bay Length (ft)	370	300 490				
Base Capacity (vph)	546	2354	1794	1583	1173	1059
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.24	0.41	0.05	0.67	0.49

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 62 (52%), Referenced to phase 2:WBT and 6:EBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 21.2
 Intersection Capacity Utilization 63.9%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Riverstone Parkway & I - 575 Northbound Ramp

Base AM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	1.00	0.95		0.95	1.00	0.97	1.00	0.95	1.00			
Flt	1.00	1.00		1.00	0.85	1.00	0.85	1.00	0.85			
Flt Protected	0.95	1.00		1.00	1.00	0.95	1.00	0.95	1.00			
Satd. Flow (prot)	1770	3539		3539	1583	3433	1583	3539	1583			
Flt Permitted	0.28	1.00		1.00	1.00	0.95	1.00	0.95	1.00			
Satd. Flow (perm)	524	3539		3539	1583	3433	1583	3539	1583			
Volume (vph)	236	525	0	0	702	77	750	0	498	0	0	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	251	559	0	0	731	80	781	0	519	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	256	0	0	0
Lane Group Flow (vph)	251	559	0	0	731	80	781	0	263	0	0	0
Turn Type	pm+pt Free custom custom											
Protected Phases	1	6			2							
Permitted Phases	6				Free	4			2			
Actuated Green, G (s)	79.8	79.8			60.8	120.0	32.2		60.8			
Effective Green, g (s)	79.8	79.8			60.8	120.0	32.2		60.8			
Actuated g/C Ratio	0.66	0.66			0.51	1.00	0.27		0.51			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	504	2353			1793	1583	921		802			
v/s Ratio Prot	c0.06	0.16			0.21							
v/s Ratio Perm	c0.27				0.05	c0.23			0.17			
v/c Ratio	0.50	0.24			0.41	0.05	0.85		0.33			
Uniform Delay, d1	9.5	8.0			18.4	0.0	41.6		17.5			
Progression Factor	0.74	0.37			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.7	0.2			0.7	0.1	7.3		1.1			
Delay (s)	7.8	3.1			19.1	0.1	48.9		18.6			
Level of Service	A	A			B	A	D		B			
Approach Delay (s)	4.6		17.2		36.8		0.0		A		A	
Approach LOS	A		B		D							
Intersection Summary												
HCM Average Control Delay	22.4		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.59											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	63.9%		ICU Level of Service		B							
Analysis Period (min)	15											
Critical Lane Group												

Lanes, Volumes, Timings
9: Riverstone Parkway & Waleska Road

Base AM - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	679	660	238	449	753	137	241	308	191	210	421	737
Act Effct Green (s)	70.0	41.8	120.0	50.2	26.0	26.0	37.4	25.4	25.4	38.6	26.0	70.0
Actuated g/C Ratio	0.58	0.35	1.00	0.42	0.22	0.22	0.31	0.21	0.21	0.32	0.22	0.58
v/c Ratio	1.04	0.53	0.15	0.91	0.98	0.33	1.00	0.78	0.39	0.78	1.04	0.78
Control Delay	56.6	27.4	0.1	38.3	64.0	17.2	92.6	59.8	8.1	42.5	91.6	22.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.6	27.4	0.1	38.3	64.0	17.2	92.6	59.8	8.1	42.5	91.6	22.5
LOS	E	C	A	D	E	B	F	E	A	D	F	C
Approach Delay	35.9			50.6			57.1			46.9		
Approach LOS	D			D			E			D		
Queue Length 50th (ft)	~525			227			317			37		
Queue Length 95th (ft)	m#589			m0			#365			#446		
Internal Link Dist (ft)	1240			m0			#311			#363		
Turn Bay Length (ft)	150			150			150			150		
Base Capacity (vph)	652			1234			1583			552		
Starvation Cap Reductn	0			0			0			0		
Spillback Cap Reductn	0			0			0			0		
Storage Cap Reductn	0			0			0			0		
Reduced v/c Ratio	1.04			0.53			0.15			0.81		

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 24 (20%), Referenced to phase 2:WBTl and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 45.9	Intersection LOS: D
Intersection Capacity Utilization 101.2%	ICU Level of Service G
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Baseline
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HCM Signalized Intersection Capacity Analysis
9: Riverstone Parkway & Waleska Road

Base AM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	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 Permitted	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	1770	1863	1583	1770	1863	1583
Flt Permitted	0.13	1.00	1.00	0.40	1.00	1.00	0.16	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)	248	3539	1583	747	3539	1583	293	1863	1583	405	1863	1583
Volume (vph)	638	620	224	404	678	123	234	299	185	197	396	693
Peak-hour factor, PHF	0.94	0.94	0.94	0.90	0.90	0.90	0.97	0.97	0.97	0.94	0.94	0.94
Adj. Flow (vph)	679	660	238	449	753	137	241	308	191	210	421	737
RTOR Reduction (vph)	0	0	0	0	0	0	73	0	0	151	0	18
Lane Group Flow (vph)	679	660	238	449	753	64	241	308	40	210	421	719
Turn Type	pm+pt	Free	pm+pt	Free	pm+pt	Perm	pm+pt	Perm	pm+pt	Perm	pm+pt	pm+ov
Protected Phases	1	6	5	2	7	4	3	8	1			
Permitted Phases	6	Free	2	2	4	4	8	8				
Actuated Green, G (s)	70.0	41.8	120.0	50.2	26.0	26.0	37.4	25.4	25.4	38.6	26.0	66.0
Effective Green, g (s)	70.0	41.8	120.0	50.2	26.0	26.0	37.4	25.4	25.4	38.6	26.0	66.0
Actuated g/C Ratio	0.58	0.35	1.00	0.42	0.22	0.22	0.31	0.21	0.21	0.32	0.22	0.55
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	652	1233	1583	519	767	343	239	394	335	274	404	923
v/s Ratio Prot	c0.35	0.19	0.17	0.21	0.21	0.04	0.10	0.17	0.08	c0.23	0.26	0.26
v/s Ratio Perm	c0.26	c0.15	0.19	0.19	0.19	0.04	0.21	0.17	0.03	0.17	0.19	0.19
w/c Ratio	1.04	0.54	0.15	0.87	0.98	0.19	1.01	0.78	0.12	0.77	1.04	0.78
Uniform Delay, d1	33.2	31.3	0.0	27.2	46.8	38.4	36.6	44.7	38.3	32.7	47.0	21.3
Progression Factor	0.56	0.82	1.00	0.88	0.76	1.03	1.00	1.00	1.00	1.01	1.02	0.99
Incremental Delay, d2	36.1	0.8	0.1	13.4	27.5	1.1	60.4	9.7	0.2	7.0	44.8	2.4
Delay (s)	54.6	26.6	0.1	31.8	62.8	40.6	97.0	54.4	38.4	40.0	92.9	23.4
Level of Service	D	C	A	C	E	D	F	D	D	D	F	C
Approach Delay (s)	34.7			50.1			64.1			47.4		
Approach LOS	C			D			E			D		
Intersection Summary												
HCM Average Control Delay	46.6			HCM Level of Service			D					
HCM Volume to Capacity ratio	0.99											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	101.2%			ICU Level of Service			G					
Analysis Period (min)	15											
Critical Lane Group												

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Lanes, Volumes, Timings
11: Reinhardt College Parkway & College Street

Base AM - Improved
12/28/2006

Lane Group	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	674	380	420	326	245
Act Effrt Green (s)	60.6	60.6	51.4	51.4	51.4
Actuated g/C Ratio	0.50	0.50	0.43	0.43	0.43
v/c Ratio	0.83	0.50	0.55	0.97	0.32
Control Delay	37.6	14.5	23.4	75.4	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	37.6	14.5	23.4	75.4	18.7
LOS	D	B	C	E	B
Approach Delay	37.6	14.5	23.4		51.1
Approach LOS	D	B	C		D
Queue Length 50th (ft)	468	104	201	225	93
Queue Length 95th (ft)	#641	118	228	#312	121
Internal Link Dist (ft)	952	6443	4497		4161
Turn Bay Length (ft)				150	
Base Capacity (vph)	811	753	822	367	836
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.83	0.50	0.51	0.89	0.29
Intersection Summary					
Cycle Length: 120					
Actuated Cycle Length: 120					
Offset: 113 (94%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.97					
Intersection Signal Delay: 34.2					
Intersection Capacity Utilization 82.7%					
Intersection LOS: C					
ICU Level of Service E					
Analysis Period (min) 15					
# 95th percentile volume exceeds capacity, queue may be longer.					
Queue shown is maximum after two cycles.					

Baseline
A & R Engineering Inc.

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HCM Signalized Intersection Capacity Analysis
11: Reinhardt College Parkway & College Street

Base AM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.96	0.96	0.96	0.95	0.95	1.00	0.94	1.00	0.94
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1843	1843	1843	1767	1767	1767	1755	1755	1770	1742	1770	1742
Flt Permitted	0.87	0.87	0.87	0.84	0.84	0.84	0.97	0.97	0.40	1.00	0.40	1.00
Satd. Flow (perm)	1624	1624	1624	1492	1492	1492	1715	1715	744	1742	744	1742
Volume (vph)	83	476	14	41	150	94	18	171	130	251	107	82
Peak-hour factor, PHF	0.85	0.85	0.85	0.75	0.75	0.75	0.76	0.76	0.76	0.77	0.77	0.77
Adj. Flow (vph)	98	560	16	55	200	125	24	225	171	326	139	106
RTOR Reduction (vph)	0	0	0	0	14	0	0	22	0	0	25	0
Lane Group Flow (vph)	0	674	0	0	366	0	0	398	0	326	220	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	2	2	4	4	4	4	4	8	8	8
Permitted Phases	6	6	2	2	4	4	4	4	4	8	8	8
Actuated Green, G (s)	60.6	60.6	60.6	60.6	60.6	60.6	51.4	51.4	51.4	51.4	51.4	51.4
Effective Green, g (s)	60.6	60.6	60.6	60.6	60.6	60.6	51.4	51.4	51.4	51.4	51.4	51.4
Actuated g/C Ratio	0.50	0.50	0.50	0.50	0.50	0.50	0.43	0.43	0.43	0.43	0.43	0.43
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	820	753	753	753	753	753	735	735	319	746	746	746
v/s Ratio Prot												
v/s Ratio Perm	0.41	0.41	0.25	0.25	0.23	0.23	0.23	0.23	0.44	0.13	0.13	0.13
v/c Ratio	0.82	0.82	0.49	0.49	0.54	0.54	0.54	0.54	1.02	0.30	0.30	0.30
Uniform Delay, d1	25.1	25.1	19.5	19.5	25.5	25.5	25.5	25.5	34.3	22.4	22.4	22.4
Progression Factor	1.00	1.00	0.64	0.64	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.1	9.1	1.5	1.5	0.8	0.8	0.8	0.8	56.1	0.2	0.2	0.2
Delay (s)	34.2	34.2	14.0	14.0	24.1	24.1	24.1	24.1	90.4	22.7	22.7	22.7
Level of Service	C	C	B	B	C	C	C	C	F	C	C	C
Approach Delay (s)	34.2	34.2	14.0	14.0	24.1	24.1	24.1	24.1	61.3	61.3	61.3	61.3
Approach LOS	C	C	B	B	C	C	C	C	E	E	E	E

Intersection Summary

HCM Average Control Delay 36.0 HCM Level of Service D

HCM Volume to Capacity ratio 0.91

Actuated Cycle Length (s) 120.0 Sum of lost time (s) 8.0

Intersection Capacity Utilization 82.7% ICU Level of Service E

Analysis Period (min) 15

c Critical Lane Group

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Lanes, Volumes, Timings
12: Knox Bridge Highway & Fincher Road

Base AM - Improved
12/28/2006

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	102	674	43	590	56	252
Act Effct Green (s)	88.9	88.9	88.9	88.9	23.1	23.1
Actuated g/C Ratio	0.74	0.74	0.74	0.74	0.19	0.19
v/c Ratio	0.24	0.49	0.12	0.43	0.16	0.81
Control Delay	7.6	8.5	6.7	7.7	13.2	52.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	8.5	6.7	7.7	13.2	52.0
LOS	A	A	A	A	B	D
Approach Delay	8.4	8.4	7.7	7.7	13.2	52.0
Approach LOS	A	A	A	A	B	D
Queue Length 50th (ft)	20	166	7	134	5	134
Queue Length 95th (ft)	56	327	26	267	24	m246
Internal Link Dist (ft)	1486	1519	1519	3460	3239	
Turn Bay Length (ft)	640	60	347	1358	611	542
Base Capacity (vph)	425	1377	347	1358	611	542
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.49	0.12	0.43	0.09	0.46

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 91 (76%), Referenced to phase 2:WBT and 6:EBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 14.7
Intersection Capacity Utilization 65.4%
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Baseline
A & R Engineering Inc.

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HCM Signalized Intersection Capacity Analysis
12: Knox Bridge Highway & Fincher Road

Base AM - Improved
12/28/2006

Movement	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱	↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	0.98	0.88	1.00	0.94	0.98
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00	0.98	0.98	0.98
Satd. Flow (prot)	1770	1860	1770	1831	1637	1637	1706	1706	1706
Flt Permitted	0.39	1.00	0.34	1.00	0.98	0.98	0.83	0.83	0.83
Satd. Flow (perm)	720	1860	636	1831	1616	1616	1450	1450	1450
Volume (vph)	92	600	6	41	502	64	3	2	35
Peak-hour factor, PHF	0.90	0.90	0.90	0.96	0.96	0.72	0.72	0.91	0.91
Adj. Flow (vph)	102	667	7	43	523	67	4	3	49
RTOR Reduction (vph)	0	0	0	2	0	0	40	0	32
Lane Group Flow (vph)	102	674	0	43	588	0	0	16	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	2	2	4	4	8	8	8
Permitted Phases	6	6	2	2	4	4	8	8	8
Actuated Green, G (s)	88.9	88.9	88.9	88.9	23.1	23.1	23.1	23.1	23.1
Effective Green, g (s)	88.9	88.9	88.9	88.9	23.1	23.1	23.1	23.1	23.1
Actuated g/C Ratio	0.74	0.74	0.74	0.74	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	533	1378	471	1356	311	311	279	279	279
v/s Ratio Prot	c0.36	c0.36	0.07	0.32	0.01	0.01	c0.15	c0.15	c0.15
v/s Ratio Perm	0.14	0.49	0.09	0.43	0.05	0.05	0.79	0.79	0.79
Uniform Delay, d1	4.7	6.3	4.3	5.9	39.5	39.5	46.1	46.1	46.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.84	0.84	0.84
Incremental Delay, d2	0.8	1.2	0.4	1.0	0.1	0.1	13.4	13.4	13.4
Delay (s)	5.5	7.6	4.7	6.9	39.6	39.6	52.0	52.0	52.0
Level of Service	A	A	A	A	D	D	D	D	D
Approach Delay (s)	7.3	7.3	6.8	6.8	39.6	39.6	52.0	52.0	52.0
Approach LOS	A	A	A	A	D	D	D	D	D
Intersection Summary									
HCM Average Control Delay	14.7				HCM Level of Service				
HCM Volume to Capacity ratio	0.55				B				
Actuated Cycle Length (s)	120.0				Sum of lost time (s)				
Intersection Capacity Utilization	65.4%				ICU Level of Service				
Analysis Period (min)	15				C				
Critical Lane Group									

Baseline
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Lanes, Volumes, Timings
13: N Etowah Drive & Riverstone Parkway

Base AM - Improved
12/28/2006

	→	↗	←	↖	↑	↘	↙	↓	↕	
Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	8	161	15	10	26	1424	32	9	1810	20
Sign Control	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Intersection Summary										
Control Type: Unsignalized										
Intersection Capacity Utilization 66.2%										
Analysis Period (min) 15										
ICU Level of Service C										

Baseline
A & R Engineering Inc.

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HCM Unsignalized Intersection Capacity Analysis
13: N Etowah Drive & Riverstone Parkway

Base AM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	6	0	119	9	0	6	24	1339	30	8	1647	18
Peak Hour Factor	0.74	0.74	0.74	0.62	0.62	0.62	0.94	0.94	0.94	0.91	0.91	0.91
Hourly flow rate (vph)	8	0	161	15	0	10	26	1424	32	9	1810	20
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			6			6						
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2591	3335	905	2398	3323	712	1830			1456		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2591	3335	905	2398	3323	712	1830			1456		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	28	100	42	0	100	97	92			98		
cM capacity (veh/h)	11	7	279	7	7	375	330			460		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	169	24	26	712	712	32	9	905	905	20		
Volume Left	8	15	26	0	0	0	9	0	0	0		
Volume Right	161	10	0	0	0	32	0	0	0	20		
cSH	233	11	330	1700	1700	1700	460	1700	1700	1700		
Volume to Capacity	0.72	2.11	0.08	0.42	0.42	0.02	0.02	0.53	0.53	0.01		
Queue Length 95th (ft)	123	98	6	0	0	0	1	0	0	0		
Control Delay (s)	60.9	1172.4	16.8	0.0	0.0	0.0	13.0	0.0	0.0	0.0		
Lane LOS	F	F	C				B					
Approach Delay (s)	60.9	1172.4	0.3				0.1					
Approach LOS	F	F	F									
Intersection Summary												
Average Delay	11.2											
Intersection Capacity Utilization	66.2%											
Analysis Period (min)	15											
	C											

Baseline
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Lanes, Volumes, Timings
15: Bells Ferry Road & Marietta Highway

Base AM - Improved
12/28/2006

	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	344	267	260	27	581	110	673	233
Act Effct Green (s)	43.5	43.5	43.5	68.5	68.5	68.5	68.5	68.5
Actuated g/C Ratio	0.36	0.36	0.36	0.57	0.57	0.57	0.57	0.57
v/c Ratio	0.94	0.40	0.40	0.16	0.55	0.44	0.63	0.23
Control Delay	70.4	28.1	7.9	19.7	20.9	25.9	23.3	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.4	28.1	7.9	19.7	20.9	25.9	23.3	3.6
LOS	E	C	A	B	C	C	C	A
Approach Delay	51.9 7.9 20.9 19.1							
Approach LOS	D A C C B							
Queue Length 50th (ft)	253	148	54	10	271	47	338	6
Queue Length 95th (ft)	313	175	67	35	471	117	540	45
Internal Link Dist (ft)	1761 266 463 416							
Turn Bay Length (ft)	150	861	820	169	1060	250	1064	996
Base Capacity (vph)	470	861	820	169	1060	250	1064	996
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.31	0.32	0.16	0.55	0.44	0.63	0.23
Intersection Summary								
Cycle Length: 120								
Actuated Cycle Length: 120								
Offset: 66 (55%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.94								
Intersection Signal Delay: 26.4								
Intersection Capacity Utilization 75.3%								
Analysis Period (min) 15								

HCM Signalized Intersection Capacity Analysis
15: Bells Ferry Road & Marietta Highway

Base AM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.99		0.93	1.00	1.00	1.00	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	1.00
Satd. Flow (prot)	1770	1839		1733	1770	1770	1856	1770	1863	1583		
Flt Permitted	0.49	1.00		0.97	0.25	1.00	0.25	1.00	0.31	1.00	1.00	1.00
Satd. Flow (perm)	910	1839		1694	464	1856			581	1863	1583	
Volume (vph)	296	210		20	12	86	97	26	538	14	95	579
Peak-hour factor, PHF	0.86	0.86		0.75	0.75	0.75	0.95	0.95	0.95	0.86	0.86	0.86
Adj. Flow (vph)	344	244		23	16	115	129	27	586	15	110	673
RTOR Reduction (vph)	0	3		0	0	35	0	0	0	0	0	92
Lane Group Flow (vph)	344	264		0	0	225	0	27	581	0	110	673
Turn Type	Perm	Perm		Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	8	8		4	4		6	6		2	2	
Permitted Phases	8	43.5		4	43.5		68.5	68.5		2	2	
Actuated Green, G (s)	43.5	43.5		43.5	43.5		68.5	68.5		68.5	68.5	
Effective Green, g (s)	43.5	43.5		43.5	43.5		68.5	68.5		68.5	68.5	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.57	0.57		0.57	0.57	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	330	667		614	614		265	1059		332	1063	
v/s Ratio Prot	0.14						0.31			c0.36		
v/s Ratio Perm	c0.38			0.13	0.13		0.06			0.19		
v/c Ratio	1.04	0.40		0.37	0.37		0.10	0.55		0.33	0.63	
Uniform Delay, d1	38.2	28.5		28.1	28.1		11.7	16.1		13.6	17.3	
Progression Factor	1.00	1.00		0.31	0.31		1.00	1.00		1.00	1.00	
Incremental Delay, d2	61.0	0.4		0.3	0.3		0.8	2.0		2.7	2.9	
Delay (s)	99.3	28.9		8.9	8.9		12.5	18.1		16.3	20.2	
Level of Service	F	C		A	A		B	B		C	B	
Approach Delay (s)		68.5		8.9	8.9		17.9			18.0		
Approach LOS		E		A	A		B					
Intersection Summary												
HCM Average Control Delay	29.4											
HCM Volume to Capacity ratio	0.79											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	75.3%											
Analysis Period (min)	15											
Critical Lane Group												

Base PM Intersection Analysis

Base 2020 PM

Lanes, Volumes, Timings
1: Cumming Highway & I -575 Northbound Ramp

Base PM
12/28/2006

	EBL	EBT	WBT	WBR	NBR	SBR
Lane Group	411	1013	1343	491	1107	148
Lane Group Flow (vph)	0.83	0.29	0.52	0.39	0.51	0.09
v/c Ratio	32.7	0.0	8.9	3.4	4.8	0.1
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	32.7	0.0	8.9	3.4	4.8	0.1
Total Delay	174	0	203	32	79	0
Queue Length 50th (ft)	174	0	203	32	79	0
Queue Length 95th (ft)	m131	m0	367	106	185	0
Internal Link Dist (ft)	1047	677				
Turn Bay Length (ft)	150		325			
Base Capacity (vph)	789	3539	2600	1250	2184	1611
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.29	0.52	0.39	0.51	0.09

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

Baseline
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Future PM
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HCM Signalized Intersection Capacity Analysis
1: Cumming Highway & I -575 Northbound Ramp

Base PM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.85	0.85		1.00	0.86
Flt	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	1.00
Flt Protected	0.95	1.00		1.00	1.00		1.00	1.00	1.00		1.00	1.00
Satd. Flow (prot)	1770	3539		3539	1583		2787	2787	2787		1611	1611
Flt Permitted	0.16	1.00		1.00	1.00		1.00	1.00	1.00		1.00	1.00
Satd. Flow (perm)	294	3539		3539	1583		2787	2787	2787		1611	1611
Volume (vph)	378	932	0	0	1316	481	0	0	1018	0	0	145
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.98	0.98	0.92	0.92	0.92	0.98	0.98	0.98
Adj. Flow (vph)	411	1013	0	0	1343	491	0	0	1107	0	0	148
RTOR Reduction (vph)	0	0	0	0	0	88	0	0	137	0	0	0
Lane Group Flow (vph)	411	1013	0	0	1343	493	0	0	970	0	0	148
Turn Type	pm+pt				Perm			custom				custom
Protected Phases	1	6			2				2			6
Permitted Phases	6				2				2			6
Actuated Green, G (s)	116.0	120.0			88.1	88.1			88.1			120.0
Effective Green, g (s)	116.0	120.0			88.1	88.1			88.1			120.0
Actuated g/C Ratio	0.97	1.00			0.73	0.73			0.73			1.00
Clearance Time (s)	4.0	4.0			4.0	4.0			4.0			4.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0			3.0			3.0
Lane Grp Cap (vph)	578	3539			2598	1162			2046			1611
v/s Ratio Prot	c0.14	0.29			0.38							
v/s Ratio Perm	c0.55				0.25				0.35			0.09
v/c Ratio	0.71	0.29			0.52	0.35			0.47			0.09
Uniform Delay, d1	17.8	0.0			6.8	5.7			6.5			0.0
Progression Factor	1.34	1.00			1.00	1.00			1.00			1.00
Incremental Delay, d2	0.4	0.0			0.7	0.8			0.8			0.1
Delay (s)	24.3	0.0			7.6	6.5			7.3			0.1
Level of Service	C	A			A	A			A			A
Approach Delay (s)		7.0			7.3			7.3				0.1
Approach LOS		A			A			A				A
Intersection Summary												
HCM Average Control Delay					7.0			HCM Level of Service				A
HCM Volume to Capacity ratio					0.70							4.0
Actuated Cycle Length (s)					120.0			Sum of lost time (s)				C
Intersection Capacity Utilization					68.0%			ICU Level of Service				C
Analysis Period (min)					15							
c Critical Lane Group												

Baseline
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Future PM
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Lane Group	EBT	EBR	WBT	SBL	SBR
Lane Group Flow (vph)	709	554	1660	676	167
v/c Ratio	1.09	0.35	1.20dr	1.09	0.43
Control Delay	96.0	0.5	51.5	100.8	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	96.0	0.5	51.5	100.8	16.7
Queue Length 50th (ft)	~320	0	~545	~590	28
Queue Length 95th (ft) m#382	2177	m0	#292	#821	93
Internal Link Dist (ft)	2177	1047			
Turn Bay Length (ft)	150				320
Base Capacity (vph)	649	1583	1588	620	392
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.09	0.35	1.05	1.09	0.43

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔↔	↔	↔↔	↔↔	↔↔				↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.85	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.85	1.00
Frt.	1.00	0.85	1.00	1.00	0.85	1.00				1.00	0.85	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	3539	1583	3146	3146	1770	1770				1583	1583	1583
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	3539	1583	3146	3146	1770	1770				1583	1583	1583
Volume (vph)	0	638	499	0	408	1169	0	0	0	656	0	162
Peak-hour factor, PHF	0.90	0.90	0.90	0.95	0.95	0.95	0.92	0.92	0.92	0.97	0.97	0.97
Adj. Flow (vph)	0	709	554	0	429	1231	0	0	0	676	0	167
RTOR Reduction (vph)	0	0	0	0	434	0	0	0	0	0	0	102
Lane Group Flow (vph)	0	709	554	0	1226	0	0	0	0	676	0	65
Turn Type		Free	Free							Prot	custom	
Protected Phases	6			2						1		6
Permitted Phases		Free	Free									
Actuated Green, G (s)	22.0	120.0	44.0	44.0	44.0	44.0	42.0	42.0	42.0	42.0	22.0	22.0
Effective Green, g (s)	22.0	120.0	44.0	44.0	44.0	44.0	42.0	42.0	42.0	42.0	22.0	22.0
Actuated g/C Ratio	0.18	1.00	0.37	0.37	0.37	0.37	0.35	0.35	0.35	0.35	0.18	0.18
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	649	1583	1154	1154	60.39	60.39	620	620	620	620	290	290
v/s Ratio Prot	c0.20						c0.38					
v/s Ratio Perm		0.35										
v/c Ratio	1.09	0.35	1.20dr	1.09	0.35	1.09	0.22	0.22	0.22	0.22	0.04	0.04
Uniform Delay, d1	49.0	0.0	38.0	39.0	38.0	39.0	41.7	41.7	41.7	41.7	41.7	41.7
Progression Factor	0.75	1.00	0.69	0.69	0.69	0.69	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	59.8	0.5	43.6	43.6	43.6	43.6	63.2	63.2	63.2	63.2	1.8	1.8
Delay (s)	96.7	0.5	70.0	70.0	70.0	70.0	102.2	102.2	102.2	102.2	43.5	43.5
Level of Service	F	A	E	E	E	E	F	F	F	F	D	D
Approach Delay (s)	54.5	70.0	70.0	70.0	70.0	70.0	90.6	90.6	90.6	90.6	90.6	90.6
Approach LOS	D	E	E	E	E	E	F	F	F	F	F	F
Intersection Summary												
HCM Average Control Delay	69.4					HCM Level of Service					E	
HCM Volume to Capacity ratio	1.08					Sum of lost time (s)					12.0	
Actuated Cycle Length (s)	120.0					ICU Level of Service					F	
Intersection Capacity Utilization	92.1%					Analysis Period (min)					15	
Analysis Period (min)	15					dr Defacto Right Lane. Recode with 1 though lane as a right lane.						
dr Defacto Right Lane. Critical Lane Group												

	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	30	392	430	705	701	700
Lane Group Flow (vph)	0.10	1.14	0.60	1.08	1.12	0.55
v/c Ratio	31.2	133.3	7.7	94.6	96.3	11.4
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	133.3	7.7	94.6	96.3	11.4
Queue Length 50th (ft)	15	~355	4	~602	~529	253
Queue Length 95th (ft)	23	#550	91 m#734 m#603	m308		
Internal Link Dist (ft)	95	1440	3002	1058		
Turn Bay Length (ft)		150		90		
Base Capacity (vph)	313	344	715	650	628	1271
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.10	1.14	0.60	1.08	1.12	0.55

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	1794	1794	1770	1587	1770	1587	1770	1780	1770	1859	1770	1859
Flt Permitted	0.68	0.68	0.74	1.00	0.74	1.00	1.00	0.15	1.00	0.15	1.00	0.15
Satd. Flow (perm)	1234	1234	1374	1587	1374	1587	1774	285	1859	285	1859	285
Volume (vph)	5	9	3	380	6	411	5	443	215	582	573	8
Peak-hour factor, PHF	0.55	0.55	0.55	0.97	0.97	0.97	0.94	0.94	0.94	0.83	0.83	0.83
Adj. Flow (vph)	9	16	5	392	6	424	5	471	229	701	690	10
RTOR Reduction (vph)	0	4	0	0	318	0	0	14	0	0	0	0
Lane Group Flow (vph)	0	26	0	392	112	0	0	691	0	701	700	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	8	8	4	4	4	4	6	6	5	5	2	2
Permitted Phases	8	8	4	4	4	4	6	6	5	5	2	2
Actuated Green, G (s)	30.0	30.0	30.0	30.0	30.0	30.0	43.0	43.0	82.0	82.0	82.0	82.0
Effective Green, g (s)	30.0	30.0	30.0	30.0	30.0	30.0	43.0	43.0	82.0	82.0	82.0	82.0
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25	0.25	0.36	0.36	0.68	0.68	0.68	0.68
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	309	344	397	344	397	344	636	636	628	1270	628	1270
v/s Ratio Prot	0.02	0.02	0.02	0.29	0.29	0.29	0.39	0.39	0.33	0.38	0.33	0.38
v/s Ratio Perm	0.08	0.08	1.14	0.28	0.28	0.28	1.09	1.09	1.12	0.55	1.12	0.55
Uniform Delay, d1	34.5	34.5	45.0	36.3	36.3	36.3	38.5	38.5	31.5	9.6	31.5	9.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.96	0.96	0.83	0.99	0.83	0.99
Incremental Delay, d2	0.1	0.1	92.0	0.4	0.4	0.4	60.5	60.5	71.4	1.6	71.4	1.6
Delay (s)	34.6	34.6	137.0	36.7	36.7	36.7	97.6	97.6	97.4	11.1	97.4	11.1
Level of Service	C	C	F	D	D	D	F	F	F	B	F	B
Approach Delay (s)	34.6	34.6	84.5	84.5	84.5	84.5	97.6	97.6	97.6	54.3	97.6	54.3
Approach LOS	C	C	F	F	F	F	F	F	F	D	F	D
Intersection Summary												
HCM Average Control Delay	72.8											
HCM Volume to Capacity ratio	1.11											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	106.7%											
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
4: Big K-Mart Driveway & Marietta Highway

Base PM
12/28/2006

Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	249	648	771	21	1165	696	478	1395	36
v/c Ratio	1.02	1.32	1.00	0.21	1.27	0.89	1.35	0.87	0.05
Control Delay	114.3	194.8	49.6	58.8	169.6	26.4	203.5	28.7	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	114.3	194.8	49.6	58.8	169.6	26.4	203.5	28.7	10.9
Queue Length 50th (ft)	~202	~649	297	16	~600	159	~488	425	4
Queue Length 95th (ft)	#320	#577	#581	43	#736	#414	m#586	m#670	m13
Internal Link Dist (ft)	162	491		2132			4585		
Turn Bay Length (ft)			395	150			150		90
Base Capacity (vph)	243	490	773	118	914	783	354	1600	722
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.02	1.32	1.00	0.18	1.27	0.89	1.35	0.87	0.05

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
4: Big K-Mart Driveway & Marietta Highway

Base PM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4		4	4		4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.98			1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.97			0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1781			1782	1583	1770	3539	1583	1770	3539	1583	1583
Flt Permitted	0.97			0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1781			1782	1583	1770	3539	1583	1770	3539	1583	1583
Volume (vph)	106	70	29	552	57	725	20	1130	675	440	1283	33
Peak-hour factor, PHF	0.82	0.82	0.82	0.94	0.94	0.94	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	129	85	35	587	61	771	21	1165	696	478	1395	36
RTOR Reduction (vph)	0	5	0	0	0	338	0	0	385	0	0	6
Lane Group Flow (vph)	0	244	0	0	648	433	21	1165	311	478	1395	30
Turn Type	Split	Split	Split	Split	Split	Split	Prot	Prot	Perm	Prot	Perm	Perm
Protected Phases	8	8	8	4	4	4	1	6	6	5	2	2
Permitted Phases							4					
Actuated Green, G (s)	16.0			33.0	33.0	33.0	3.1	28.6	28.6	26.4	51.9	51.9
Effective Green, g (s)	16.0			33.0	33.0	33.0	3.1	28.6	28.6	26.4	51.9	51.9
Actuated g/C Ratio	0.13			0.28	0.28	0.28	0.03	0.24	0.24	0.22	0.43	0.43
Clearance Time (s)	4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	237			490	435	46	843	377	389	1531	685	
v/s Ratio Prot	c0.14			c0.36			0.01	c0.33		c0.27	0.39	
v/s Ratio Perm									0.20			0.02
v/c Ratio	1.03			1.32	1.00	0.46	1.38	0.83	1.23	0.91	0.04	
Uniform Delay, d1	52.0			43.5	43.4	57.6	45.7	43.3	46.8	31.9	19.7	
Progression Factor	1.00			1.00	1.00	1.00	1.00	1.00	1.00	0.84	0.74	0.67
Incremental Delay, d2	66.1			158.9	41.8	7.0	179.3	18.3	117.4	6.8	0.1	
Delay (s)	118.1			202.4	85.2	64.6	225.0	61.7	156.9	30.6	13.3	
Level of Service	F			F	F	F	E	F	E	F	C	B
Approach Delay (s)	118.1			138.7			162.8			61.9		E
Approach LOS	F			F			F			F		

Intersection Summary

HCM Average Control Delay 119.2 HCM Level of Service F

HCM Volume to Capacity ratio 1.27

Actuated Cycle Length (s) 120.0 Sum of lost time (s) 16.0

Intersection Capacity Utilization 105.9% ICU Level of Service G

Analysis Period (min) 15

c Critical Lane Group

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
5: Riverstone Parkway & I - 575 Northbound Ramp

Base PM
12/28/2006

	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group	597	934	1107	309	1075	808
Lane Group Flow (vph)	1.22	0.47	1.10	0.20	0.84	1.21
v/c Ratio	133.5	3.8	101.7	0.3	41.1	136.8
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	133.5	3.8	101.7	0.3	41.1	136.8
Total Delay	~477	30	~513	0	386	~705
Queue Length 50th (ft)	~477	30	~513	0	386	~705
Queue Length 95th (ft) m#685	35	#648	0	475	#951	
Internal Link Dist (ft)	1330	1370				
Turn Bay Length (ft)	370		300	490		
Base Capacity (vph)	490	1976	1003	1583	1287	669
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.22	0.47	1.10	0.20	0.84	1.21

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
5: Riverstone Parkway & I - 575 Northbound Ramp

Base PM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.97		1.00		
Flt	1.00	1.00		1.00	0.85		1.00	1.00		0.85		
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		1.00		
Satd. Flow (prot)	1770	3539		3539	1583		3539	1583		1583		
Flt Permitted	0.11	1.00		1.00	1.00		0.95	1.00		1.00		
Satd. Flow (perm)	196	3539		3539	1583		3539	1583		1583		
Volume (vph)	573	897	0	0	1041	290	1032	0	776	0	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.94	0.94	0.94	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	597	934	0	0	1107	309	1075	0	808	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	75	0	0	0
Lane Group Flow (vph)	597	934	0	0	1107	309	1075	0	733	0	0	0
Turn Type	pm+pt Free custom custom											
Protected Phases	1	6			2							
Permitted Phases	6				Free	4			4			
Actuated Green, G (s)	67.0	67.0			34.0	120.0	45.0		45.0			
Effective Green, g (s)	67.0	67.0			34.0	120.0	45.0		45.0			
Actuated g/C Ratio	0.56	0.56			0.28	1.00	0.38		0.38			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	490	1976			1003	1583	1287		594			
v/s Ratio Prot	c0.29	0.26			0.31							
v/s Ratio Perm	c0.39					0.20	0.31		c0.46			
v/c Ratio	1.22	0.47			1.10	0.20	0.84		1.23			
Uniform Delay, d1	47.7	15.9			43.0	0.0	34.1		37.5			
Progression Factor	0.69	0.21			1.00	1.00	1.00		1.00			
Incremental Delay, d2	108.2	0.4			61.2	0.3	4.8		119.4			
Delay (s)	141.2	3.8			104.2	0.3	39.0		156.9			
Level of Service	F	A			F	A	D		F			
Approach Delay (s)	57.4				81.5				89.6			0.0
Approach LOS	E				F				F			A
Intersection Summary												
HCM Average Control Delay					77.0	HCM Level of Service				E		
HCM Volume to Capacity ratio					1.21							
Actuated Cycle Length (s)					120.0	Sum of lost time (s)				8.0		
Intersection Capacity Utilization					100.0%	ICU Level of Service				F		
Analysis Period (min)					15							
c Critical Lane Group												

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
6: Riverstone Parkway & I - 575 Southbound Ramp

Base PM
12/28/2006

	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group	1482	743	542	1503	122	482
Lane Group Flow (vph)	0.84	0.47	0.92	0.51	0.64	0.30
v/c Ratio	25.6	0.9	40.2	0.2	66.3	0.5
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.6	0.9	40.2	0.2	66.3	0.5
Queue Length 50th (ft)	500	1	187	0	92	0
Queue Length 95th (ft)	#604	4	m199	m0	153	0
Internal Link Dist (ft)	752		1330			
Turn Bay Length (ft)	225	375				
Base Capacity (vph)	1757	1583	620	2923	236	1583
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.47	0.87	0.51	0.52	0.30
Intersection Summary						
#	95th percentile volume exceeds capacity, queue may be longer.					
m	Queue shown is maximum after two cycles.					
n	Volume for 95th percentile queue is metered by upstream signal.					

HCM Signalized Intersection Capacity Analysis
6: Riverstone Parkway & I - 575 Southbound Ramp

Base PM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3539	1583	1770	3539						1770	1583	
Flt Permitted	1.00	1.00	0.06	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3539	1583	117	3539						1770	1583	
Volume (vph)	0	1408	706	520	1443	0	0	0	0	112	0	443
Peak-hour factor, PHF	0.95	0.95	0.95	0.96	0.96	0.96	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1482	743	542	1503	0	0	0	0	122	0	482
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1482	743	542	1503	0	0	0	0	122	0	482
Turn Type	Free pm+pt											
Protected Phases	6	5	2							custom		Free
Permitted Phases		Free	2							8		Free
Actuated Green, G (s)	59.6	120.0	99.1	99.1						12.9		120.0
Effective Green, g (s)	59.6	120.0	99.1	99.1						12.9		120.0
Actuated g/C Ratio	0.50	1.00	0.83	0.83						0.11		1.00
Clearance Time (s)	4.0	4.0	4.0	4.0						4.0		4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0						3.0		3.0
Lane Grp Cap (vph)	1758	1583	586	2923						190		1583
v/s Ratio Prot	0.42		c0.27	0.42								
v/s Ratio Perm	0.84	0.47	c0.49	0.51						c0.07		0.30
Uniform Delay, d1	26.1	0.0	35.6	3.2						51.3		0.0
Progression Factor	0.76	1.00	1.00	0.00						1.00		1.00
Incremental Delay, d2	4.2	0.8	7.6	0.2						7.2		0.5
Delay (s)	24.2	0.8	43.0	0.2						58.6		0.5
Level of Service	C	A	D	A						E		A
Approach Delay (s)	16.4			11.5				0.0			12.2	
Approach LOS	B			B				A			B	
Intersection Summary												
HCM Average Control Delay	13.8											
HCM Volume to Capacity ratio	0.88											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	100.0%											
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
7: Riverstone Parkway & Riverstone Boulevard

Base PM
12/28/2006



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	191	1514	1278	694	796	197
v/c Ratio	0.75	0.45	0.48	0.44	0.83	0.37
Control Delay	50.6	4.7	12.9	0.8	48.4	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.6	4.7	12.9	0.8	48.4	14.8
Queue Length 50th (ft)	80	83	201	0	299	45
Queue Length 95th (ft)	165	143	324	0	330	96
Internal Link Dist (ft)	1490	547			375	
Turn Bay Length (ft)	165		290			110
Base Capacity (vph)	428	3328	2686	1583	1202	632
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.45	0.48	0.44	0.66	0.31
Intersection Summary						

Baseline
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Future PM
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HCM Signalized Intersection Capacity Analysis
7: Riverstone Parkway & Riverstone Boulevard

Base PM
12/28/2006



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔↔	↔↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	1.00
Flt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	3433	1583
Flt Permitted	0.14	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	269	5085	5085	1583	3433	1583
Volume (vph)	178	1408	1227	666	708	175
Peak-hour factor, PHF	0.93	0.93	0.96	0.96	0.89	0.89
Adj. Flow (vph)	191	1514	1278	694	796	197
RTOR Reduction (vph)	0	0	0	0	0	87
Lane Group Flow (vph)	191	1514	1278	694	796	111
Turn Type	pm+pt	Free	Free	Free	Perm	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6			Free		8
Actuated Green, G (s)	78.5	78.5	63.3	120.0	33.5	33.5
Effective Green, g (s)	78.5	78.5	63.3	120.0	33.5	33.5
Actuated g/C Ratio	0.65	0.65	0.53	1.00	0.28	0.28
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	316	3326	2682	1583	958	442
v/s Ratio Prot	c0.06	0.30	0.25		c0.23	
v/s Ratio Perm	c0.34			0.44		0.07
v/c Ratio	0.60	0.46	0.48	0.44	0.83	0.25
Uniform Delay, d1	11.4	10.2	17.9	0.0	40.6	33.5
Progression Factor	1.79	0.39	0.63	1.00	1.00	1.00
Incremental Delay, d2	3.0	0.4	0.5	0.8	6.2	0.3
Delay (s)	23.4	4.4	11.8	0.8	46.8	33.8
Level of Service	C	A	B	A	D	C
Approach Delay (s)		6.5	7.9		44.2	
Approach LOS		A	A		D	
Intersection Summary						
HCM Average Control Delay			15.1		HCM Level of Service	B
HCM Volume to Capacity ratio			0.67			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			63.8%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
8: Riverstone Parkway & Reinhardt College Parkway

Base PM
12/28/2006



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	400	1357	1058	268	373	207
v/c Ratio	0.89	0.36	0.39	0.17	0.58	0.44
Control Delay	29.9	7.7	7.4	0.2	40.0	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.9	7.7	7.4	0.2	40.0	4.4
Queue Length 50th (ft)	198	209	47	0	86	0
Queue Length 95th (ft)	m217	m223	79	0	m97	m0
Internal Link Dist (ft)	1839	1490			2482	
Turn Bay Length (ft)	190					
Base Capacity (vph)	724	3790	2714	1583	744	505
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.36	0.39	0.17	0.50	0.41

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

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
8: Riverstone Parkway & Reinhardt College Parkway

Base PM
12/28/2006



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔↔	↔↔	↔	↔↔	↔↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	1.00
Flt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	3433	1583
Flt Permitted	0.20	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	372	5085	5085	1583	3433	1583
Volume (vph)	380	1289	1026	260	366	203
Peak-hour factor, PHF	0.95	0.95	0.97	0.97	0.98	0.98
Adj. Flow (vph)	400	1357	1058	268	373	207
RTOR Reduction (vph)	0	0	0	0	0	168
Lane Group Flow (vph)	400	1357	1058	268	373	39
Turn Type	pm+pt	Free	Free	Free	Perm	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6			Free		8
Actuated Green, G (s)	89.4	89.4	64.0	120.0	22.6	22.6
Effective Green, g (s)	89.4	89.4	64.0	120.0	22.6	22.6
Actuated g/C Ratio	0.74	0.74	0.53	1.00	0.19	0.19
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	526	3788	2712	1583	647	298
v/s Ratio Prot	c0.14	0.27	0.21		c0.11	
v/s Ratio Perm	c0.43			0.17		0.02
v/c Ratio	0.76	0.36	0.39	0.17	0.58	0.13
Uniform Delay, d1	12.0	5.3	16.5	0.0	44.3	40.5
Progression Factor	0.76	1.33	0.38	1.00	0.85	0.39
Incremental Delay, d2	3.2	0.1	0.4	0.2	0.9	0.1
Delay (s)	12.2	7.2	6.7	0.2	38.6	16.0
Level of Service	B	A	A	A	D	B
Approach Delay (s)		8.3	5.4		30.6	
Approach LOS		A	A		C	

Intersection Summary
HCM Average Control Delay
HCM Volume to Capacity ratio
Actuated Cycle Length (s)
Intersection Capacity Utilization
Analysis Period (min)
c Critical Lane Group

Baseline
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Future PM
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	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group Flow (vph)	538	1000	383	1039	304	442	548	293	271	420	
v/c Ratio	1.10	0.82	0.99	1.02	0.90	1.09	0.88	1.09	0.73	0.79	
Control Delay	92.7	14.4	84.9	60.5	61.1	116.7	31.8	118.2	50.6	22.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	92.7	14.4	84.9	60.5	61.1	116.7	31.8	118.2	50.6	22.3	
Queue Length 50th (ft)	~428	166	216	~453	179	~387	153	~208	181	38	
Queue Length 95th (ft)	m333	m144	#433	#590	#313	#590	#364	#387	#281	#229	
Internal Link Dist (ft)	1240		3515		1145				4852		
Turn Bay Length (ft)	150		150		160			80		90	
Base Capacity (vph)	490	1225	386	1020	337	404	625	269	373	530	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	1.10	0.82	0.99	1.02	0.90	1.09	0.88	1.09	0.73	0.79	
Intersection Summary											
~ Volume exceeds capacity, queue is theoretically infinite.											
Queue shown is maximum after two cycles.											
# 95th percentile volume exceeds capacity, queue may be longer.											
Queue shown is maximum after two cycles.											
m Volume for 95th percentile queue is metered by upstream signal.											

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.98	1.00	0.97	1.00	0.97	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3472	1770	3429	1770	3429	1770	1863	1583	1770	1863	1583
Flt Permitted	0.10	1.00	0.11	1.00	0.11	1.00	0.25	1.00	1.00	0.17	1.00	1.00
Satd. Flow (perm)	191	3472	213	3429	213	3429	466	1863	1583	310	1863	1583
Volume (vph)	511	829	121	352	758	198	280	407	504	278	257	399
Peak-hour factor, PHF	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.95	0.95
Adj. Flow (vph)	538	873	127	383	824	215	304	442	548	293	271	420
RTOR Reduction (vph)	0	10	0	0	19	0	0	0	282	0	0	214
Lane Group Flow (vph)	538	990	0	383	1020	0	304	442	266	293	271	206
Turn Type	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	Perm
Protected Phases	1	6	5	2	7	4	4	3	8	8	8	8
Permitted Phases	6		2		4			4				
Actuated Green, G (s)	68.0	42.0	57.0	35.0	42.0	26.0	26.0	26.0	38.0	24.0	24.0	24.0
Effective Green, g (s)	68.0	42.0	57.0	35.0	42.0	26.0	26.0	26.0	38.0	24.0	24.0	24.0
Actuated g/C Ratio	0.57	0.35	0.48	0.29	0.35	0.22	0.22	0.22	0.32	0.20	0.20	0.20
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	490	1215	387	1000	337	404	343	269	373	317	317	317
v/s Ratio Prot	c0.27	0.29	0.18	0.30	c0.12	c0.24	c0.13	c0.13	0.15	0.13	0.13	0.13
v/s Ratio Perm	c0.36		0.29		0.20		0.17	0.22		0.13	0.13	0.13
v/c Ratio	1.10	0.82	0.99	1.02	0.99	1.02	0.90	1.09	0.78	1.09	0.73	0.65
Uniform Delay, d1	37.0	35.5	35.8	42.5	32.1	47.0	44.3	55.2	44.9	44.1	44.1	44.1
Progression Factor	1.44	0.39	1.19	0.65	1.00	1.00	1.00	1.00	1.00	1.29	0.86	0.65
Incremental Delay, d2	47.5	0.6	41.4	32.9	26.0	72.6	10.5	79.5	6.6	4.5	4.5	4.5
Delay (s)	100.7	14.5	83.9	60.5	58.0	119.6	54.7	150.6	45.2	33.1	33.1	33.1
Level of Service	F	B	F	E	E	F	D	F	D	F	D	C
Approach Delay (s)	44.6		66.8		77.7		71.4					
Approach LOS	D		E		E		E			E		
Intersection Summary												
HCM Average Control Delay	63.8				HCM Level of Service				E			
HCM Volume to Capacity ratio	1.09											
Actuated Cycle Length (s)	120.0				Sum of lost time (s)				12.0			
Intersection Capacity Utilization	105.7%				ICU Level of Service				G			
Analysis Period (min)	15											
Critical Lane Group												

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group	128	635	977	194	350	625
Lane Group Flow (vph)	0.31	1.03	1.03	0.12	1.02	0.48
v/c Ratio	39.0	61.7	38.5	0.0	90.4	9.6
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.0	61.7	38.5	0.0	90.4	9.6
Queue Length 50th (ft)	65	~167	~795	0	~236	196
Queue Length 95th (ft)	m102	m#508	m504	m0	#428	271
Internal Link Dist (ft)	3912	4852		250	275	2585
Turn Bay Length (ft)						
Base Capacity (vph)	413	618	947	1583	343	1304
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	1.03	1.03	0.12	1.02	0.48

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
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)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.06	1.00
Satd. Flow (perm)	1770	1583	1863	1583	115	1863
Volume (vph)	118	584	967	192	322	575
Peak-hour factor, PHF	0.92	0.92	0.99	0.99	0.92	0.92
Adj. Flow (vph)	128	635	977	194	350	625
RTOR Reduction (vph)	0	248	0	0	0	0
Lane Group Flow (vph)	128	387	977	194	350	625
Turn Type	Perm	Perm	Free	Free	pm+pt	
Protected Phases	4	6	5	2		
Permitted Phases			Free	2		
Actuated Green, G (s)	28.0	28.0	61.0	120.0	84.0	84.0
Effective Green, g (s)	28.0	28.0	61.0	120.0	84.0	84.0
Actuated g/C Ratio	0.23	0.23	0.51	1.00	0.70	0.70
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	413	369	947	1583	343	1304
v/s Ratio Prot	0.07	0.52	0.12	0.16	0.34	
v/s Ratio Perm			0.12	0.12	0.56	
v/c Ratio	0.31	1.05	1.03	1.02	0.48	
Uniform Delay, d1	38.0	46.0	29.5	0.0	52.7	8.1
Progression Factor	0.97	0.90	0.60	1.00	1.00	1.00
Incremental Delay, d2	0.4	56.5	18.5	0.0	53.9	1.3
Delay (s)	37.2	97.7	36.3	0.0	106.6	9.4
Level of Service	D	F	D	A	F	A
Approach Delay (s)	87.5	30.3			44.3	
Approach LOS	F	C			D	
Intersection Summary						
HCM Average Control Delay			50.0		HCM Level of Service	D
HCM Volume to Capacity ratio			1.02			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			93.7%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
11: Reinhardt College Parkway & College Street

Base PM
12/28/2006

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	459	789	163	308
Intersection Summary				



HCM Unsignalized Intersection Capacity Analysis
11: Reinhardt College Parkway & College Street

Base PM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	79	319	15	98	483	144	21	89	41	115	73	80
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.93	0.93	0.93	0.87	0.87	0.87
Hourly flow rate (vph)	88	354	17	107	525	157	23	96	44	132	84	92
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	459	788	162	308								
Volume Left (vph)	88	107	23	132								
Volume Right (vph)	17	157	44	92								
HadJ (s)	0.05	-0.06	-0.10	-0.06								
Departure Headway (s)	7.2	7.1	8.4	7.7								
Degree Utilization, x	0.92	1.55	0.38	0.66								
Capacity (veh/h)	487	511	393	446								
Control Delay (s)	49.5	276.3	16.5	24.7								
Approach Delay (s)	49.5	276.3	16.5	24.7								
Approach LOS	E	F	C	C								
Intersection Summary												
Delay			146.0									
HCM Level of Service			F									
Intersection Capacity Utilization			81.8%									D
Analysis Period (min)			15									

Lanes, Volumes, Timings
12: Knox Bridge Highway & Fincher Road

Base PM
12/28/2006

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	111	527	34	817	72	160
Intersection Summary						

Baseline
A & R Engineering Inc.

Future PM
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HCM Unsignalized Intersection Capacity Analysis
12: Knox Bridge Highway & Fincher Road

Base PM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔	↔	↔	↔
Sign Control	Free	Free		Free	Free		Stop	Stop	Stop	Stop	Stop
Grade	0%	0%		0%	0%		0%	0%	0%	0%	0%
Volume (veh/h)	101	473	6	33	696	88	8	21	61	5	76
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.96	0.65	0.65	0.89	0.89	0.89
Hourly flow rate (vph)	111	520	7	34	725	92	12	28	32	69	85
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	817		526			1627	1630	523	1627	1588	771
VC1, stage 1 conf vol											
VC2, stage 2 conf vol											
VCu, unblocked vol	817		526			1627	1630	523	1627	1588	771
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 %	86		97			77	67	94	0	94	79
cM capacity (veh/h)	811		1040			54	85	554	51	90	400
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1					
Volume Total	111	526	34	817	72	160					
Volume Left	111	0	34	0	12	69					
Volume Right	0	7	0	92	32	85					
cSH	811	1700	1040	1700	118	98					
Volume to Capacity	0.14	0.31	0.03	0.48	0.61	1.63					
Queue Length 95th (ft)	12	0	3	0	77	312					
Control Delay (s)	10.1	0.0	8.6	0.0	75.3	400.5					
Lane LOS	B	A	A	F	F	F					
Approach Delay (s)	1.8		0.3		75.3	400.5					
Approach LOS			F		F	F					
Intersection Summary											
Average Delay			41.1								
Intersection Capacity Utilization			72.5%			ICU Level of Service			C		
Analysis Period (min)			15								

Baseline
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Future PM
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Lanes, Volumes, Timings
13: N Etowah Drive & Riverstone Parkway

Base PM
12/28/2006

	→	←	↖	↗	↑	↘	↙	↓	↕
Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group Flow (vph)	103	48	92	1630	18	23	1666	38	
Intersection Summary									

Baseline
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Future PM
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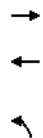
HCM Unsignalized Intersection Capacity Analysis
13: N Etowah Drive & Riverstone Parkway

Base PM
12/28/2006

	↖	→	↗	↘	←	↖	↗	↑	↘	↙	↓	↕
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕	↕	↕	↕	↕
Sign Control		Stop		Stop	Stop			Free		↕	↕	Free
Grade		0%			0%			0%				0%
Volume (veh/h)	44	0	33	6	0	26	85	1500	17	20	1466	33
Peak Hour Factor	0.75	0.75	0.75	0.66	0.66	0.66	0.92	0.92	0.92	0.88	0.88	0.88
Hourly flow rate (vph)	59	0	44	9	0	39	92	1630	18	23	1666	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	2711	3545	833	2694	3564	815	1703			1649		
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
vCu, unblocked vol	2711	3545	833	2694	3564	815	1703			1649		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	86	0	100	88	75			94		
cM capacity (veh/h)	7	4	312	7	4	320	369			388		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	103	48	92	815	815	18	23	833	833	38		
Volume Left	59	9	92	0	0	0	23	0	0	0		
Volume Right	44	39	0	0	0	18	0	0	0	38		
cSH	12	33	369	1700	1700	388	1700	1700	1700	1700		
Volume to Capacity	8.83	1.45	0.25	0.48	0.48	0.01	0.06	0.49	0.49	0.02		
Queue Length 95th (ft)	Err	133	24	0	0	0	5	0	0	0		
Control Delay (s)	Err	499.8	18.0	0.0	0.0	0.0	14.9	0.0	0.0	0.0		
Lane LOS	F	F	C				B					
Approach Delay (s)	Err	499.8	1.0				0.2					
Approach LOS	F	F										
Intersection Summary												
Average Delay												
Intersection Capacity Utilization												
Analysis Period (min)												

Baseline
A & R Engineering Inc.

Future PM
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Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	55	176	163
Intersection Summary			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Left	Right	Through	Through	Through	Right
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	23	26	36	115	115	35
Peak Hour Factor	0.89	0.89	0.86	0.86	0.92	0.92
Hourly flow rate (vph)	26	29	42	134	125	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
VC, conflicting volume						
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
vCu, unblocked vol						
tC, single (s)						
tC, 2 stage (s)						
tF (s)						
p0 queue free %						
cM capacity (veh/h)						
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	55	176	163			
Volume Left	26	42	0			
Volume Right	29	0	38			
cSH	743	1416	1700			
Volume to Capacity	0.07	0.03	0.10			
Queue Length 95th (ft)	6	2	0			
Control Delay (s)	10.2	2.0	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.2	2.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			29.6%			A
Analysis Period (min)			15			

Lanes, Volumes, Timings
15: Bells Ferry Road & Marietta Highway

Base PM
12/28/2006

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	429	477	38	847	89	695	260
v/c Ratio	1.36	0.72	0.19	0.85	0.91	0.70	0.27
Control Delay	212.9	23.3	17.5	34.2	99.4	25.6	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	212.9	23.3	17.5	34.2	99.4	25.6	2.4
Queue Length 50th (ft)	~438	255	15	541	60	385	0
Queue Length 95th (ft)	#643	m269	38	#759	#174	531	39
Internal Link Dist (ft)	1761	266		463		416	
Turn Bay Length (ft)			150		150		250
Base Capacity (vph)	315	667	204	992	98	994	966
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.36	0.72	0.19	0.85	0.91	0.70	0.27

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
15: Bells Ferry Road & Marietta Highway

Base PM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔				↔			↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0			4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00			1.00			1.00	1.00		1.00	1.00	1.00
Frt	0.99			0.95			1.00	1.00		1.00	1.00	0.85
Flt Protected	0.97			0.99			0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1784			1758			1770	1858		1770	1863	1583
Flt Permitted	0.42			0.92			0.21	1.00		0.10	1.00	1.00
Satd. Flow (perm)	780			1624			382	1858		185	1863	1583
Volume (vph)	250	107	33	45	204	151	35	776	12	83	646	242
Peak-hour factor, PHF	0.91	0.91	0.91	0.84	0.84	0.84	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	275	118	36	54	243	180	38	834	13	89	695	260
RTOR Reduction (vph)	0	3	0	0	18	0	0	0	0	0	0	121
Lane Group Flow (vph)	0	426	0	0	459	0	38	847	0	89	695	139
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	8	8		4	4		6	6		2	2	2
Permitted Phases	8			4			6			2		2
Actuated Green, G (s)	48.0			48.0			64.0	64.0		64.0	64.0	64.0
Effective Green, g (s)	48.0			48.0			64.0	64.0		64.0	64.0	64.0
Actuated g/C Ratio	0.40			0.40			0.53	0.53		0.53	0.53	0.53
Clearance Time (s)	4.0			4.0			4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0			3.0			3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	312			650			204	991		99	994	844
v/s Ratio Prot							0.46			0.37		
v/s Ratio Perm	0.55			0.28			0.10			0.48		0.09
v/c Ratio	1.37			0.71			0.19	0.85		0.90	0.70	0.16
Uniform Delay, d1	36.0			30.1			14.5	24.0		25.1	20.8	14.3
Progression Factor	1.00			0.66			1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	183.7			2.2			2.0	9.3		66.0	4.1	0.4
Delay (s)	219.7			22.2			16.5	33.3		91.1	24.9	14.7
Level of Service	F			C			B	C		F	C	B
Approach Delay (s)	219.7			22.2			32.6			28.0		
Approach LOS	F			C			C			C		
Intersection Summary												
HCM Average Control Delay	57.5				HCM Level of Service				E			
HCM Volume to Capacity ratio	1.10											
Actuated Cycle Length (s)	120.0				Sum of lost time (s)				8.0			
Intersection Capacity Utilization	103.4%				ICU Level of Service				G			
Analysis Period (min)	15											
Critical Lane Group												

Baseline
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Future PM
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Base 2020 PM Improved

Lanes, Volumes, Timings
2: Cumming Highway & I-575 Southbound Ramp

HCM Signalized Intersection Capacity Analysis
2: Cumming Highway & I-575 Southbound Ramp

Base PM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.85	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.95	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3539	1583	3539	1583	3539	1583	1770	1770	1583	1770	1583	1583
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00
Satd. Flow (perm)	3539	1583	3539	1583	3539	1583	1770	1770	1583	1770	1583	1583
Volume (vph)	0	638	499	0	408	1169	0	0	0	656	0	162
Peak-hour factor, PHF	0.90	0.90	0.90	0.95	0.95	0.95	0.92	0.92	0.92	0.97	0.97	0.97
Adj. Flow (vph)	0	709	554	0	429	1231	0	0	0	676	0	167
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	92
Lane Group Flow (vph)	0	709	554	0	429	1231	0	0	0	676	0	75
Turn Type	Free	Free	Free	Free	Free	Free	Prot	Prot	Prot	Prot	custom	custom
Protected Phases	6	2	2	2	2	2	1	1	1	1	1	1
Permitted Phases	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Actuated Green, G (s)	38.4	120.0	21.0	120.0	21.0	120.0	48.6	48.6	48.6	48.6	38.4	38.4
Effective Green, g (s)	38.4	120.0	21.0	120.0	21.0	120.0	48.6	48.6	48.6	48.6	38.4	38.4
Actuated g/C Ratio	0.32	1.00	0.18	1.00	0.18	1.00	0.40	0.40	0.40	0.40	0.32	0.32
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1132	1583	619	1583	619	1583	717	717	717	717	507	507
v/s Ratio Prot	0.20	0.12	0.12	0.12	0.12	0.12	0.38	0.38	0.38	0.38	0.05	0.05
v/s Ratio Perm	0.63	0.35	0.35	0.69	0.78	0.78	0.94	0.94	0.94	0.94	0.15	0.15
Uniform Delay, d1	34.7	0.0	46.5	0.0	46.5	0.0	34.4	34.4	34.4	34.4	29.1	29.1
Progression Factor	0.76	1.00	0.88	1.00	0.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	0.5	5.8	3.6	5.8	3.6	20.7	20.7	20.7	20.7	0.6	0.6
Delay (s)	28.4	0.5	46.8	3.6	46.8	3.6	55.1	55.1	55.1	55.1	29.7	29.7
Level of Service	C	A	D	A	D	A	E	E	E	E	C	C
Approach Delay (s)	16.2	14.7	14.7	14.7	14.7	14.7	50.1	50.1	50.1	50.1	D	D
Approach LOS	B	B	B	B	B	B	A	A	A	A	D	D
Intersection Summary												
HCM Average Control Delay	23.1											
HCM Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	60.6%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.85	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.95	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3539	1583	3539	1583	3539	1583	1770	1770	1583	1770	1583	1583
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00
Satd. Flow (perm)	3539	1583	3539	1583	3539	1583	1770	1770	1583	1770	1583	1583
Volume (vph)	0	638	499	0	408	1169	0	0	0	656	0	162
Peak-hour factor, PHF	0.90	0.90	0.90	0.95	0.95	0.95	0.92	0.92	0.92	0.97	0.97	0.97
Adj. Flow (vph)	0	709	554	0	429	1231	0	0	0	676	0	167
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	92
Lane Group Flow (vph)	0	709	554	0	429	1231	0	0	0	676	0	75
Turn Type	Free	Free	Free	Free	Free	Free	Prot	Prot	Prot	Prot	custom	custom
Protected Phases	6	2	2	2	2	2	1	1	1	1	1	1
Permitted Phases	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Actuated Green, G (s)	38.4	120.0	21.0	120.0	21.0	120.0	48.6	48.6	48.6	48.6	38.4	38.4
Effective Green, g (s)	38.4	120.0	21.0	120.0	21.0	120.0	48.6	48.6	48.6	48.6	38.4	38.4
Actuated g/C Ratio	0.32	1.00	0.18	1.00	0.18	1.00	0.40	0.40	0.40	0.40	0.32	0.32
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1132	1583	619	1583	619	1583	717	717	717	717	507	507
v/s Ratio Prot	0.20	0.12	0.12	0.12	0.12	0.12	0.38	0.38	0.38	0.38	0.05	0.05
v/s Ratio Perm	0.63	0.35	0.35	0.69	0.78	0.78	0.94	0.94	0.94	0.94	0.15	0.15
Uniform Delay, d1	34.7	0.0	46.5	0.0	46.5	0.0	34.4	34.4	34.4	34.4	29.1	29.1
Progression Factor	0.76	1.00	0.88	1.00	0.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	0.5	5.8	3.6	5.8	3.6	20.7	20.7	20.7	20.7	0.6	0.6
Delay (s)	28.4	0.5	46.8	3.6	46.8	3.6	55.1	55.1	55.1	55.1	29.7	29.7
Level of Service	C	A	D	A	D	A	E	E	E	E	C	C
Approach Delay (s)	16.2	14.7	14.7	14.7	14.7	14.7	50.1	50.1	50.1	50.1	D	D
Approach LOS	B	B	B	B	B	B	A	A	A	A	D	D
Intersection Summary												
HCM Average Control Delay	23.1											
HCM Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	60.6%											
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
3: Bobo Grinding Co Driveway & Marietta Street

HCM Signalized Intersection Capacity Analysis
3: Bobo Grinding Co Driveway & Marietta Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Lane Util. Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794
Satd. Flow (prot)	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Flt Permitted	1486	1486	1486	1486	1486	1486	1486	1486	1486	1486	1486	1486
Satd. Flow (perm)	5	9	3	380	6	411	5	443	215	582	573	8
Volume (vph)	0.55	0.55	0.55	0.97	0.97	0.97	0.94	0.94	0.94	0.94	0.83	0.83
Peak-hour factor, PHF	9	16	5	392	6	424	5	471	229	701	690	10
Adj. Flow (vph)	0	4	0	0	300	0	0	14	0	0	0	0
RTOR Reduction (vph)	0	26	0	392	130	0	0	691	0	701	700	0
Lane Group Flow (vph)	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Turn Type	8	8	8	4	4	4	6	6	5	5	2	2
Protected Phases	35.0	35.0	35.0	35.0	35.0	35.0	48.0	48.0	25.0	25.0	77.0	77.0
Actuated Green, G (s)	35.0	35.0	35.0	35.0	35.0	35.0	48.0	48.0	25.0	25.0	77.0	77.0
Effective Green, g (s)	0.29	0.29	0.29	0.29	0.29	0.29	0.40	0.40	0.21	0.21	0.64	0.64
Actuated g/C Ratio	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	433	433	433	401	463	0.08	0.39	0.39	0.98	0.98	0.59	0.59
Lane Grp Cap (vph)	0.02	0.06	0.06	0.98	0.28	0.97	0.97	0.97	0.98	0.98	0.59	0.59
v/s Ratio Prot	30.7	30.7	30.7	42.1	32.8	35.4	47.3	47.3	12.4	12.4	12.4	12.4
v/s Ratio Perm	1.00	1.00	1.00	1.00	1.00	1.00	0.96	0.96	0.69	0.69	0.97	0.97
Uniform Delay, d1	0.1	38.6	0.3	27.7	28.4	2.1	27.7	28.4	2.1	27.7	28.4	2.1
Progression Factor	30.7	30.7	30.7	80.7	33.1	61.7	61.7	61.7	60.9	60.9	14.1	14.1
Incremental Delay, d2	C	C	C	F	C	E	E	E	E	E	B	B
Delay (s)	30.7	30.7	30.7	80.7	33.1	61.7	61.7	61.7	60.9	60.9	14.1	14.1
Level of Service	C	C	C	F	C	E	E	E	E	E	B	B
Approach Delay (s)	30.7	30.7	30.7	55.8	55.8	55.8	61.7	61.7	37.5	37.5	37.5	37.5
Approach LOS	C	C	C	E	E	E	E	E	D	D	D	D

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection Summary												
HCM Average Control Delay	48.3	HCM Level of Service										
HCM Volume to Capacity ratio	0.98	D										
Actuated Cycle Length (s)	120.0	Sum of lost time (s)										
Intersection Capacity Utilization	105.1%	ICU Level of Service										
Analysis Period (min)	15	G										
c Critical Lane Group	15											

Lanes, Volumes, Timings
4: Big K-Mart Driveway & Marietta Highway

Base PM - Improved
12/28/2006

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	249	315	333	771	21	1165	696	478	1395	36
v/c Ratio	0.93	0.89	0.93	0.93	0.21	0.83	0.83	0.60	0.78	0.04
Control Delay	88.2	73.8	80.1	43.0	58.8	47.4	18.6	33.9	21.7	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	88.2	73.8	80.1	43.0	58.8	47.4	18.6	33.9	21.7	10.6
Queue Length 50th (ft)	188	249	266	465	16	315	104	126	272	6
Queue Length 95th (ft)	#295	#416	#446	#747	43	374	#325	m156	m345	m14
Internal Link Dist (ft)	162		491		424				418	
Turn Bay Length (ft)	150		395		150			150		90
Base Capacity (vph)	272	364	369	828	118	1399	837	801	1778	801
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.87	0.90	0.93	0.18	0.83	0.83	0.60	0.78	0.04
Intersection Summary										
#	95th percentile volume exceeds capacity, queue may be longer.									
m	Queue shown is maximum after two cycles.									
m	Volume for 95th percentile queue is metered by upstream signal.									

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
4: Big K-Mart Driveway & Marietta Highway

Base PM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	0.95	1.00	0.91	0.91	1.00	0.91	1.00	0.97	0.95	1.00
Lane Util. Factor	0.98	1.00	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.85
Flt Protected	0.97	0.97	0.97	0.95	0.96	0.96	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1781	1681	1700	1583	1770	1583	1770	1583	1583	1583	1583	1583
Flt Permitted	0.97	0.95	0.96	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1781	1681	1700	1583	1770	1583	1770	1583	1583	1583	1583	1583
Volume (vph)	106	70	29	552	57	725	20	1130	675	440	1283	33
Peak-hour factor, PHF	0.82	0.82	0.82	0.94	0.94	0.94	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	129	85	35	587	61	771	21	1165	696	478	1395	36
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	244	0	315	333	695	21	1165	284	478	1395	30
Turn Type	Split	Split	Split	pm+ov	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Perm
Protected Phases	8	8	8	4	4	4	5	1	6	5	2	2
Permitted Phases	17.8	25.2	25.2	55.6	3.1	30.6	30.6	30.6	30.6	30.4	57.9	57.9
Actuated Green, G (s)	17.8	25.2	25.2	55.6	3.1	30.6	30.6	30.6	30.6	30.4	57.9	57.9
Effective Green, g (s)	0.15	0.21	0.21	0.46	0.03	0.26	0.26	0.26	0.26	0.25	0.48	0.48
Actuated g/C Ratio	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	264	353	357	786	46	1297	404	870	1708	764		
Lane Grp Cap (vph)	c0.14	0.19	0.20	c0.22	0.01	c0.23	0.14	0.39				
v/s Ratio Prot	0.92	0.89	0.93	0.88	0.46	0.90	0.70	0.55	0.82	0.04		
v/s Ratio Perm	50.4	46.1	46.6	29.3	57.6	43.2	40.6	38.9	26.5	16.4		
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.76	0.71	0.77		
Progression Factor	35.4	23.5	30.8	11.5	7.0	10.0	9.8	0.6	3.5	0.1		
Incremental Delay, d2	85.9	69.5	77.4	40.8	64.6	53.2	50.4	30.1	22.2	12.7		
Delay (s)	F	E	E	D	E	D	D	C	C	B		
Level of Service	F	E	E	D	E	D	D	C	C	C		
Approach Delay (s)	85.9	55.8	55.8				52.3		24.0			
Approach LOS	F	E	E				D		C			
Intersection Summary												
HCM Average Control Delay	44.8											
HCM Volume to Capacity ratio	0.89											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	88.0%											
Analysis Period (min)	15											
c Critical Lane Group												

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
5: Riverstone Parkway & I - 575 Northbound Ramp

Base PM - Improved
12/28/2006

	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group	597	934	1107	309	1075	808
Lane Group Flow (vph)	1.03	0.42	1.01	0.20	1.04	0.87
v/c Ratio	62.9	1.0	72.3	0.3	81.2	20.4
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	62.9	1.0	72.3	0.3	81.2	20.4
Total Delay	~163	0	~463	0	~465	141
Queue Length 50th (ft)	~163	0	~463	0	~465	141
Queue Length 95th (ft) m#611	1330	1370	0	#611	0	#596 #437
Internal Link Dist (ft)	370		300	490		
Turn Bay Length (ft)	579	2241	1091	1583	1030	924
Base Capacity (vph)	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.42	1.01	0.20	1.04	0.87

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
5: Riverstone Parkway & I - 575 Northbound Ramp

Base PM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.95
Flt Protected	0.95	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	3539	3539	3539	1583	3433	1583	3539	1583	3433	1583	3539
Flt Permitted	0.10	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	182	3539	3539	3539	1583	3433	1583	3539	1583	3433	1583	3539
Volume (vph)	573	897	0	0	1041	290	1032	0	776	0	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.94	0.94	0.94	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	597	934	0	0	1107	309	1075	0	808	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	436	0	0	0
Lane Group Flow (vph)	597	934	0	0	1107	309	1075	0	372	0	0	0
Turn Type	pm+pt	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Protected Phases	1	6	2	2	4	4	2	2	4	4	2	2
Permitted Phases	6	6	6	6	6	6	6	6	6	6	6	6
Actuated Green, G (s)	76.0	76.0	76.0	76.0	120.0	36.0	37.0	37.0	120.0	36.0	37.0	37.0
Effective Green, g (s)	76.0	76.0	76.0	76.0	120.0	36.0	37.0	37.0	120.0	36.0	37.0	37.0
Actuated g/C Ratio	0.63	0.63	0.31	0.31	1.00	0.30	0.31	0.31	1.00	0.30	0.31	0.31
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	578	2241	1091	1583	1030	488	488	488	1091	1583	1030	488
v/s Ratio Prot	c0.30	0.26	0.31	0.31	0.20	c0.31	0.24	0.24	c0.30	0.26	0.31	0.31
v/s Ratio Perm	c0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
v/c Ratio	1.03	0.42	1.01	0.20	1.04	0.76	0.76	0.76	1.01	0.20	1.04	0.76
Uniform Delay, d1	35.8	11.0	41.5	0.0	42.0	37.5	37.5	37.5	41.5	0.0	42.0	37.5
Progression Factor	0.77	0.06	1.00	1.00	1.00	1.00	1.00	1.00	0.77	0.06	1.00	1.00
Incremental Delay, d2	36.2	0.3	30.9	0.3	40.1	10.8	10.8	10.8	36.2	0.3	40.1	10.8
Delay (s)	63.6	1.0	72.4	0.3	82.1	48.3	48.3	48.3	63.6	1.0	82.1	48.3
Level of Service	E	A	E	A	F	D	D	D	E	A	F	D
Approach Delay (s)	25.4	56.7	67.6	67.6	56.7	25.4	25.4	25.4	56.7	67.6	67.6	56.7
Approach LOS	C	E	E	E	E	C	C	C	E	E	E	E
Intersection Summary												
HCM Average Control Delay	51.0											
HCM Volume to Capacity ratio	1.02											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	100.0%											
Analysis Period (min)	15											
c Critical Lane Group												

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
9: Riverstone Parkway & Waleska Road

Base PM - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	538	873	127	383	824	215	304	442	548	293	271	420
Lane Group Flow (vph)	1.01	0.80	0.08	0.91	0.96	0.44	0.83	1.02	0.79	1.03	0.68	0.50
v/c Ratio	52.2	37.0	0.0	55.1	54.8	14.0	47.2	93.1	19.5	97.7	63.0	15.6
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.2	37.0	0.0	55.1	54.8	14.0	47.2	93.1	19.5	97.7	63.0	15.6
Queue Length 50th (ft)	~290	347	0	134	342	81	171	~354	88	~195	214	153
Queue Length 95th (ft) m#500	m409	m409	m0	#383	#468	158	#272	#565	243	#372	307	222
Internal Link Dist (ft)	1240			3515			1145				4852	
Turn Bay Length (ft)	150	150	150	150	150	150	160			80		90
Base Capacity (vph)	534	1085	1583	446	855	486	377	435	683	285	398	844
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.80	0.08	0.86	0.96	0.44	0.81	1.02	0.79	1.03	0.68	0.50

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
9: Riverstone Parkway & Waleska Road

Base PM - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00
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	1770	1863	1583	1770	1863	1583
Flt Permitted	0.12	1.00	1.00	0.14	1.00	1.00	0.27	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	226	3539	1583	257	3539	1583	512	1863	1583	290	1863	1583
Volume (vph)	511	829	121	352	758	198	280	407	504	278	257	399
Peak-hour factor, PHF	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.95
Adj. Flow (vph)	538	873	127	383	824	215	304	442	548	293	271	420
RTOR Reduction (vph)	0	0	0	0	0	0	104	0	0	324	0	0
Lane Group Flow (vph)	538	873	127	383	824	111	304	442	224	293	271	387
Turn Type	pm+pt	Free	pm+pt	Free	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	1	6	5	2	7	4	3	8	1			
Permitted Phases	6	Free	2	2	4	4	8					
Actuated Green, G (s)	65.0	36.8	120.0	53.2	29.0	29.0	45.3	28.0	28.0	40.7	25.7	57.7
Effective Green, g (s)	65.0	36.8	120.0	53.2	29.0	29.0	45.3	28.0	28.0	40.7	25.7	57.7
Actuated g/C Ratio	0.54	0.31	1.00	0.44	0.24	0.24	0.38	0.23	0.23	0.34	0.21	0.48
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	534	1085	1583	419	855	383	375	435	369	283	399	814
v/s Ratio Prot	c0.27	0.25	0.18	0.22	0.23	0.12	c0.24	c0.13	c0.13	0.15	0.13	0.13
v/s Ratio Perm	c0.28	0.08	0.08	0.22	0.07	0.19	0.14	0.22	0.14	0.22	0.12	0.12
v/c Ratio	1.01	0.80	0.08	0.91	0.96	0.29	0.81	1.02	0.61	1.04	0.68	0.48
Uniform Delay, d1	35.5	38.3	0.0	33.1	45.0	37.1	29.4	46.0	41.1	33.8	43.4	21.0
Progression Factor	0.57	0.85	1.00	0.86	0.69	0.76	1.00	1.00	1.00	1.18	1.22	0.83
Incremental Delay, d2	30.3	3.5	0.1	23.2	22.4	1.8	12.5	47.3	2.8	61.7	4.4	0.4
Delay (s)	50.6	36.1	0.1	51.6	53.6	30.2	41.8	93.3	43.9	101.7	57.3	17.8
Level of Service	D	A	D	D	D	C	D	F	D	F	E	B
Approach Delay (s)		38.2			49.5			60.3			53.7	
Approach LOS		D			D			E			D	

Intersection Summary

HCM Average Control Delay	49.6	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
11: Reinhardt College Parkway & College Street

Base PM - Improved
12/28/2006

	→	←	→	←	→	←	→	←	→
Lane Group	EBT	WBT	NBT	SBL	SBT				
Lane Group Flow (vph)	459	789	163	132	176				
v/c Ratio	0.42	0.65	0.55	0.78	0.54				
Control Delay	7.3	1.6	44.1	74.7	38.7				
Queue Delay	0.0	0.0	0.0	0.0	0.0				
Total Delay	7.3	1.6	44.1	74.7	38.7				
Queue Length 50th (ft)	103	24	107	99	94				
Queue Length 95th (ft)	220	m101	154	150	145				
Internal Link Dist (ft)	952	6443	4497		4161				
Turn Bay Length (ft)				150					
Base Capacity (vph)	1083	1216	450	262	476				
Starvation Cap Reductn	0	0	0	0	0				
Spillback Cap Reductn	0	0	0	0	0				
Storage Cap Reductn	0	0	0	0	0				
Reduced v/c Ratio	0.42	0.65	0.36	0.50	0.37				
Intersection Summary									
m Volume for 95th percentile queue is metered by upstream signal.									

HCM Signalized Intersection Capacity Analysis
11: Reinhardt College Parkway & College Street

Base PM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔		↔		↔		↔		↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0			4.0			4.0		4.0
Lane Util. Factor	1.00			1.00			1.00			1.00		1.00
Flt	1.00			0.97			0.96			1.00		0.92
Flt Protected	0.99			0.99			0.99			0.95		1.00
Satd. Flow (prot)	1836			1800			1782			1770		1717
Flt Permitted	0.76			0.87			0.89			0.44		1.00
Satd. Flow (perm)	1404			1584			1600			820		1717
Volume (vph)	79	319	15	98	483	144	21	89	41	115	73	80
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.93	0.93	0.93	0.87	0.87	0.87
Adj. Flow (vph)	88	354	17	107	525	157	23	96	44	132	84	92
RTOR Reduction (vph)	0	1	0	0	5	0	0	12	0	0	37	0
Lane Group Flow (vph)	0	458	0	0	784	0	0	151	0	132	139	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	2	2	4	4	4	4	4	8	8	8
Permitted Phases	6	6	2	2	4	4	4	4	4	8	8	8
Actuated Green, G (s)	91.8			91.8			20.2			20.2		20.2
Effective Green, g (s)	91.8			91.8			20.2			20.2		20.2
Actuated g/C Ratio	0.76			0.76			0.17			0.17		0.17
Clearance Time (s)	4.0			4.0			4.0			4.0		4.0
Vehicle Extension (s)	3.0			3.0			3.0			3.0		3.0
Lane Grp Cap (vph)	1074			1212			269			138		289
v/s Ratio Prot	0.33			v/s Ratio Prot			0.09			c0.16		0.08
v/s Ratio Perm	0.43			0.65			0.56			0.96		0.48
Uniform Delay, d1	4.9			6.6			45.8			49.5		45.2
Progression Factor	1.00			0.17			0.94			1.00		1.00
Incremental Delay, d2	1.2			0.2			2.4			62.7		1.3
Delay (s)	6.2			1.4			45.3			112.2		46.4
Level of Service	A			A			D			F		D
Approach Delay (s)	6.2			1.4			45.3			74.6		E
Approach LOS	A			A			D			E		E
Intersection Summary												
HCM Average Control Delay	19.9				HCM Level of Service				B			
HCM Volume to Capacity ratio	0.70											
Actuated Cycle Length (s)	120.0				Sum of lost time (s)				8.0			
Intersection Capacity Utilization	75.4%				ICU Level of Service				D			
Analysis Period (min)	15											
Critical Lane Group												

Lanes, Volumes, Timings
12: Knox Bridge Highway & Fincher Road

Base PM - Improved
12/28/2006

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	111	527	34	817	72	160
v/c Ratio	0.32	0.35	0.06	0.54	0.33	0.77
Control Delay	6.2	3.9	3.1	5.7	32.1	55.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.2	3.9	3.1	5.7	32.1	55.2
Queue Length 50th (ft)	16	77	4	153	29	66
Queue Length 95th (ft)	52	163	14	322	43	163
Internal Link Dist (ft)	1486	1519	60	3460	3239	
Turn Bay Length (ft)	640					
Base Capacity (vph)	347	1524	603	1503	468	424
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.35	0.06	0.54	0.15	0.38
Intersection Summary						

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
12: Knox Bridge Highway & Fincher Road

Base PM - Improved
12/28/2006

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Movement	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	1.00	0.98	0.94	0.99	0.94	0.93	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.99	0.99	0.95	0.98	0.98
Satd. Flow (prot)	1770	1859	1770	1831	1737	1737	1693	1693	1693
Flt Permitted	0.31	1.00	0.44	1.00	0.91	0.91	0.78	0.78	0.78
Satd. Flow (perm)	572	1859	829	1831	1592	1592	1356	1356	1356
Volume (vph)	101	473	6	33	896	88	21	61	5
Peak-hour factor, PHF	0.91	0.91	0.91	0.96	0.96	0.65	0.65	0.89	0.89
Adj. Flow (vph)	111	520	7	34	725	92	28	32	6
RTOR Reduction (vph)	0	0	0	2	0	0	0	0	0
Lane Group Flow (vph)	111	527	0	34	815	0	44	0	119
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	2	2	4	4	8	8	8
Permitted Phases	6	6	2	2	4	4	8	8	8
Actuated Green, G (s)	98.4	98.4	98.4	98.4	13.6	13.6	13.6	13.6	13.6
Effective Green, g (s)	98.4	98.4	98.4	98.4	13.6	13.6	13.6	13.6	13.6
Actuated g/C Ratio	0.82	0.82	0.82	0.82	0.11	0.11	0.11	0.11	0.11
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	469	1524	680	1501	180	180	154	154	154
v/s Ratio Prot	0.19	0.28	0.04	0.04	0.03	0.03	c0.09	c0.09	c0.09
v/c Ratio Perm	0.24	0.35	0.05	0.54	0.24	0.24	0.77	0.77	0.77
Uniform Delay, d1	2.4	2.7	2.0	3.5	48.5	48.5	51.7	51.7	51.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.93	0.93	0.93
Incremental Delay, d2	1.2	0.6	0.1	1.4	0.7	0.7	19.4	19.4	19.4
Delay (s)	3.6	3.3	2.2	4.9	49.2	49.2	67.3	67.3	67.3
Level of Service	A	A	A	A	D	D	E	E	E
Approach Delay (s)	3.4	3.4	4.8	4.8	49.2	49.2	67.3	67.3	67.3
Approach LOS	A	A	A	A	D	D	E	E	E
Intersection Summary									
HCM Average Control Delay	11.9				HCM Level of Service		B		
HCM Volume to Capacity ratio	0.57								
Actuated Cycle Length (s)	120.0				Sum of lost time (s)		8.0		
Intersection Capacity Utilization	72.5%				ICU Level of Service		C		
Analysis Period (min)	15								
c Critical Lane Group									

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
13: N Etowah Drive & Riverstone Parkway

Base PM - Improved
12/28/2006

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	59	44	9	39	92	1630	18	23	1666	38
Intersection Summary										

Baseline
A & R Engineering Inc.

Future PM
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HCM Unsignalized Intersection Capacity Analysis
13: N Etowah Drive & Riverstone Parkway

Base PM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷	↶	↶	↷	↶	↶	↶	↶	↶	↶	↶
Sign Control	Stop	Stop		Stop	Stop		Free	Free		Free	Free	
Grade	0%			0%			0%					0%
Volume (veh/h)	44	0	33	6	0	26	85	1500	17	20	1466	33
Peak Hour Factor	0.75	0.75	0.75	0.66	0.66	0.66	0.92	0.92	0.92	0.88	0.88	0.88
Hourly flow rate (vph)	59	0	44	9	0	39	92	1630	18	23	1666	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			6			6						
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2711	3545	833	2694	3564	815	1703			1649		
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
vCu, unblocked vol	2711	3545	833	2694	3564	815	1703			1649		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	86	0	100	88	75			94		
cM capacity (veh/h)	7	4	312	7	4	320	369			388		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	103	48	92	815	815	18	23	833	833	38		
Volume Left	59	9	92	0	0	0	23	0	0	0		
Volume Right	44	39	0	0	0	18	0	0	0	38		
cSH	12	36	369	1700	1700	388	1700	1700	1700	1700		
Volume to Capacity	8.81	1.33	0.25	0.48	0.48	0.01	0.06	0.49	0.49	0.02		
Queue Length 95th (ft)	Err	127	24	0	0	0	5	0	0	0		
Control Delay (s)	Err	234.5	18.0	0.0	0.0	0.0	14.9	0.0	0.0	0.0		
Lane LOS	F	F	C				B					
Approach Delay (s)	Err	234.5	1.0				0.2					
Approach LOS	F	F										
Intersection Summary												
Average Delay	287.4											
Intersection Capacity Utilization	64.3%											
Analysis Period (min)	15											
	C											

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
15: Bells Ferry Road & Marietta Highway

Base PM - Improved
12/28/2006

	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group	275	154	477	38	847	89	695	260
v/c Ratio	1.47	0.25	0.83	0.13	0.76	0.49	0.62	0.25
Control Delay	270.1	27.7	33.2	11.9	23.2	25.3	18.4	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	270.1	27.7	33.2	11.9	23.2	25.3	18.4	1.8
Queue Length 50th (ft)	~293	78	243	12	454	37	324	0
Queue Length 95th (ft)	#465	133	m358	30	628	96	447	33
Internal Link Dist (ft)	1761	266			463		416	
Turn Bay Length (ft)	150			150		150		250
Base Capacity (vph)	187	609	576	285	1116	180	1118	1054
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.47	0.25	0.83	0.13	0.76	0.49	0.62	0.25

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
15: Bells Ferry Road & Marietta Highway

Base PM - Improved
12/28/2006

	EBL	EBT	WBL	NBL	NBT	SBL	SBT	SBR
Movement	EBL	EBT	WBL	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.96	0.95	1.00	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.99	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1797	1758	1770	1858	1770	1863	1583
Flt Permitted	0.30	1.00	0.95	0.25	1.00	0.16	1.00	1.00
Satd. Flow (perm)	560	1797	1674	475	1858	300	1863	1583
Volume (vph)	250	107	33	45	35	776	12	83
Peak-hour factor, PHF	0.91	0.91	0.84	0.84	0.93	0.93	0.93	0.93
Adj. Flow (vph)	275	118	36	54	243	180	38	834
RTOR Reduction (vph)	0	9	0	0	0	0	0	0
Lane Group Flow (vph)	275	145	0	0	459	0	38	847
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	8	8	4	4	6	6	2	2
Permitted Phases	8	8	4	4	6	6	2	2
Actuated Green, G (s)	40.0	40.0	40.0	40.0	72.0	72.0	72.0	72.0
Effective Green, g (s)	40.0	40.0	40.0	40.0	72.0	72.0	72.0	72.0
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.60	0.60	0.60	0.60
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	187	599	558	285	1115	180	1118	950
v/s Ratio Prot		0.08			c0.46		0.37	
v/s Ratio Perm	c0.49		0.27	0.08		0.30		0.10
v/c Ratio	1.47	0.24	0.82	0.13	0.76	0.49	0.62	0.16
Uniform Delay, d1	40.0	29.0	36.7	10.4	17.6	13.6	15.3	10.6
Progression Factor	1.00	1.00	0.67	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	238.5	0.2	6.6	1.0	4.9	9.4	2.6	0.4
Delay (s)	278.5	29.2	31.2	11.4	22.5	23.0	17.9	11.0
Level of Service	F	C	C	C	B	C	B	B
Approach Delay (s)	189.0		31.2		22.0		16.6	
Approach LOS	F		C		C		B	

Intersection Summary

HCM Average Control Delay 46.8 HCM Level of Service D

HCM Volume to Capacity ratio 1.01

Actuated Cycle Length (s) 120.0 Sum of lost time (s) 8.0

Intersection Capacity Utilization 95.8% ICU Level of Service F

Analysis Period (min) 15

c Critical Lane Group

Baseline
A & R Engineering Inc.

Future PM
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Base Saturday Intersection Analysis

Base 2020 Saturday

Lane Group	EBL	EBT	WBT	WBR	NBR	SBR
Lane Group Flow (vph)	125	742	900	580	703	127
v/c Ratio	0.24	0.21	0.29	0.39	0.28	0.08
Control Delay	1.5	0.1	1.3	0.9	0.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.5	0.1	1.3	0.9	0.3	0.1
Queue Length 50th (ft)	2	0	33	0	0	0
Queue Length 95th (ft)	m4	m0	41	8	3	0
Internal Link Dist (ft)	1047	677				
Turn Bay Length (ft)	150		325			
Base Capacity (vph)	855	3539	3141	1470	2556	1611
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.21	0.29	0.39	0.28	0.08

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00	0.95		0.95	1.00		0.85		0.88		1.00	
Flt	1.00	1.00		1.00	1.00		1.00		0.85		1.00	
Flt Protected	0.95	1.00		1.00	1.00		1.00		1.00		1.00	
Satd. Flow (prot)	1770	3539		3539	1583		2787		2787		1611	
Flt Permitted	0.30	1.00		1.00	1.00		1.00		1.00		1.00	
Satd. Flow (perm)	564	3539		3539	1583		2787		2787		1611	
Volume (vph)	119	705	0	0	864	557	0	0	647	0	0	119
Peak-hour factor, PHF	0.95	0.95	0.95	0.96	0.96	0.96	0.92	0.92	0.92	0.94	0.94	0.94
Adj. Flow (vph)	125	742	0	0	900	580	0	0	703	0	0	127
RTOR Reduction (vph)	0	0	0	0	0	65	0	0	79	0	0	0
Lane Group Flow (vph)	125	742	0	0	900	515	0	0	624	0	0	127
Turn Type	pm+pt				Perm			custom				custom
Protected Phases	1	6			2							6
Permitted Phases	6				2				2			6
Actuated Green, G (s)	116.0	120.0			106.5	106.5			106.5			120.0
Effective Green, g (s)	116.0	120.0			106.5	106.5			106.5			120.0
Actuated g/C Ratio	0.97	1.00			0.89	0.89			0.89			1.00
Clearance Time (s)	4.0	4.0			4.0	4.0			4.0			4.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0			3.0			3.0
Lane Grp Cap (vph)	600	3539			3141	1405			2473			1611
v/s Ratio Prot	0.01	c0.21			0.25							
v/s Ratio Perm	0.19				c0.33				0.22			0.08
v/c Ratio	0.21	0.21			0.29	0.37			0.25			0.08
Uniform Delay, d1	0.2	0.0			1.0	1.1			1.0			0.0
Progression Factor	8.33	1.00			1.00	1.00			1.00			1.00
Incremental Delay, d2	0.1	0.1			0.2	0.7			0.2			0.1
Delay (s)	1.8	0.1			1.2	1.9			1.2			0.1
Level of Service	A	A			A	A			A			A
Approach Delay (s)		0.3			1.5			1.2				0.1
Approach LOS		A			A			A				A
Intersection Summary												
HCM Average Control Delay					1.1							A
HCM Volume to Capacity ratio					0.35							A
Actuated Cycle Length (s)					120.0							4.0
Intersection Capacity Utilization					48.8%							A
Analysis Period (min)					15							
c Critical Lane Group												

Lanes, Volumes, Timings
2: Cumming Highway & I-575 Southbound Ramp

Base SAT
12/28/2006

Lane Group	EBT	EBR	WBT	SBL	SBR
Lane Group Flow (vph)	388	98	1036	452	114
v/c Ratio	0.42	0.06	0.73	0.89	0.23
Control Delay	31.7	0.1	20.1	60.7	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.7	0.1	20.1	60.7	8.7
Queue Length 50th (ft)	126	0	201	336	0
Queue Length 95th (ft)	200	0	282	413	51
Internal Link Dist (ft)	2177	1047			
Turn Bay Length (ft)		150			320
Base Capacity (vph)	933	1583	1426	664	501
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.42	0.06	0.73	0.68	0.23
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
2: Cumming Highway & I-575 Southbound Ramp

Base SAT
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔↔	↔	↔	↔↔	↔↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.85	1.00	0.95	1.00	0.90	1.00	0.95	1.00	0.85	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3182	3182	3182	3182	1770	1770	1770	1583	1770	1583
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3182	3182	3182	3182	1770	1770	1770	1583	1770	1583
Volume (vph)	0	365	92	0	318	656	0	0	0	443	0	112
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.92	0.92	0.92	0.98	0.98	0.98
Adj. Flow (vph)	0	388	98	0	338	698	0	0	0	452	0	114
RTOR Reduction (vph)	0	0	0	0	313	0	0	0	0	0	0	84
Lane Group Flow (vph)	0	388	98	0	723	0	0	0	0	452	0	30
Turn Type	Free			Free			Prot			custom		
Protected Phases	6			2			1					
Permitted Phases	Free			Free			1					
Actuated Green, G (s)	31.6			42.0			34.4			31.6		
Effective Green, g (s)	31.6			42.0			34.4			31.6		
Actuated g/C Ratio	0.26			1.00			0.29			0.26		
Clearance Time (s)	4.0			4.0			4.0			4.0		
Vehicle Extension (s)	3.0			3.0			3.0			3.0		
Lane Grp Cap (vph)	932			1583			1114			507		
v/s Ratio Prot	c0.11			0.06			c0.23			c0.26		
v/s Ratio Perm	0.42			0.06			0.65			0.89		
Uniform Delay, d1	36.6			0.0			32.8			41.0		
Progression Factor	0.79			1.00			0.96			1.00		
Incremental Delay, d2	1.2			0.1			2.9			17.7		
Delay (s)	30.1			0.1			34.5			58.7		
Level of Service	C			A			C			E		
Approach Delay (s)	24.0			34.5			34.5			0.0		
Approach LOS	C			C			C			A		
Intersection Summary												
HCM Average Control Delay	37.2			HCM Level of Service			D					
HCM Volume to Capacity ratio	0.66											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			12.0					
Intersection Capacity Utilization	61.2%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
3: Bobo Grinding Co Driveway & Marietta Street

Base SAT
12/28/2006

	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	13	245	250	597	232	438
Lane Group Flow (vph)	0.04	0.83	0.47	0.55	0.46	0.33
v/c Ratio	25.4	67.2	7.6	15.8	8.3	7.0
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.4	67.2	7.6	15.8	8.3	7.0
Queue Length 50th (ft)	5	183	3	196	35	74
Queue Length 95th (ft)	13	253	64	m419	m105	260
Internal Link Dist (ft)	95	1440	3002			1058
Turn Bay Length (ft)		150			90	
Base Capacity (vph)	476	407	637	1076	567	1344
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.60	0.39	0.55	0.41	0.33

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

Baseline
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Future PM
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HCM Signalized Intersection Capacity Analysis
3: Bobo Grinding Co Driveway & Marietta Street

Base SAT
12/28/2006



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	0.98	0.98	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1733	1733	1770	1589	1770	1589	1777	1777	1770	1861	1861
Flt Permitted	0.91	0.91	0.75	1.00	1.00	1.00	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)	1601	1601	1395	1589	1776	1589	1776	1776	670	1861	1861
Volume (vph)	3	2	3	233	5	233	2	377	194	218	410
Peak-hour factor, PHF	0.62	0.62	0.62	0.95	0.95	0.95	0.96	0.96	0.96	0.94	0.94
Adj. Flow (vph)	5	3	5	245	5	245	2	393	202	232	436
RTOR Reduction (vph)	0	4	0	0	193	0	0	12	0	0	0
Lane Group Flow (vph)	0	9	0	245	57	0	0	585	0	232	438
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	8	8	4	4	4	4	6	6	5	5	2
Permitted Phases	8	8	4	4	4	4	6	6	5	5	2
Actuated Green, G (s)	25.4	25.4	25.4	25.4	25.4	25.4	71.9	71.9	86.6	86.6	86.6
Effective Green, g (s)	25.4	25.4	25.4	25.4	25.4	25.4	71.9	71.9	86.6	86.6	86.6
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21	0.21	0.60	0.60	0.72	0.72	0.72
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	339	295	336	295	336	336	1064	1064	582	1343	1343
v/s Ratio Prot	0.01	0.01	0.18	0.04	0.04	0.04	c0.33	c0.33	c0.04	c0.24	c0.24
v/c Ratio	0.03	0.03	0.83	0.17	0.17	0.17	0.55	0.55	0.40	0.33	0.33
Uniform Delay, d1	37.5	37.5	45.2	38.7	38.7	38.7	14.4	14.4	7.2	6.1	6.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.84	0.84	0.85	0.90	0.90
Incremental Delay, d2	0.0	0.0	17.7	0.2	0.2	0.2	2.0	2.0	0.4	0.6	0.6
Delay (s)	37.5	37.5	62.9	38.9	38.9	38.9	14.0	14.0	6.6	6.1	6.1
Level of Service	D	D	E	D	D	D	B	B	A	A	A
Approach Delay (s)	37.5	37.5	50.8	50.8	50.8	50.8	14.0	14.0	6.2	6.2	6.2
Approach LOS	D	D	D	D	D	D	B	B	A	A	A
Intersection Summary											
HCM Average Control Delay			21.5				HCM Level of Service		C		
HCM Volume to Capacity ratio			0.60								
Actuated Cycle Length (s)			120.0				Sum of lost time (s)		12.0		
Intersection Capacity Utilization			83.1%				ICU Level of Service		E		
Analysis Period (min)			15								
c Critical Lane Group											

Baseline
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Lanes, Volumes, Timings
4: Big K-Mart Driveway & Marietta Highway

Base SAT
12/28/2006

Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	250	532	364	34	1044	486	353	1005	72
v/c Ratio	1.03	1.08	0.52	0.32	1.07	0.67	1.09	0.66	0.10
Control Delay	116.6	105.9	6.6	62.2	92.2	12.3	116.0	13.1	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	116.6	105.9	6.6	62.2	92.2	12.3	116.0	13.1	3.4
Queue Length 50th (ft)	~205	~461	2	26	~472	49	~300	212	5
Queue Length 95th (ft)	#373	#677	76	60	#606	170 m	#443	252	m12
Internal Link Dist (ft)	162	491			2132			4585	
Turn Bay Length (ft)			395	150			150		90
Base Capacity (vph)	242	492	697	118	973	728	325	1529	702
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.03	1.08	0.52	0.29	1.07	0.67	1.09	0.66	0.10

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Baseline
A & R Engineering Inc.

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HCM Signalized Intersection Capacity Analysis
4: Big K-Mart Driveway & Marietta Highway

Base SAT
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.98	0.97	0.97	0.96	0.96	0.96	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	0.97	0.97	0.97	0.96	0.96	0.96	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (prot)	1783	1783	1783	1788	1788	1788	1770	1770	1770	1770	1770	1770
Flt Permitted	0.97	0.97	0.97	0.96	0.96	0.96	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (perm)	1783	1783	1783	1788	1788	1788	1770	1770	1770	1770	1770	1770
Volume (vph)	129	70	26	420	80	342	33	1023	476	346	985	71
Peak-hour factor, PHF	0.90	0.90	0.90	0.94	0.94	0.94	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	143	78	29	447	85	364	34	1044	486	353	1005	72
RTOR Reduction (vph)	0	4	0	0	0	262	0	0	292	0	0	18
Lane Grp Flow (vph)	0	246	0	0	532	102	34	1044	194	353	1005	54
Turn Type	Split	Split	Split	Split	Split	Split	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	8	8	8	4	4	4	1	6	6	5	2	2
Permitted Phases												
Actuated Green, G (s)	16.0	16.0	16.0	33.0	33.0	33.0	4.7	33.0	33.0	22.0	50.3	50.3
Effective Green, g (s)	16.0	16.0	16.0	33.0	33.0	33.0	4.7	33.0	33.0	22.0	50.3	50.3
Actuated g/C Ratio	0.13	0.13	0.13	0.28	0.28	0.28	0.04	0.28	0.28	0.18	0.42	0.42
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	238	492	435	69	973	435	325	1483	664	325	1483	664
v/s Ratio Prot	c0.14	c0.14	c0.14	c0.30	c0.30	c0.30	c0.02	c0.29	c0.29	c0.20	c0.28	c0.28
v/s Ratio Perm	1.03	1.03	1.03	1.08	1.08	1.08	0.24	1.07	1.07	0.45	1.09	0.68
Uniform Delay, d1	52.0	52.0	52.0	43.5	43.5	43.5	56.5	43.5	43.5	35.9	49.0	28.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.14	0.41
Incremental Delay, d2	67.0	67.0	67.0	64.3	64.3	64.3	5.4	50.5	50.5	3.3	64.6	1.6
Delay (s)	119.0	119.0	119.0	107.8	107.8	107.8	61.9	94.0	94.0	39.2	120.4	13.2
Level of Service	F	F	F	F	F	F	C	E	F	D	F	B
Approach Delay (s)	119.0	119.0	119.0	77.8	77.8	77.8	76.3	76.3	76.3	39.3	39.3	39.3
Approach LOS	F	F	F	E	E	E	E	E	E	D	D	D

Intersection Summary

HCM Average Control Delay 66.4 HCM Level of Service E

HCM Volume to Capacity ratio 1.07

Actuated Cycle Length (s) 120.0 Sum of lost time (s) 16.0

Intersection Capacity Utilization 91.6% ICU Level of Service F

Analysis Period (min) 15

c Critical Lane Group

Baseline
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Lanes, Volumes, Timings
5: Riverstone Parkway & I - 575 Northbound Ramp

Base SAT
12/28/2006

	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group	338	1282	1609	153	948	846
Lane Group Flow (vph)	1.26	0.69	1.21	0.10	0.68	1.26
v/c Ratio	160.7	10.6	137.0	0.1	32.0	160.0
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	160.7	10.6	137.0	0.1	32.0	160.0
Queue Length 50th (ft)	~266	362	~802	0	304	~808
Queue Length 95th (ft) m#387	347	#941	0	378	#1055	
Internal Link Dist (ft)	1330	1370				
Turn Bay Length (ft)	370		300	490		
Base Capacity (vph)	269	1858	1327	1583	1402	671
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.26	0.69	1.21	0.10	0.68	1.26

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Baseline
A & R Engineering Inc.

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HCM Signalized Intersection Capacity Analysis
5: Riverstone Parkway & I - 575 Northbound Ramp

Base SAT
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		
Lane Util. Factor	1.00	0.95		0.95	1.00		0.95	1.00		0.95		
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95		
Satd. Flow (prot)	1770	3539		3539	1583		3539	1583		3539		
Flt Permitted	0.08	1.00		1.00	1.00		0.95	1.00		0.95		
Satd. Flow (perm)	152	3539		3539	1583		3539	1583		3539		
Volume (vph)	321	1218	0	0	1593	151	920	0	821	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.99	0.99	0.99	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	338	1282	0	0	1609	153	948	0	846	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	24	0	0	0
Lane Group Flow (vph)	338	1282	0	0	1609	153	948	0	822	0	0	0
Turn Type	pm+pt											
Protected Phases	1	6			2				custom			
Permitted Phases	6					Free	4					
Actuated Green, G (s)	63.0	63.0			45.0	120.0	49.0					
Effective Green, g (s)	63.0	63.0			45.0	120.0	49.0					
Actuated g/C Ratio	0.52	0.52			0.38	1.00	0.41					
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0					
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0					
Lane Grp Cap (vph)	269	1858			1327	1583	1402					
v/s Ratio Prot	c0.15	0.36			0.45							
v/c Ratio Perm	c0.51					0.10	0.28					
v/c Ratio	1.26	0.69			1.21	0.10	0.68					
Uniform Delay, d1	55.2	21.2			37.5	0.0	29.0					
Progression Factor	0.90	0.43			1.00	1.00	1.00					
Incremental Delay, d2	132.3	1.3			102.8	0.1	1.3					
Delay (s)	181.9	10.5			140.3	0.1	30.3					
Level of Service	F	B			F	A	C					
Approach Delay (s)		46.2			128.2		96.1					
Approach LOS		D			F		F					
Intersection Summary												
HCM Average Control Delay					91.4		HCM Level of Service					F
HCM Volume to Capacity ratio					1.25							
Actuated Cycle Length (s)					120.0		Sum of lost time (s)					8.0
Intersection Capacity Utilization					98.1%		ICU Level of Service					F
Analysis Period (min)					15							
c Critical Lane Group												

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
6: Riverstone Parkway & I - 575 Southbound Ramp

Base SAT
12/28/2006

	EBT	EBR	WBL	WBT	SBL	SBR	
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR	
Lane Group Flow (vph)	1297	828	534	1999	246	423	
v/c Ratio	0.82	0.52	0.91	0.73	0.86	0.27	
Control Delay	25.2	1.9	28.1	3.6	75.6	0.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.2	1.9	28.1	3.6	75.6	0.4	
Queue Length 50th (ft)	365	31	253	185	184	0	
Queue Length 95th (ft)	#419	62	m236	m69	#311	0	
Internal Link Dist (ft)	752			1330			
Turn Bay Length (ft)		225	375				
Base Capacity (vph)	1577	1583	624	2729	310	1583	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.82	0.52	0.86	0.73	0.79	0.27	
Intersection Summary							
#	95th percentile volume exceeds capacity, queue may be longer.						
m	Queue shown is maximum after two cycles.						
	Volume for 95th percentile queue is metered by upstream signal.						

HCM Signalized Intersection Capacity Analysis
6: Riverstone Parkway & I - 575 Southbound Ramp

Base SAT
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0				4.0	4.0	
Lane Util. Factor	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	1.00				1.00	0.85	1.00
Flt Protected	1.00	1.00	1.00	0.95	1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	3539	1583	1770	3539		3539				1770	1583	1583
Flt Permitted	1.00	1.00	0.07	1.00		1.00				0.95	1.00	1.00
Satd. Flow (perm)	3539	1583	130	3539		3539				1770	1583	1583
Volume (vph)	0	1258	803	523	1959	0	0	0	0	234	0	402
Peak-hour factor, PHF	0.97	0.97	0.97	0.98	0.98	0.98	0.92	0.92	0.92	0.95	0.95	0.95
Adj. Flow (vph)	0	1297	828	534	1999	0	0	0	0	246	0	423
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1297	828	534	1999	0	0	0	0	246	0	423
Turn Type	Free pm+pt											
Protected Phases	6 5 2											
Permitted Phases	Free 2											
Actuated Green, G (s)	53.4 120.0 92.5 92.5											
Effective Green, g (s)	53.4 120.0 92.5 92.5											
Actuated g/C Ratio	0.44 1.00 0.77 0.77											
Clearance Time (s)	4.0 4.0 4.0 4.0											
Vehicle Extension (s)	3.0 3.0 3.0 3.0											
Lane Grp Cap (vph)	1575 1583 580 2728											
v/s Ratio Prot	0.37 c0.27 0.56											
v/s Ratio Perm	0.52 c0.44											
v/c Ratio	0.82 0.52 0.92 0.73											
Uniform Delay, d1	29.2 0.0 34.9 7.2											
Progression Factor	0.67 1.00 0.78 0.45											
Incremental Delay, d2	4.3 1.0 2.6 0.2											
Delay (s)	23.9 1.0 30.0 3.4											
Level of Service	C A C A											
Approach Delay (s)	15.0											
Approach LOS	B A											
Intersection Summary												
HCM Average Control Delay	13.5 HCM Level of Service B											
HCM Volume to Capacity ratio	0.90											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	98.1% ICU Level of Service F											
Analysis Period (min)	15											
Critical Lane Group												

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	246	1310	1512	846	780	169
Lane Group Flow (vph)	0.56	0.39	0.70	0.53	0.85	0.34
v/c Ratio	38.2	8.5	18.2	1.0	50.5	15.8
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	38.2	8.5	18.2	1.0	50.5	15.8
Total Delay	119	141	294	0	292	41
Queue Length 50th (ft)	232	390	0	346	94	
Queue Length 95th (ft)	1490	547			375	
Internal Link Dist (ft)	165		290		110	
Turn Bay Length (ft)	438	3378	2149	1583	1087	570
Base Capacity (vph)	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.39	0.70	0.53	0.72	0.30

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

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	AAA	AAA	AAA	AAA	AAA	AAA
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	1.00
Flt Protected	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	3433	1583
Flt Permitted	0.08	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	152	5085	5085	1583	3433	1583
Volume (vph)	241	1284	1467	821	749	162
Peak-hour factor, PHF	0.98	0.98	0.97	0.97	0.96	0.96
Adj. Flow (vph)	246	1310	1512	846	780	169
RTOR Reduction (vph)	0	0	0	0	0	73
Lane Group Flow (vph)	246	1310	1512	846	780	96
Turn Type	pm+pt	Free	Free	Free	Perm	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6			Free		8
Actuated Green, G (s)	79.7	79.7	50.7	120.0	32.3	32.3
Effective Green, g (s)	79.7	79.7	50.7	120.0	32.3	32.3
Actuated g/C Ratio	0.66	0.66	0.42	1.00	0.27	0.27
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	438	3377	2148	1583	924	426
v/s Ratio Prot	0.12	0.26	c0.30		c0.23	
v/s Ratio Perm	0.26			c0.53		0.06
v/c Ratio	0.56	0.39	0.70	0.53	0.84	0.23
Uniform Delay, d1	29.2	9.1	28.5	0.0	41.5	34.1
Progression Factor	1.01	0.85	0.57	1.00	1.00	1.00
Incremental Delay, d2	1.5	0.3	1.5	1.0	7.1	0.3
Delay (s)	31.0	8.0	17.7	1.0	48.6	34.4
Level of Service	C	A	B	A	D	C
Approach Delay (s)		11.7	11.7		46.1	
Approach LOS		B	B		D	

Intersection Summary
HCM Average Control Delay
HCM Volume to Capacity ratio
Actuated Cycle Length (s)
Intersection Capacity Utilization
Analysis Period (min)
c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	380	1259	1335	286	373	159
v/c Ratio	0.58	0.32	0.62	0.18	0.72	0.43
Control Delay	12.2	0.9	7.7	0.2	45.0	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	0.9	7.7	0.2	45.0	5.3
Queue Length 50th (ft)	99	18	125	0	147	7
Queue Length 95th (ft)	m100	20	175	0	122	m17
Internal Link Dist (ft)	1839	1490			2482	
Turn Bay Length (ft)	190					
Base Capacity (vph)	659	3977	2155	1583	687	444
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.32	0.62	0.18	0.54	0.36
Intersection Summary						
m	Volume for 95th percentile queue is metered by upstream signal.					



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	1.00
Flt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	3433	1583
Flt Permitted	0.12	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	217	5085	5085	1583	3433	1583
Volume (vph)	357	1183	1268	272	339	145
Peak-hour factor, PHF	0.94	0.94	0.95	0.95	0.91	0.91
Adj. Flow (vph)	380	1259	1335	286	373	159
RTOR Reduction (vph)	0	0	0	0	0	135
Lane Group Flow (vph)	380	1259	1335	286	373	24
Turn Type	pm+pt Free Perm					
Protected Phases	1	6	2		8	
Permitted Phases	6			Free		8
Actuated Green, G (s)	93.9	93.9	50.9	120.0	18.1	18.1
Effective Green, g (s)	93.9	93.9	50.9	120.0	18.1	18.1
Actuated g/C Ratio	0.78	0.78	0.42	1.00	0.15	0.15
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	675	3979	2157	1583	518	239
v/s Ratio Prot	c0.18	0.25	c0.26		c0.11	
v/s Ratio Perm	0.26			0.18		0.02
v/c Ratio	0.56	0.32	0.62	0.18	0.72	0.10
Uniform Delay, d1	19.1	3.8	27.0	0.0	48.5	43.9
Progression Factor	0.40	0.19	0.24	1.00	0.79	0.36
Incremental Delay, d2	0.6	0.1	1.0	0.2	4.1	0.2
Delay (s)	8.2	0.9	7.5	0.2	42.6	16.1
Level of Service	A	A	A	A	D	B
Approach Delay (s)		2.6	6.2		34.7	
Approach LOS		A	A		C	
Intersection Summary						
HCM Average Control Delay			8.6		HCM Level of Service	A
HCM Volume to Capacity ratio			0.60			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			63.9%		ICU Level of Service	B
Analysis Period (min)			15			
c	Critical Lane Group					

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group Flow (vph)	416	1075	386	1108	174	174	488	260	240	428	
v/c Ratio	0.89	0.75	0.88	0.81	0.72	0.69	0.85	0.82	0.73	0.80	
Control Delay	45.7	12.9	56.0	10.0	54.1	63.4	23.4	57.4	59.3	25.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	45.7	12.9	56.0	10.0	54.1	63.4	23.4	57.4	59.3	25.0	
Queue Length 50th (ft)	281	127	263	31	107	129	50	175	178	93	
Queue Length 95th (ft)	m302	m140	#410	#530	#175	201	#196	#261	249	191	
Internal Link Dist (ft)	1240		3515		1145				4852		
Turn Bay Length (ft)	150		150		160			80		90	
Base Capacity (vph)	497	1424	468	1362	241	311	611	317	388	576	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.84	0.75	0.82	0.81	0.72	0.56	0.80	0.82	0.62	0.74	
Intersection Summary											
#	95th percentile volume exceeds capacity, queue may be longer.										
m	Queue shown is maximum after two cycles.										
m	Volume for 95th percentile queue is metered by upstream signal.										

Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Flt	1.00	0.98	1.00	0.97	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	3462	1770	3438	1770	1863	1583	1770	1863	1583	
Flt Permitted	0.09	1.00	0.10	1.00	0.38	1.00	1.00	0.29	1.00	1.00	
Satd. Flow (perm)	176	3462	195	3438	701	1863	1583	543	1863	1583	
Volume (vph)	404	891	151	371	861	203	169	473	224	206	
Peak-hour factor, PHF	0.97	0.97	0.96	0.96	0.96	0.97	0.97	0.86	0.86	0.86	
Adj. Flow (vph)	416	919	156	386	897	211	174	488	260	240	
RTOR Reduction (vph)	0	11	0	0	16	0	0	361	0	0	
RTOR Reduction (vph)	0	11	0	0	16	0	0	361	0	0	
Lane Group Flow (vph)	416	1064	0	386	1092	0	174	174	127	260	
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt		pm+pt	Perm	
Protected Phases	1	6	5	2	7	4		3	8		
Permitted Phases	6		2		4		4	8		8	
Actuated Green, G (s)	75.9	49.0	71.9	47.0	25.1	16.2	16.2	34.1	21.2	21.2	
Effective Green, g (s)	75.9	49.0	71.9	47.0	25.1	16.2	16.2	34.1	21.2	21.2	
Actuated g/C Ratio	0.63	0.41	0.60	0.39	0.21	0.13	0.13	0.28	0.18	0.18	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	469	1414	444	1347	226	252	214	296	329	280	
v/s Ratio Prot	c0.20	0.31	0.18	0.32	0.06	0.09		c0.10	0.13		
v/s Ratio Perm	c0.36		0.34		0.10			0.08	c0.15	0.11	
v/c Ratio	0.89	0.75	0.87	0.81	0.77	0.69	0.69	0.59	0.88	0.73	
Uniform Delay, d1	35.9	30.3	36.4	32.5	42.7	49.5	48.8	37.3	46.7	45.6	
Progression Factor	0.85	0.35	0.96	0.13	1.00	1.00	1.00	1.01	1.01	1.06	
Incremental Delay, d2	10.0	1.9	13.7	4.4	14.6	7.9	4.4	23.1	7.5	3.7	
Delay (s)	40.5	12.4	48.7	8.7	57.2	57.4	53.2	61.0	54.5	52.2	
Level of Service	D	B	D	A	E	E	D	E	D	D	
Approach Delay (s)		20.2		19.1		54.9			55.3		
Approach LOS		C		B		D			E		
Intersection Summary											
HCM Average Control Delay	32.8				HCM Level of Service				C		
HCM Volume to Capacity ratio	0.89										
Actuated Cycle Length (s)	120.0				Sum of lost time (s)				12.0		
Intersection Capacity Utilization	87.3%				ICU Level of Service				E		
Analysis Period (min)	15										
Critical Lane Group											

Lanes, Volumes, Timings
10: Reinhardt College Parkway & Waleska Road

Base SAT
12/28/2006

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group	96	424	532	116	419	676
Lane Group Flow (vph)	0.51	0.77	0.46	0.07	0.69	0.44
v/c Ratio	56.1	16.9	8.2	0.0	21.7	4.9
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.1	16.9	8.2	0.0	21.7	4.9
Queue Length 50th (ft)	77	40	112	0	45	87
Queue Length 95th (ft)	83	83	m289	m0	217	304
Internal Link Dist (ft)	3912		4852		2585	
Turn Bay Length (ft)				250	275	
Base Capacity (vph)	413	694	1145	1583	745	1539
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.61	0.46	0.07	0.56	0.44

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

Baseline
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HCM Signalized Intersection Capacity Analysis
10: Reinhardt College Parkway & Waleska Road

Base SAT
12/28/2006

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt	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)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.37	1.00
Satd. Flow (perm)	1770	1583	1863	1583	696	1863
Volume (vph)	92	407	505	110	390	629
Peak-hour factor, PHF	0.96	0.96	0.95	0.95	0.93	0.93
Adj. Flow (vph)	96	424	532	116	419	676
RTOR Reduction (vph)	0	378	0	0	0	0
Lane Group Flow (vph)	96	46	532	116	419	676
Turn Type	Perm	Perm	Free	Free	pm+pt	
Protected Phases	4	6	6	5	2	
Permitted Phases		4		Free	2	
Actuated Green, G (s)	12.9	12.9	73.7	120.0	99.1	99.1
Effective Green, g (s)	12.9	12.9	73.7	120.0	99.1	99.1
Actuated g/C Ratio	0.11	0.11	0.61	1.00	0.83	0.83
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	190	170	1144	1583	766	1539
v/s Ratio Prot	c0.05	0.03	0.29	0.07	c0.10	0.36
v/s Ratio Perm						
v/c Ratio	0.51	0.27	0.47	0.07	0.55	0.44
Uniform Delay, d1	50.5	49.2	12.5	0.0	10.6	2.9
Progression Factor	0.98	1.76	0.48	1.00	1.00	1.00
Incremental Delay, d2	2.0	0.8	0.7	0.0	0.8	0.9
Delay (s)	51.5	87.5	6.7	0.0	11.4	3.8
Level of Service	D	F	A	A	B	A
Approach Delay (s)	80.9		5.5		6.7	
Approach LOS	F		A		A	
Intersection Summary						
HCM Average Control Delay			23.4			C
HCM Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			120.0			8.0
Intersection Capacity Utilization			63.3%			B
Analysis Period (min)			15			
c Critical Lane Group						

Baseline
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Lanes, Volumes, Timings
11: Reinhardt College Parkway & College Street

Base SAT
12/28/2006

	→	←	←	↑	↓	
Lane Group	EBT	WBT	NBT	SBT		
Lane Group Flow (vph)	399	418	176	223		
Intersection Summary						

HCM Unsignalized Intersection Capacity Analysis
11: Reinhardt College Parkway & College Street

Base SAT
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	39	310	18	45	287	61	23	76	44	74	54	70
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.81	0.81	0.81	0.89	0.89	0.89
Hourly flow rate (vph)	42	337	20	48	305	65	28	94	54	83	61	79
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	399	418	177	222								
Volume Left (vph)	42	48	28	83								
Volume Right (vph)	20	65	54	79								
HadJ (s)	0.03	-0.04	-0.12	-0.10								
Departure Headway (s)	6.2	6.1	6.9	6.8								
Degree Utilization, x	0.69	0.71	0.34	0.42								
Capacity (veh/h)	551	555	433	458								
Control Delay (s)	21.8	22.7	13.5	14.7								
Approach Delay (s)	21.8	22.7	13.5	14.7								
Approach LOS	C	C	B	B								
Intersection Summary												
Delay			19.6									
HCM Level of Service			C									
Intersection Capacity Utilization			53.4%								A	
Analysis Period (min)			15									

Lanes, Volumes, Timings
12: Knox Bridge Highway & Fincher Road

Base SAT
12/28/2006



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	91	432	22	510	41	151		
Intersection Summary								

Baseline
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HCM Unsignalized Intersection Capacity Analysis
12: Knox Bridge Highway & Fincher Road

Base SAT
12/28/2006



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Left	Thru	Thru	Left	Thru	Thru	Left	Thru	Thru	Left	Thru	Thru
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	80	371	9	21	408	82	9	6	21	59	11	71
Peak Hour Factor	0.88	0.88	0.88	0.96	0.96	0.96	0.86	0.86	0.86	0.93	0.93	0.93
Hourly flow rate (vph)	91	422	10	22	425	85	10	7	24	63	12	76
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	510			432			1160	1163	427	1143	1125	468
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
vCu, unblocked vol	510			432			1160	1163	427	1143	1125	468
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 %	91			98			92	96	96	58	94	87
cM capacity (veh/h)	1055			1128			132	175	628	152	184	595
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	91	432	22	510	42	152						
Volume Left	91	0	22	0	10	63						
Volume Right	0	10	0	85	24	76						
cSH	1055	1700	1128	1700	265	249						
Volume to Capacity	0.09	0.25	0.02	0.30	0.16	0.61						
Queue Length 95th (ft)	7	0	1	0	14	90						
Control Delay (s)	8.7	0.0	8.3	0.0	21.2	39.8						
Lane LOS	A	A	A	C	C	E						
Approach Delay (s)	1.5		0.3		21.2	39.8						
Approach LOS	C		C		E	E						
Intersection Summary												
Average Delay			6.3									
Intersection Capacity Utilization			54.7%							A		
Analysis Period (min)			15									

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
13: N Etowah Drive & Riverstone Parkway

Base SAT
12/28/2006

	→	←	↔	↑	↗	↘	↓	↖
Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	60	25	42	1630	12	9	1460	9
Intersection Summary								

Baseline
A & R Engineering Inc.

Future PM
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HCM Unsignalized Intersection Capacity Analysis
13: N Etowah Drive & Riverstone Parkway

Base SAT
12/28/2006

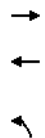
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕	Stop		↕	↕	↕	↕	Free	↕
Sign Control		Stop			Stop		↕	↕	↕	↕	Free	↕
Grade		0%			0%		↕	↕	↕	↕	0%	↕
Volume (veh/h)	12	0	39	9	0	8	38	1467	11	9	1416	9
Peak Hour Factor	0.85	0.85	0.85	0.69	0.69	0.69	0.90	0.90	0.90	0.97	0.97	0.97
Hourly flow rate (vph)	14	0	46	13	0	12	42	1630	12	9	1460	9
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2378	3205	730	2463	3202	815	1469			1642		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2378	3205	730	2463	3202	815	1469			1642		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	11	100	87	0	100	96	91			98		
cM capacity (veh/h)	16	9	365	12	9	321	455			390		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	60	25	42	815	815	12	9	730	730	9		
Volume Left	14	13	42	0	0	0	9	0	0	0		
Volume Right	46	12	0	0	0	12	0	0	0	9		
cSH	59	23	455	1700	1700	1700	390	1700	1700	1700		
Volume to Capacity	1.01	1.09	0.09	0.48	0.48	0.01	0.02	0.43	0.43	0.01		
Queue Length 95th (ft)	120	79	8	0	0	0	2	0	0	0		
Control Delay (s)	234.7	462.7	13.7	0.0	0.0	0.0	14.5	0.0	0.0	0.0		
Lane LOS	F	F	B				B					
Approach Delay (s)	234.7	462.7	0.3				0.1					
Approach LOS	F	F										
Intersection Summary												
Average Delay	8.1											
Intersection Capacity Utilization	50.6%											
Analysis Period (min)	15											
A												

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
14: Broad Water Bay Road & Finch Road

Base SAT
12/28/2006



Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	90	120	126
Intersection Summary			

HCM Unsignalized Intersection Capacity Analysis
14: Broad Water Bay Road & Finch Road

Base SAT
12/28/2006



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Left	Right	Through	Through	Through	Right
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	30	51	45	61	68	42
Peak Hour Factor	0.90	0.90	0.88	0.88	0.87	0.87
Hourly flow rate (vph)	33	57	51	69	78	48
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None				
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
VC, conflicting volume	274	102	126			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
vCu, unblocked vol	274	102	126			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	94	96			
cM capacity (veh/h)	691	953	1460			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	90	120	126			
Volume Left	33	51	0			
Volume Right	57	0	48			
cSH	835	1460	1700			
Volume to Capacity	0.11	0.04	0.07			
Queue Length 95th (ft)	9	3	0			
Control Delay (s)	9.8	3.4	0.0			
Lane LOS	A	A	A			
Approach Delay (s)	9.8	3.4	0.0			
Approach LOS	A	A	A			
Intersection Summary						
Average Delay			3.8			
Intersection Capacity Utilization			23.8%			A
Analysis Period (min)			15			

Lanes, Volumes, Timings
15: Bells Ferry Road & Marietta Highway

Base SAT
12/28/2006

	→	←	↔	↑	↓	↗	↘
Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	446	361	28	609	98	609	211
v/c Ratio	1.13	0.50	0.12	0.64	0.42	0.64	0.23
Control Delay	119.7	10.6	17.2	25.5	25.3	25.5	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	119.7	10.6	17.2	25.5	25.3	25.5	2.7
Queue Length 50th (ft)	~402	126	11	333	46	333	0
Queue Length 95th (ft)	#609	m122	29	460	97	460	38
Internal Link Dist (ft)	1761	266		463		416	
Turn Bay Length (ft)			150		150		250
Base Capacity (vph)	394	723	235	945	235	947	908
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.13	0.50	0.12	0.64	0.42	0.64	0.23

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
15: Bells Ferry Road & Marietta Highway

Base SAT
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flt	0.99	0.99		0.92	0.92		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.97	0.97		0.99	0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1791	1791		1699	1699		1770	1859		1770	1863	1583
Flt Permitted	0.50	0.50		0.93	0.93		0.25	1.00		0.25	1.00	1.00
Satd. Flow (perm)	924	924		1586	1586		462	1859		462	1863	1583
Volume (vph)	284	113	18	35	95	210	27	570	9	92	572	198
Peak-hour factor, PHF	0.93	0.93	0.93	0.94	0.94	0.94	0.95	0.95	0.95	0.94	0.94	0.94
Adj. Flow (vph)	305	122	19	37	101	223	28	600	9	98	609	211
RTOR Reduction (vph)	0	1	0	0	48	0	0	0	0	0	0	104
Lane Group Flow (vph)	0	445	0	0	313	0	28	609	0	98	609	107
Turn Type	Perm	Perm		Perm	Perm		Perm	Perm		Perm	Perm	Perm
Protected Phases	8	8		4	4		6	6		2	2	2
Permitted Phases	8	8		4	4		6	6		2	2	2
Actuated Green, G (s)	51.0	51.0		51.0	51.0		61.0	61.0		61.0	61.0	61.0
Effective Green, g (s)	51.0	51.0		51.0	51.0		61.0	61.0		61.0	61.0	61.0
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.51	0.51		0.51	0.51	0.51
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	393	674		674	674		235	945		235	947	805
v/s Ratio Prot												
v/s Ratio Perm	0.48	0.48		0.20	0.20		0.06	0.33		0.21	0.33	0.07
v/c Ratio	1.13	1.13		0.46	0.46		0.12	0.64		0.42	0.64	0.13
Uniform Delay, d1	34.5	34.5		24.7	24.7		15.4	21.6		18.4	21.5	15.6
Progression Factor	1.00	1.00		0.44	0.44		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	86.4	86.4		0.4	0.4		1.0	3.4		5.4	3.4	0.3
Delay (s)	120.9	120.9		11.3	11.3		16.5	24.9		23.8	24.9	15.9
Level of Service	F	F		B	B		C	C		C	C	B
Approach Delay (s)	120.9	120.9		11.3	11.3		24.6	24.6		22.7	22.7	C
Approach LOS	F	F		B	B		C	C		C	C	C

Intersection Summary

HCM Average Control Delay 40.0 HCM Level of Service D

HCM Volume to Capacity ratio 0.87

Actuated Cycle Length (s) 120.0 Sum of lost time (s) 8.0

Intersection Capacity Utilization 91.6% ICU Level of Service F

Analysis Period (min) 15

c Critical Lane Group

Baseline
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Future PM
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Base 2020 Saturday Improved

Lanes, Volumes, Timings
2: Cumming Highway & I-575 Southbound Ramp

Base SAT - Improved
12/28/2006

	EBT	EBR	WBT	WBR	SBL	SBR
Lane Group	EBT	EBR	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	388	98	338	698	452	114
v/c Ratio	0.27	0.06	0.44	0.44	0.91	0.16
Control Delay	17.6	0.1	41.8	1.1	64.9	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.6	0.1	41.8	1.1	64.9	5.7
Queue Length 50th (ft)	98	0	120	0	340	0
Queue Length 95th (ft)	132	0	167	2	418	42
Internal Link Dist (ft)	2177	1047				
Turn Bay Length (ft)		150		150		320
Base Capacity (vph)	1430	1583	767	1583	782	708
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.06	0.44	0.44	0.58	0.16
Intersection Summary						

Baseline
A & R Engineering Inc.

Future PM
Page 3

HCM Signalized Intersection Capacity Analysis
2: Cumming Highway & I-575 Southbound Ramp

Base SAT - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.85	1.00
Flt	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3539	1583	3539	1583	3539	1583	1770	1770	1770	1583	1583	1583
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3539	1583	3539	1583	3539	1583	1770	1770	1770	1583	1583	1583
Volume (vph)	0	365	92	0	318	656	0	0	0	443	0	112
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.92	0.92	0.92	0.98	0.98	0.98
Adj. Flow (vph)	0	388	98	0	338	698	0	0	0	452	0	114
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	68
Lane Group Flow (vph)	0	388	98	0	338	698	0	0	0	452	0	46
Turn Type	Free	Free	Free	Free	Free	Free	Prot	Prot	Prot	Prot	Prot	custom
Protected Phases	6	2					1					
Permitted Phases	Free	Free	Free	Free	Free	Free						6
Actuated Green, G (s)	48.5	120.0	26.0	120.0	26.0	120.0	33.5			33.5		48.5
Effective Green, g (s)	48.5	120.0	26.0	120.0	26.0	120.0	33.5			33.5		48.5
Actuated g/C Ratio	0.40	1.00	0.22	1.00	0.22	1.00	0.28			0.28		0.40
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0		4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0		3.0
Lane Grp Cap (vph)	1430	1583	767	1583	767	1583	494			494		640
v/s Ratio Prot	0.11	0.10	0.10	0.10	0.10	0.10	c0.26			c0.26		0.03
v/c Ratio Perm	0.27	0.06	0.44	0.44	0.44	0.44	0.91			0.91		0.07
Uniform Delay, d1	23.9	0.0	40.7	0.0	40.7	0.0	41.9			41.9		21.9
Progression Factor	0.67	1.00	0.98	1.00	0.98	1.00	1.00			1.00		1.00
Incremental Delay, d2	0.4	0.1	1.8	0.9	1.8	0.9	21.5			21.5		0.2
Delay (s)	16.4	0.1	41.5	0.9	41.5	0.9	63.4			63.4		22.2
Level of Service	B	A	D	A	D	A	E			E		C
Approach Delay (s)	13.1	14.1	14.1	14.1	14.1	14.1	55.1			55.1		E
Approach LOS	B	B	B	B	B	B	A			A		E
Intersection Summary												
HCM Average Control Delay	25.0					HCM Level of Service						
HCM Volume to Capacity ratio	0.58					C						
Actuated Cycle Length (s)	120.0					Sum of lost time (s)						
Intersection Capacity Utilization	41.3%					A						
Analysis Period (min)	15											
Critical Lane Group												

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
3: Bobo Grinding Co Driveway & Marietta Street

Base SAT - Improved
12/28/2006

	→	↖	↗	↖	↗	↖	↗	↖	↗
Lane Group	EBT	WBL	WBT	NBT	SBL	SBT			
Lane Group Flow (vph)	13	245	250	597	232	438			
v/c Ratio	0.04	0.82	0.47	0.58	0.61	0.33			
Control Delay	25.1	66.3	7.5	20.5	47.0	7.6			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0			
Total Delay	25.1	66.3	7.5	20.5	47.0	7.6			
Queue Length 50th (ft)	5	183	3	273	48	47			
Queue Length 95th (ft)	13	250	63	471	118	356			
Internal Link Dist (ft)	95	148	3002			1058			
Turn Bay Length (ft)		150				90			
Base Capacity (vph)	490	419	648	1036	464	1341			
Starvation Cap Reductn	0	0	0	0	0	0			
Spillback Cap Reductn	0	0	0	0	0	0			
Storage Cap Reductn	0	0	0	0	0	0			
Reduced v/c Ratio	0.03	0.58	0.39	0.58	0.50	0.33			
Intersection Summary									

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
3: Bobo Grinding Co Driveway & Marietta Street

Base SAT - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Flt	0.95	0.95	0.95	1.00	0.85	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Flt Protected	0.98	0.98	0.98	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1733	1733	1770	1589	1770	1589	1777	1777	3433	1861	1861	1861
Flt Permitted	0.91	0.91	0.75	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1602	1602	1395	1589	1589	1589	1776	1776	3433	1861	1861	1861
Volume (vph)	3	2	3	233	5	233	2	377	194	218	410	2
Peak-hour factor, PHF	0.62	0.62	0.62	0.95	0.95	0.95	0.96	0.96	0.96	0.94	0.94	0.94
Adj. Flow (vph)	5	3	5	245	5	245	2	393	202	232	436	2
RTOR Reduction (vph)	0	4	0	0	0	193	0	12	0	0	0	0
Lane Group Flow (vph)	0	9	0	245	57	0	0	585	0	232	438	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	8	8	8	4	4	4	6	6	5	5	2	2
Permitted Phases	8	8	8	4	4	4	6	6	5	5	2	2
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5	25.5	69.3	69.3	13.2	86.5	86.5	86.5
Effective Green, g (s)	25.5	25.5	25.5	25.5	25.5	25.5	69.3	69.3	13.2	86.5	86.5	86.5
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21	0.21	0.58	0.58	0.11	0.72	0.72	0.72
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	340	340	296	338	338	338	1026	1026	378	1341	1341	1341
v/s Ratio Prot						0.04			c0.07	0.24	0.24	0.24
v/s Ratio Perm	0.01	0.01	c0.18	0.83	0.17	0.17	c0.33	c0.33	0.61	0.33	0.33	0.33
v/c Ratio	0.03	0.03	0.83	0.83	0.17	0.17	0.57	0.57	51.0	6.1	6.1	6.1
Uniform Delay, d1	37.4	37.4	45.2	38.6	38.6	38.6	16.0	16.0	0.79	0.96	0.96	0.96
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	0.79	0.96	0.96	0.96
Incremental Delay, d2	0.0	0.0	17.1	0.2	0.2	0.2	2.3	2.3	2.9	0.6	0.6	0.6
Delay (s)	37.5	37.5	62.2	38.8	38.8	38.8	18.4	18.4	43.3	6.5	6.5	6.5
Level of Service	D	D	E	D	D	D	B	B	D	A	A	A
Approach Delay (s)	37.5	37.5	50.4	38.6	38.6	38.6	18.4	18.4	19.2	19.2	19.2	19.2
Approach LOS	D	D	D	D	D	D	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	27.8			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.64											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)								
Intersection Capacity Utilization	83.1%			ICU Level of Service								
Analysis Period (min)	15			E								
Critical Lane Group												

Baseline
A & R Engineering Inc.

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Lanes, Volumes, Timings
4: Big K-Mart Driveway & Marietta Highway

Base SAT - Improved
12/28/2006

	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group Flow (vph)	250	259	273	364	34	1044	486	353	1005	72	
v/c Ratio	0.81	0.80	0.83	0.55	0.32	0.57	0.55	0.71	0.59	0.09	
Control Delay	67.1	64.6	67.2	10.3	62.0	34.3	5.6	41.1	21.5	7.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	67.1	64.6	67.2	10.3	62.0	34.3	5.6	41.1	21.5	7.4	
Queue Length 50th (ft)	184	202	214	54	26	250	0	112	363	10	
Queue Length 95th (ft)	271	292	307	91	60	320	86	167	461	m22	
Internal Link Dist (ft)	162		491			424			418		
Turn Bay Length (ft)	150		395		150			150		90	
Base Capacity (vph)	362	392	399	675	118	1832	881	526	1691	772	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.69	0.66	0.68	0.54	0.29	0.57	0.55	0.67	0.59	0.09	
Intersection Summary											
m	Volume for 95th percentile queue is metered by upstream signal.										

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
4: Big K-Mart Driveway & Marietta Highway

Base SAT - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Lane Util. 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
Flt Protected	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Satd. Flow (prot)	1783	1681	1711	1583	1770	5085	1583	3433	3539	1583		
Flt Permitted	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Satd. Flow (perm)	1783	1681	1711	1583	1770	5085	1583	3433	3539	1583		
Volume (vph)	129	70	26	420	80	342	33	1023	476	346	985	71
Peak-hour factor, PHF	0.90	0.90	0.90	0.94	0.94	0.94	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	143	78	29	447	85	364	34	1044	486	353	1005	72
RTOR Reduction (vph)	0	4	0	0	0	130	0	0	311	0	0	16
Lane Group Flow (vph)	0	246	0	259	273	234	34	1044	175	353	1005	56
Turn Type	Split	Split	Split	pm+ov	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Perm
Protected Phases	8	8	8	4	4	5	1	6	5	5	2	2
Permitted Phases	20.4	20.4	23.0	23.0	40.3	4.8	43.3	43.3	17.3	55.8	55.8	55.8
Actuated Green, G (s)	20.4	20.4	23.0	23.0	40.3	4.8	43.3	43.3	17.3	55.8	55.8	55.8
Effective Green, g (s)	0.17	0.17	0.19	0.19	0.34	0.04	0.36	0.36	0.14	0.46	0.46	0.46
Actuated g/C Ratio	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	303	322	328	532	71	1835	571	495	1646	736		
Lane Grp Cap (vph)	c0.14	0.15	c0.16	0.06	0.02	c0.21						
v/s Ratio Prot	0.81	0.80	0.83	0.44	0.48	0.57	0.31	0.71	0.61	0.08		
v/c Ratio	47.9	46.3	46.6	31.1	56.4	30.8	27.6	49.0	24.0	17.8		
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.49
Progression Factor	15.1	13.5	16.3	0.6	5.0	1.3	1.4	3.7	1.3	0.2		
Incremental Delay, d2	63.0	59.9	63.0	31.6	61.4	32.1	29.0	38.3	19.9	8.8		
Delay (s)	E	E	E	C	E	C	C	C	D	B	A	A
Level of Service	E	E	E	C	E	C	C	C	D	B	A	A
Approach Delay (s)	63.0	49.3					31.8			23.9		
Approach LOS	E	D					C			C		
Intersection Summary												
HCM Average Control Delay	34.7											
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	63.3%											
Analysis Period (min)	15											
c	Critical Lane Group											

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
5: Riverstone Parkway & I - 575 Northbound Ramp

Base SAT - Improved
12/28/2006

	EBL	EBT	WBT	WBR	NBL	NBR	
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR	
Lane Group Flow (vph)	338	1282	1609	153	948	846	
v/c Ratio	0.99	0.56	0.99	0.10	0.97	0.76	
Control Delay	74.2	2.8	53.1	0.1	66.2	8.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	74.2	2.8	53.1	0.1	66.2	8.7	
Queue Length 50th (ft)	172	8	635	0	375	52	
Queue Length 95th (ft) m#333	333	9	#816	0	#512	217	
Internal Link Dist (ft)	1330	1370					
Turn Bay Length (ft)	370		300	490			
Base Capacity (vph)	343	2300	1622	1583	973	1120	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.99	0.56	0.99	0.10	0.97	0.76	
Intersection Summary							
#	95th percentile volume exceeds capacity, queue may be longer.						
m	Queue shown is maximum after two cycles.						
	Volume for 95th percentile queue is metered by upstream signal.						

HCM Signalized Intersection Capacity Analysis
5: Riverstone Parkway & I - 575 Northbound Ramp

Base SAT - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	1.00	0.95		0.95	1.00	0.97	1.00	0.97	1.00			
Flt	1.00	1.00		1.00	0.85	1.00	0.85	1.00	0.85			
Flt Protected	0.95	1.00		1.00	1.00	0.95	1.00	0.95	1.00			
Satd. Flow (prot)	1770	3539		3539	1583	3433	1583					
Flt Permitted	0.07	1.00		1.00	1.00	0.95	1.00					
Satd. Flow (perm)	126	3539		3539	1583	3433	1583					
Volume (vph)	321	1218	0	0	1593	151	920	0	821	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.99	0.99	0.99	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	338	1282	0	0	1609	153	948	0	846	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	394	0	0	0
Lane Group Flow (vph)	338	1282	0	0	1609	153	948	0	452	0	0	0
Turn Type	pm+pt											
Protected Phases	1	6			2				Free custom			custom
Permitted Phases	6					Free	4			2		
Actuated Green, G (s)	78.0	78.0			55.0	120.0	34.0		55.0			
Effective Green, g (s)	78.0	78.0			55.0	120.0	34.0		55.0			
Actuated g/C Ratio	0.65	0.65			0.46	1.00	0.28		0.46			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	342	2300			1622	1583	973		726			
v/s Ratio Prot	c0.16	0.36			0.45							
v/s Ratio Perm	c0.48					0.10	c0.28		0.29			
v/c Ratio	0.99	0.56			0.99	0.10	0.97		0.62			
Uniform Delay, d1	40.8	11.5			32.3	0.0	42.6		24.6			
Progression Factor	1.13	0.19			1.00	1.00	1.00		1.00			
Incremental Delay, d2	34.4	0.6			20.5	0.1	22.6		4.0			
Delay (s)	80.7	2.8			52.8	0.1	65.2		28.6			
Level of Service	F	A			D	A	E		C			
Approach Delay (s)	19.1				48.2		47.9		D		0.0	
Approach LOS	B				D		D		D		A	
Intersection Summary												
HCM Average Control Delay					39.0	HCM Level of Service				D		
HCM Volume to Capacity ratio					0.97							
Actuated Cycle Length (s)					120.0	Sum of lost time (s)				8.0		
Intersection Capacity Utilization					98.1%	ICU Level of Service				F		
Analysis Period (min)					15							
Critical Lane Group												

Lanes, Volumes, Timings
9: Riverstone Parkway & Waleska Road

Base SAT - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	416	919	156	386	897	211	174	174	488	260	240	428
v/c Ratio	0.70	0.62	0.10	0.81	0.71	0.32	0.69	0.68	0.80	0.80	0.73	0.58
Control Delay	24.5	15.2	0.1	26.2	15.3	2.0	50.0	62.1	17.0	52.9	57.9	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	15.2	0.1	26.2	15.3	2.0	50.0	62.1	17.0	52.9	57.9	15.6
Queue Length 50th (ft)	111	124	0	65	108	1	106	129	24	172	174	157
Queue Length 95th (ft) m#255	182	m0	#365	96	9	160	196	142	220	244	210	
Internal Link Dist (ft)	1240			3515			1145			4852		
Turn Bay Length (ft)	150	150	150	150	150	150	160		80		90	
Base Capacity (vph)	592	1489	1583	517	1259	651	251	342	660	328	419	733
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.62	0.10	0.75	0.71	0.32	0.69	0.51	0.74	0.79	0.57	0.58

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
9: Riverstone Parkway & Waleska Road

Base SAT - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	0.85	1.00	0.85	1.00	1.00	0.85	1.00	0.85	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	1770	1863	1583	1770	1863	1583
Flt Permitted	0.32	1.00	1.00	0.21	1.00	1.00	0.37	1.00	1.00	0.30	1.00	1.00
Satd. Flow (perm)	591	3539	1583	382	3539	1583	696	1863	1583	554	1863	1583
Volume (vph)	404	891	151	371	861	203	169	169	473	224	206	368
Peak-hour factor, PHF	0.97	0.97	0.97	0.96	0.96	0.96	0.97	0.97	0.97	0.86	0.86	0.86
Adj. Flow (vph)	416	919	156	386	897	211	174	174	488	260	240	428
RTOR Reduction (vph)	0	0	0	0	0	0	88	0	0	391	0	42
Lane Group Flow (vph)	416	919	156	386	897	123	174	174	97	260	240	386
Turn Type	pm+pt	Free	pm+pt	Free	pm+pt	Free	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	1	6	5	2	7	4	7	4	3	8	1	8
Permitted Phases	6	Free	2	2	4	4	2	4	4	8	8	8
Actuated Green, G (s)	50.5	50.5	120.0	42.7	42.7	42.7	25.5	16.5	16.5	34.3	21.3	52.3
Effective Green, g (s)	50.5	50.5	120.0	42.7	42.7	42.7	25.5	16.5	16.5	34.3	21.3	52.3
Actuated g/C Ratio	0.42	0.42	1.00	0.36	0.36	0.36	0.21	0.14	0.14	0.29	0.18	0.44
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	553	1489	1583	404	1259	563	228	256	218	298	331	690
v/s Ratio Prot	c0.19	0.26	c0.18	0.25	0.06	0.09	0.06	0.09	c0.10	0.13	0.14	0.14
v/s Ratio Perm	0.12	0.10	c0.16	0.25	0.08	0.10	0.08	0.10	0.06	c0.15	0.10	0.10
v/c Ratio	0.75	0.62	0.10	0.96	0.71	0.22	0.76	0.68	0.45	0.87	0.73	0.56
Uniform Delay, d1	30.7	27.2	0.0	33.6	33.4	27.0	42.3	49.2	47.6	37.2	46.6	25.2
Progression Factor	0.52	0.46	1.00	0.38	0.35	0.07	1.00	1.00	1.00	0.99	0.99	0.99
Incremental Delay, d2	4.9	1.7	0.1	30.8	3.1	0.8	14.0	7.0	1.5	22.3	7.3	0.9
Delay (s)	20.9	14.1	0.1	43.4	14.7	2.7	56.3	56.2	49.0	59.1	53.5	25.9
Level of Service	C	B	A	D	B	A	E	E	D	E	D	C
Approach Delay (s)	14.5			20.4			52.0			42.3		
Approach LOS	B			C			D			D		

Intersection Summary

HCM Average Control Delay 28.4 HCM Level of Service C
HCM Volume to Capacity ratio 0.83
Actuated Cycle Length (s) 120.0 Sum of lost time (s) 8.0
Intersection Capacity Utilization 80.8% ICU Level of Service D
Analysis Period (min) 15
c Critical Lane Group

Lanes, Volumes, Timings
11: Reinhardt College Parkway & College Street

Base SAT - Improved
12/28/2006

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	399	418	176	83
v/c Ratio	0.29	0.31	0.73	0.57
Control Delay	4.3	1.6	58.9	62.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.3	1.6	58.9	62.3
Queue Length 50th (ft)	67	24	115	61
Queue Length 95th (ft)	131	1	158	107
Internal Link Dist (ft)	952	6443	4497	4161
Turn Bay Length (ft)			150	
Base Capacity (vph)	1372	1344	660	426
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.29	0.31	0.27	0.19
Intersection Summary				

HCM Signalized Intersection Capacity Analysis
11: Reinhardt College Parkway & College Street

Base SAT - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	0.99	0.99	0.98	0.98	0.99	0.96	0.99	0.95	1.00	0.92	0.92
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.95	1.00	0.95	0.95
Satd. Flow (prot)	1840	1840	1840	1813	1813	1813	1771	1771	1770	1705	1705	1705
Flt Permitted	0.93	0.93	0.92	0.92	0.92	0.92	0.83	0.83	0.33	1.00	0.33	1.00
Satd. Flow (perm)	1714	1714	1677	1677	1677	1677	1468	1468	613	1705	613	1705
Volume (vph)	39	310	18	45	287	61	23	76	44	74	54	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.81	0.81	0.81	0.89	0.89	0.89
Adj. Flow (vph)	42	337	20	48	305	65	28	94	54	83	61	79
RTOR Reduction (vph)	0	1	0	0	2	0	0	19	0	0	0	55
Lane Group Flow (vph)	0	398	0	0	416	0	0	157	0	83	85	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	2	2	2	2	4	4	4	8	8	8
Permitted Phases	6	6	2	2	2	2	4	4	4	8	8	8
Actuated Green, G (s)	96.2	96.2	96.2	96.2	96.2	96.2	15.8	15.8	15.8	15.8	15.8	15.8
Effective Green, g (s)	96.2	96.2	96.2	96.2	96.2	96.2	15.8	15.8	15.8	15.8	15.8	15.8
Actuated g/C Ratio	0.80	0.80	0.80	0.80	0.80	0.80	0.13	0.13	0.13	0.13	0.13	0.13
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1374	1374	1344	1344	1344	1344	193	193	81	224	224	224
v/s Ratio Prot												
v/s Ratio Perm	0.23	0.23	0.25	0.25	0.25	0.25	0.11	0.11	0.14	0.05	0.05	0.05
v/c Ratio	0.29	0.29	0.31	0.31	0.31	0.31	0.81	0.81	1.02	0.38	0.38	0.38
Uniform Delay, d1	3.1	3.1	3.1	3.1	3.1	3.1	50.7	50.7	52.1	47.6	47.6	47.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.97	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.5	0.5	0.5	0.5	0.5	22.3	22.3	106.9	1.1	1.1	1.1
Delay (s)	3.6	3.6	3.6	3.6	3.6	3.6	71.5	71.5	159.0	48.7	48.7	48.7
Level of Service	A	A	A	A	A	A	E	E	F	D	D	D
Approach Delay (s)	3.6	3.6	3.6	3.6	3.6	3.6	71.5	71.5	89.8	89.8	89.8	89.8
Approach LOS	A	A	A	A	A	A	E	E	F	F	F	F
Intersection Summary												
HCM Average Control Delay	28.5				HCM Level of Service				C			
HCM Volume to Capacity ratio	0.41											
Actuated Cycle Length (s)	120.0				Sum of lost time (s)				8.0			
Intersection Capacity Utilization	53.9%				ICU Level of Service				A			
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
12: Knox Bridge Highway & Fincher Road

Base SAT - Improved
12/28/2006

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	91	432	22	510	41	151
Lane Group Flow (vph)	0.16	0.28	0.03	0.34	0.21	0.75
v/c Ratio	3.5	3.3	2.8	3.5	27.1	54.0
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.5	3.3	2.8	3.5	27.1	54.0
Queue Length 50th (ft)	10	54	2	66	12	75
Queue Length 95th (ft)	32	123	10	155	41	140
Internal Link Dist (ft)	1486	1519	3460	3239		
Turn Bay Length (ft)	640	60				
Base Capacity (vph)	562	1538	651	1506	594	572
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.28	0.03	0.34	0.07	0.26
Intersection Summary						

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HCM Signalized Intersection Capacity Analysis
12: Knox Bridge Highway & Fincher Road

Base SAT - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	1.00	1.00	1.00	0.98	0.92	0.99	0.98	0.98	0.98	0.98
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.99	0.99	0.99	0.99	0.98	0.98	0.98
Satd. Flow (prot)	1770	1856	1770	1816	1816	1695	1695	1695	1695	1701	1701	1701
Flt Permitted	0.46	1.00	0.50	1.00	1.00	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Satd. Flow (perm)	849	1856	928	1816	1816	1502	1502	1502	1502	1521	1521	1521
Volume (vph)	80	371	9	21	408	82	9	6	21	59	11	71
Peak-hour factor, PHF	0.88	0.88	0.88	0.96	0.96	0.96	0.86	0.86	0.86	0.93	0.93	0.93
Adj. Flow (vph)	91	422	10	22	425	85	10	7	24	63	12	76
RTOR Reduction (vph)	0	0	0	0	2	0	0	21	0	0	42	0
Lane Group Flow (vph)	91	432	0	22	508	0	0	20	0	0	109	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	2	2	4	4	4	4	4	8	8	8
Permitted Phases	6	6	2	2	4	4	4	4	4	8	8	8
Actuated Green, G (s)	99.4	99.4	99.4	99.4	99.4	99.4	12.6	12.6	12.6	12.6	12.6	12.6
Effective Green, g (s)	99.4	99.4	99.4	99.4	99.4	99.4	12.6	12.6	12.6	12.6	12.6	12.6
Actuated g/C Ratio	0.83	0.83	0.83	0.83	0.83	0.83	0.10	0.10	0.10	0.10	0.10	0.10
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	703	1537	769	1504	1504	1504	158	158	158	160	160	160
v/s Ratio Prot	0.11	0.23	0.02	0.02	0.02	0.01	0.01	0.01	0.01	c0.07	c0.07	c0.07
v/c Ratio	0.13	0.28	0.03	0.34	0.34	0.12	0.12	0.12	0.12	0.68	0.68	0.68
Uniform Delay, d1	2.0	2.3	1.8	2.5	2.5	48.7	51.8	51.8	51.8	51.8	51.8	51.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.92	0.92
Incremental Delay, d2	0.4	0.5	0.1	0.6	0.6	0.4	0.4	0.4	0.4	11.2	11.2	11.2
Delay (s)	2.4	2.8	1.9	3.1	3.1	49.0	58.6	58.6	58.6	58.6	58.6	58.6
Level of Service	A	A	A	A	A	D	D	D	D	E	E	E
Approach Delay (s)	2.7	2.7	3.0	3.0	3.0	58.6	58.6	58.6	58.6	58.6	58.6	58.6
Approach LOS	A	A	A	A	A	D	D	D	D	E	E	E
Intersection Summary												
HCM Average Control Delay	11.1											
HCM Volume to Capacity ratio	0.38											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	54.7%											
Analysis Period (min)	15											
c Critical Lane Group												

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Lanes, Volumes, Timings	Base SAT - Improved
13: N Etowah Drive & Riverstone Parkway	12/28/2006

Improved
12/28/2006

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	14	46	13	12	42	1630	12	9	1460	9
Intersection Summary										

HCM Unsignalized Intersection Capacity Analysis	Base SAT - Improved
13: N Etowah Drive & Riverstone Parkway	12/28/2006

Base SAT - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	12	0	39	9	0	8	38	1487	11	9	1416	9
Peak Hour Factor	0.85	0.85	0.85	0.69	0.69	0.69	0.90	0.90	0.90	0.97	0.97	0.97
Hourly flow rate (vph)	14	0	46	13	0	12	42	1630	12	9	1460	9
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			6			6						
Median type												
Median storage (veh)		None			None							
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	2378	3205	730	2463	3202	815	1469			1642		
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCu, unblocked vol	2378	3205	730	2463	3202	815	1469			1642		
Tc, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	11	100	87	0	100	96	91			98		
cM capacity (veh/h)	16	9	365	12	9	321	455			390		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	60	25	42	815	815	12	9	730	730	9		
Volume Left	14	13	42	0	0	0	9	0	0	0		
Volume Right	46	12	0	0	0	0	12	0	0	0		
cSH	68	23	455	1700	1700	1700	390	1700	1700	1700		
Volume to Capacity	0.89	1.05	0.09	0.48	0.48	0.01	0.02	0.43	0.43	0.01		
Queue Length 95th (ft)	107	78	8	0	0	0	2	0	0	0		
Control Delay (s)	131.7	366.1	13.7	0.0	0.0	0.0	14.5	0.0	0.0	0.0		
Lane LOS	F	F	B				B					
Approach Delay (s)	131.7	366.1	0.3				0.1					
Approach LOS	F	F										
Intersection Summary												
Average Delay	5.4										B	
Intersection Capacity Utilization	57.2%											
Analysis Period (min)	15											

Lanes, Volumes, Timings
15: Bells Ferry Road & Marietta Highway

Base SAT - Improved
12/28/2006

	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group	305	141	361	28	609	98	609	211
Lane Group Flow (vph)	0.94	0.20	0.54	0.12	0.59	0.43	0.59	0.22
v/c Ratio	72.5	22.2	7.2	18.4	22.7	26.9	22.7	2.9
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	72.5	22.2	7.2	18.4	22.7	26.9	22.7	2.9
Total Delay	220	66	79	10	309	44	309	0
Queue Length 50th (ft)	352	99	m88	32	495	113	495	41
Queue Length 95th (ft)	1761	266		463			416	
Internal Link Dist (ft)	150			150			150	250
Turn Bay Length (ft)	395	841	800	228	1037	228	1039	976
Base Capacity (vph)	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.17	0.45	0.12	0.59	0.43	0.59	0.22

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

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HCM Signalized Intersection Capacity Analysis
15: Bells Ferry Road & Marietta Highway

Base SAT - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flt	1.00	0.98		1.00	0.92		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.99			0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1825		1699			1770	1859		1770	1863	1583
Flt Permitted	0.42	1.00		0.96			0.28	1.00		0.28	1.00	1.00
Satd. Flow (perm)	774	1825		1637			529	1859		529	1863	1583
Volume (vph)	284	113	18	35	95	210	27	570	9	92	572	198
Peak-hour factor, PHF	0.93	0.93	0.93	0.94	0.94	0.94	0.95	0.95	0.95	0.94	0.94	0.94
Adj. Flow (vph)	305	122	19	37	101	223	28	600	9	98	609	211
RTOR Reduction (vph)	0	6	0	0	56	0	0	0	0	0	0	93
Lane Group Flow (vph)	305	135	0	0	305	0	28	609	0	98	609	118
Turn Type	Perm	Perm		Perm	Perm		Perm	Perm		Perm	Perm	Perm
Protected Phases	8	8		4	4		6	6		2	2	2
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	45.1	45.1		45.1			66.9	66.9		66.9	66.9	66.9
Effective Green, g (s)	45.1	45.1		45.1			66.9	66.9		66.9	66.9	66.9
Actuated g/C Ratio	0.38	0.38		0.38			0.56	0.56		0.56	0.56	0.56
Clearance Time (s)	4.0	4.0		4.0			4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0			3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	291	686		615			295	1036		295	1039	883
v/s Ratio Prot		0.07						c0.33			0.33	
v/s Ratio Perm	c0.39			0.19			0.05			0.19		0.07
v/c Ratio	1.05	0.20		0.50			0.09	0.59		0.33	0.59	0.13
Uniform Delay, d1	37.4	25.2		28.7			12.4	17.5		14.4	17.5	12.7
Progression Factor	1.00	1.00		0.23			1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	65.9	0.1		0.6			0.6	2.4		3.0	2.4	0.3
Delay (s)	103.4	25.4		7.0			13.0	19.9		17.4	19.9	13.0
Level of Service	F	C		A			B	B		B	B	B
Approach Delay (s)		78.7		7.0				19.6			18.0	
Approach LOS		E		A				B			B	
Intersection Summary												
HCM Average Control Delay			28.2									C
HCM Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			120.0								8.0	
Intersection Capacity Utilization			84.5%								E	
Analysis Period (min)			15									
c Critical Lane Group												

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Future AM Intersection Analysis

Future 2020 AM

Lanes, Volumes, Timings
1: Cumming Highway & I -575 Northbound Ramp

Future AM
12/28/2006



Lane Group	EBL	EBT	WBT	WBR	NBR	SBR
Lane Group Flow (vph)	231	458	1379	438	886	398
Act Effct Green (s)	116.0	120.0	98.6	98.6	98.6	120.0
Actuated g/C Ratio	0.97	1.00	0.82	0.82	0.82	1.00
v/c Ratio	0.60	0.13	0.47	0.32	0.36	0.25
Control Delay	12.3	0.0	4.1	0.9	0.4	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.3	0.0	4.1	0.9	0.4	0.4
LOS	B	A	A	A	A	A
Approach Delay	4.1 3.4					
Approach LOS	A					
Queue Length 50th (ft)	86	0	121	0	0	0
Queue Length 95th (ft)	m107	m0	225	21	0	0
Internal Link Dist (ft)	1047 677					
Turn Bay Length (ft)	150	325				
Base Capacity (vph)	704	3539	2909	1379	2481	1611
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.13	0.47	0.32	0.36	0.25

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 25 (21%), Referenced to phase 2:WBT and 6:EBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 2.5
Intersection Capacity Utilization 67.2%
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Baseline
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HCM Signalized Intersection Capacity Analysis
1: Cumming Highway & I -575 Northbound Ramp

Future AM
12/28/2006



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.85		1.00	0.86	
Flt Protected	0.95	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Satd. Flow (prot)	1770	3539		3539	1583		2787			2787	1611	
Flt Permitted	0.17	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Satd. Flow (perm)	314	3539		3539	1583		2787			2787	1611	
Volume (vph)	224	444	0	0	1324	420	0	0	815	0	0	386
Peak-hour factor, PHF	0.97	0.97	0.97	0.96	0.96	0.96	0.92	0.92	0.92	0.97	0.97	0.97
Adj. Flow (vph)	231	458	0	0	1379	438	0	0	886	0	0	398
RTOR Reduction (vph)	0	0	0	0	0	78	0	0	158	0	0	0
Lane Group Flow (vph)	231	458	0	0	1379	360	0	0	728	0	0	398
Turn Type	pm+pt Perm custom custom											
Protected Phases	1	6		2					2			6
Permitted Phases	6											
Actuated Green, G (s)	116.0	120.0		98.6	98.6				98.6			120.0
Effective Green, g (s)	116.0	120.0		98.6	98.6				98.6			120.0
Actuated g/C Ratio	0.97	1.00		0.82	0.82				0.82			1.00
Clearance Time (s)	4.0	4.0		4.0	4.0				4.0			4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0				3.0			3.0
Lane Grp Cap (vph)	466	3539		2908	1301				2290			1611
v/s Ratio Prot	c0.06	0.13		0.39	0.23				0.26			0.25
v/s Ratio Perm	c0.42								0.32			0.25
v/c Ratio	0.50	0.13		0.47	0.28				0.26			0.25
Uniform Delay, d1	2.4	0.0		3.1	2.5				2.6			0.0
Progression Factor	1.17	1.00		1.00	1.00				1.00			1.00
Incremental Delay, d2	0.4	0.0		0.6	0.5				0.4			0.4
Delay (s)	3.3	0.0		3.7	3.0				2.9			0.4
Level of Service	A	A		A	A				A			A
Approach Delay (s)	1.1 3.5 2.9 0.4											
Approach LOS	A A											

Intersection Summary

HCM Average Control Delay	2.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Baseline
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	368	173	1762	322	314			
Act Effct Green (s)	16.0	120.0	67.7	24.3	16.0			
Actuated g/C Ratio	0.13	1.00	0.56	0.20	0.13			
v/c Ratio	0.78	0.11	0.88	0.90	0.65			
Control Delay	48.3	0.1	20.3	74.2	12.1			
Queue Delay	0.0	0.0	0.0	0.0	0.0			
Total Delay	48.3	0.1	20.3	74.2	12.1			
LOS	D	A	C	E	B			
Approach Delay	32.9		20.3					
Approach LOS	C		C					
Queue Length 50th (ft)	147	0	285	241	0			
Queue Length 95th (ft)	m173	m0	302	#394	87			
Internal Link Dist (ft)	2177		1047					
Turn Bay Length (ft)	150							
Base Capacity (vph)	472	1583	2011	384	483			
Starvation Cap Reductn	0	0	0	0	0			
Spillback Cap Reductn	0	0	0	0	0			
Storage Cap Reductn	0	0	0	0	0			
Reduced v/c Ratio	0.78	0.11	0.88	0.84	0.65			

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 1 (1%), Referenced to phase 2:WBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 27.7
Intersection Capacity Utilization 76.2%
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR
Lane Configurations	↔↔	↔↔	↔	↔↔	↔↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.85	0.95	0.92	1.00	0.85	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3539	1583	3246	3246	1770	1770	1583	3539
Flt Permitted	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3246	3246	1770	1770	1583	3539
Volume (vph)	0	346	163	0	773	954	0	290
Peak-hour factor, PHF	0.94	0.94	0.94	0.98	0.98	0.92	0.92	0.90
Adj. Flow (vph)	0	368	173	0	789	973	0	322
RTOR Reduction (vph)	0	0	0	0	180	0	0	0
Lane Group Flow (vph)	0	368	173	0	1582	0	0	322
Turn Type		Free	Free		Prot	Prot	Prot	custom
Protected Phases		6	2		1			
Permitted Phases		Free	Free		1			
Actuated Green, G (s)	16.0	120.0	67.7	24.3	16.0	24.3	16.0	6
Effective Green, g (s)	16.0	120.0	67.7	24.3	16.0	24.3	16.0	6
Actuated g/C Ratio	0.13	1.00	0.56	0.20	0.13	0.20	0.13	0.13
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	472	1583	1831	358	211	358	211	472
v/s Ratio Prot	c0.10		c0.49	c0.18		c0.18		c0.10
v/s Ratio Perm		0.11	0.11		0.11		0.11	
v/c Ratio	0.78	0.11	0.86	0.90	0.20	0.90	0.20	0.78
Uniform Delay, d1	50.3	0.0	22.2	46.7	46.3	46.7	46.3	50.3
Progression Factor	0.82	1.00	0.84	1.00	1.00	1.00	1.00	0.82
Incremental Delay, d2	6.4	0.1	5.3	2.1	2.1	2.1	2.1	6.4
Delay (s)	47.8	0.1	24.0	70.8	48.4	70.8	48.4	54.2
Level of Service	D	A	C	C	E	E	D	D
Approach Delay (s)	32.5		24.0		59.7			32.5
Approach LOS	C		C		E			C

Intersection Summary

HCM Average Control Delay	33.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	25	173	651	716	448	435
Act Effct Green (s)	23.1	23.1	23.1	62.9	88.9	88.9
Actuated g/C Ratio	0.19	0.19	0.19	0.52	0.74	0.74
v/c Ratio	0.11	0.65	0.93	0.75	0.75	0.32
Control Delay	31.4	54.8	31.8	25.2	20.8	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.4	54.8	31.8	25.2	20.8	2.7
LOS	C	D	C	C	C	A
Approach Delay	31.4		36.7	25.2		11.8
Approach LOS	C		D	C		B
Queue Length 50th (ft)	13	123	136	343	122	41
Queue Length 95th (ft)	23	187	#353	m459	m195	m52
Internal Link Dist (ft)	95		1440	3002		1058
Turn Bay Length (ft)	150				90	
Base Capacity (vph)	298	357	774	950	596	1377
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.48	0.84	0.75	0.75	0.32

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 76 (63%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 24.3
Intersection Capacity Utilization 107.1%
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.97	0.97	0.97	1.00	0.85	1.00	0.96	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.99	0.99	0.99	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1795	1795	1795	1770	1591	1770	1795	1795	1770	1860	1770	1860
Flt Permitted	0.58	0.58	0.58	0.74	1.00	0.74	1.00	1.00	0.30	1.00	0.30	1.00
Satd. Flow (perm)	1058	1058	1058	1380	1591	1380	1793	1793	557	1860	557	1860
Volume (vph)	3	9	3	157	17	575	3	495	182	421	404	5
Peak-hour factor, PHF	0.62	0.62	0.62	0.91	0.91	0.91	0.95	0.95	0.95	0.94	0.94	0.94
Adj. Flow (vph)	5	15	5	173	19	632	3	521	192	448	430	5
RTOR Reduction (vph)	0	4	0	0	0	395	0	10	0	0	0	0
Lane Group Flow (vph)	0	21	0	173	256	0	0	706	0	448	435	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	8	8	8	4	4	6	6	6	5	2	5	2
Permitted Phases	8	8	8	4	4	6	6	6	5	2	5	2
Actuated Green, G (s)	23.1	23.1	23.1	23.1	23.1	62.9	62.9	62.9	88.9	88.9	88.9	88.9
Effective Green, g (s)	23.1	23.1	23.1	23.1	23.1	62.9	62.9	62.9	88.9	88.9	88.9	88.9
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19	0.52	0.52	0.52	0.74	0.74	0.74	0.74
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	204	204	204	266	306	940	940	940	635	1378	635	1378
v/s Ratio Prot	0.02	0.02	0.02	0.13	0.16	0.39	0.39	0.39	0.13	0.23	0.13	0.23
v/s Ratio Perm	0.10	0.10	0.10	0.65	0.84	0.75	0.75	0.75	0.39	0.32	0.39	0.32
Uniform Delay, d1	39.9	39.9	39.9	44.7	46.6	22.4	22.4	22.4	21.9	5.3	21.9	5.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	0.83	0.83	0.83	0.70	0.36	0.70	0.36
Incremental Delay, d2	0.2	0.2	0.2	5.6	17.7	4.7	4.7	4.7	2.0	0.3	2.0	0.3
Delay (s)	40.1	40.1	40.1	50.3	64.4	23.3	23.3	23.3	17.2	2.2	17.2	2.2
Level of Service	D	D	D	D	E	C	C	C	B	A	B	A
Approach Delay (s)	40.1	40.1	40.1	61.4	61.4	23.3	23.3	23.3	9.8	9.8	9.8	9.8
Approach LOS	D	D	D	E	E	C	C	C	A	A	A	A
Intersection Summary												
HCM Average Control Delay	31.4											
HCM Volume to Capacity ratio	0.74											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	107.1%											
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
4: Big K-Mart Driveway & Marietta Highway

Future AM
12/28/2006

	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	202	670	954	8	1464	571	961	1516	24
Act Effct Green (s)	15.4	27.0	27.0	6.1	30.6	30.6	31.0	63.3	63.3
Actuated g/C Ratio	0.13	0.22	0.22	0.05	0.26	0.26	0.26	0.53	0.53
v/c Ratio	0.86	1.68	1.20	0.09	1.62	0.88	2.10	0.81	0.03
Control Delay	82.9	345.5	119.7	56.1	316.6	35.1	524.8	22.2	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.9	345.5	119.7	56.1	316.6	35.1	524.8	22.2	9.0
LOS	F	F	F	E	F	D	F	C	A
Approach Delay	82.9	212.8			236.9			215.2	
Approach LOS	F	F			F			F	
Queue Length 50th (ft)	153	~757	~536	6	~866	202	~1192	464	3
Queue Length 95th (ft)	178	#915	#688	23	#1005	#422m#1109	m#513	m#9	
Internal Link Dist (ft)	162	491			2132			4585	
Turn Bay Length (ft)	243	400	795	118	902	646	457	1867	839
Base Capacity (vph)	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	1.68	1.20	0.07	1.62	0.88	2.10	0.81	0.03

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 12 (10%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 2.10

Intersection Signal Delay: 217.4

Intersection Capacity Utilization 134.0%

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

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HCM Signalized Intersection Capacity Analysis
4: Big K-Mart Driveway & Marietta Highway

Future AM
12/28/2006

	EBT	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	1810	1779	1583	1779	1583	1779	1583	1779	1583	1779	1583	1583
Flt Permitted	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (perm)	1810	1779	1583	1779	1583	1779	1583	1779	1583	1779	1583	1583
Volume (vph)	61	73	8	534	36	811	8	1391	542	855	1349	21
Peak-hour factor, PHF	0.70	0.70	0.70	0.85	0.85	0.85	0.95	0.95	0.95	0.89	0.89	0.89
Adj. Flow (vph)	87	104	11	628	42	954	8	1464	571	961	1516	24
RTOR Reduction (vph)	0	2	0	0	0	439	0	0	252	0	0	3
Lane Group Flow (vph)	0	200	0	0	670	515	8	1464	319	961	1516	21
Turn Type	Split	Split	Split	Split	Split	Split	Prot	Prot	Prot	Prot	Prot	Perm
Protected Phases	8	8	8	4	4	4	1	6	6	5	2	2
Permitted Phases	15.4	15.4	15.4	27.0	27.0	27.0	1.5	27.4	27.4	34.2	60.1	60.1
Actuated Green, G (s)	15.4	15.4	15.4	27.0	27.0	27.0	1.5	27.4	27.4	34.2	60.1	60.1
Effective Green, g (s)	0.13	0.13	0.13	0.22	0.22	0.22	0.01	0.23	0.23	0.29	0.50	0.50
Actuated g/C Ratio	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	232	400	356	22	808	361	504	1772	793			
Lane Grp Cap (vph)	c0.11			c0.38								
v/s Ratio Prot	0.86	1.68	1.45	0.36	1.81	0.88	1.91	0.86	0.03			
v/c Ratio	51.3	46.5	46.5	58.8	46.3	44.8	42.9	26.2	15.1			
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88	0.78	0.72	
Progression Factor	26.5	314.5	216.6	9.9	370.3	25.6	412.8	3.6	0.0			
Incremental Delay, d2	77.8	361.0	263.1	68.7	416.6	70.4	450.5	24.0	11.0			
Delay (s)	E	F	F	F	F	F	E	F	E	F	C	B
Level of Service	E	F	F	F	F	F	E	F	E	F	C	B
Approach Delay (s)	77.8			303.5			318.4		187.8			
Approach LOS	E			F			F		F			

Intersection Summary

HCM Average Control Delay 255.7 HCM Level of Service F

HCM Volume to Capacity ratio 1.67

Actuated Cycle Length (s) 120.0 Sum of lost time (s) 16.0

Intersection Capacity Utilization 134.0% ICU Level of Service H

Analysis Period (min) 15

c Critical Lane Group

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Lanes, Volumes, Timings
5: Riverstone Parkway & I - 575 Northbound Ramp

Future AM
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	EBL	EBT	WBT	WBR	NBL	NBR	
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR	
Lane Group Flow (vph)	515	593	749	80	816	519	
Act Effct Green (s)	78.8	78.8	42.2	120.0	33.2	33.2	
Actuated g/C Ratio	0.66	0.66	0.35	1.00	0.28	0.28	
v/c Ratio	0.90	0.26	0.60	0.05	0.86	0.77	
Control Delay	41.5	1.8	36.6	0.1	51.2	22.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	41.5	1.8	36.6	0.1	51.2	22.2	
LOS	D	A	D	A	D	C	
Approach Delay	20.3 33.1						
Approach LOS	C C						
Queue Length 50th (ft)	286	2	258	0	302	135	
Queue Length 95th (ft)	181	20	355	0	380	278	
Internal Link Dist (ft)	1330 1370						
Turn Bay Length (ft)	370	300 490					
Base Capacity (vph)	665	2324	1246	1583	1001	695	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.77	0.26	0.60	0.05	0.82	0.75	
Intersection Summary							
Cycle Length: 120							
Actuated Cycle Length: 120							
Offset: 58 (48%), Referenced to phase 2:WBT and 6:EBTL, Start of Green							
Control Type: Actuated-Coordinated							
Maximum v/c Ratio: 0.90							
Intersection Signal Delay: 31.5							
Intersection Capacity Utilization 79.0%							
Analysis Period (min) 15							
Intersection LOS: C							
ICU Level of Service D							

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HCM Signalized Intersection Capacity Analysis
5: Riverstone Parkway & I - 575 Northbound Ramp

Future AM
12/28/2006

Movement	EBL	EBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00
Flt	1.00	1.00	1.00	1.00	0.85	1.00	0.85	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	3539	3539	1583	3433	3433	1583	1583	1583	1583
Flt Permitted	0.19	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	361	3539	3539	1583	3433	3433	1583	1583	1583	1583
Volume (vph)	484	557	0	0	719	77	783	0	498	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.96	0.96	0.96	0.96	0.96	0.92	0.92
Adj. Flow (vph)	515	593	0	0	749	80	816	0	519	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	238	0
Lane Group Flow (vph)	515	593	0	0	749	80	816	0	281	0
Turn Type	pm+pt		Free custom							
Protected Phases	1	6	2		custom					
Permitted Phases	6	Free								
Actuated Green, G (s)	78.8	78.8	42.2		120.0		33.2		33.2	
Effective Green, g (s)	78.8	78.8	42.2		120.0		33.2		33.2	
Actuated g/C Ratio	0.66	0.66	0.35		1.00		0.28		0.28	
Clearance Time (s)	4.0	4.0	4.0		4.0		4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	620	2324	1245		1583		950		438	
v/s Ratio Prot	c0.23	0.17	0.21							
v/s Ratio Perm	c0.32	0.05 c0.24								
v/c Ratio	0.83	0.26	0.60		0.05		0.86		0.64	
Uniform Delay, d1	22.6	8.5	32.0		0.0		41.2		38.2	
Progression Factor	0.87	0.18	1.00		1.00		1.00		1.00	
Incremental Delay, d2	7.8	0.2	2.2		0.1		7.8		3.2	
Delay (s)	27.4	1.8	34.1		0.1		49.0		41.4	
Level of Service	C	A	C		A		D		D	
Approach Delay (s)	13.7		30.9							
Approach LOS	B		C							
Intersection Summary										
HCM Average Control Delay	31.2		HCM Level of Service							
HCM Volume to Capacity ratio	0.83		C							
Actuated Cycle Length (s)	120.0		Sum of lost time (s)							
Intersection Capacity Utilization	79.0%		ICU Level of Service							
Analysis Period (min)	15		D							
Critical Lane Group										

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Lanes, Volumes, Timings
6: Riverstone Parkway & I - 575 Southbound Ramp

Future AM
12/28/2006

Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	976	919	459	1261	197	742
Act Effct Green (s)	62.6	120.0	94.2	94.2	17.8	120.0
Actuated g/C Ratio	0.52	1.00	0.78	0.78	0.15	1.00
v/c Ratio	0.53	0.58	0.87	0.45	0.75	0.47
Control Delay	10.9	3.9	42.5	2.8	66.1	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.9	3.9	42.5	2.8	66.1	1.0
LOS	B	A	D	A	E	A
Approach Delay	7.5			13.4		
Approach LOS	A			B		
Queue Length 50th (ft)	151	98	289	50	148	0
Queue Length 95th (ft)	257	124	m293	12	220	0
Internal Link Dist (ft)	752			1330		
Turn Bay Length (ft)	225	375				
Base Capacity (vph)	1846	1583	686	2778	339	1583
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.58	0.67	0.45	0.58	0.47

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 8 (7%), Referenced to phase 2:WBT and 6:EBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 11.2
Intersection Capacity Utilization 79.0%
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
6: Riverstone Parkway & I - 575 Southbound Ramp

Future AM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3539	1583	1770	3539						1770	1770	1583
Flt Permitted	1.00	1.00	0.19	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	359	3539						1770	1770	1583
Volume (vph)	0	908	855	422	1160	0	0	0	0	177	0	668
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.90	0.90
Adj. Flow (vph)	0	976	919	459	1261	0	0	0	0	197	0	742
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	976	919	459	1261	0	0	0	0	197	0	742
Turn Type		Free	pm+pt							custom		Free
Protected Phases		6	5	5	2						8	
Permitted Phases			Free									Free
Actuated Green, G (s)		62.6	120.0	94.2	94.2					17.8		120.0
Effective Green, g (s)		62.6	120.0	94.2	94.2					17.8		120.0
Actuated g/C Ratio		0.52	1.00	0.78	0.78					0.15		1.00
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		1846	1583	606	2778					263		1583
v/s Ratio Prot		0.28		c0.17	0.36							
v/s Ratio Perm		0.53	0.58	0.76	0.45					c0.11		0.47
Uniform Delay, d1		19.0	0.0	17.3	4.3					0.75		0.47
Progression Factor		0.46	1.00	1.12	0.50					1.00		1.00
Incremental Delay, d2		1.0	1.4	4.0	0.4					11.1		1.0
Delay (s)		9.7	1.4	23.3	2.6					60.0		1.0
Level of Service		A	A	C	A					E		A
Approach Delay (s)		5.7			8.1			0.0			13.4	
Approach LOS		A			A			A			B	
Intersection Summary												
HCM Average Control Delay				8.2				HCM Level of Service			A	
HCM Volume to Capacity ratio				0.75								
Actuated Cycle Length (s)				120.0				Sum of lost time (s)			8.0	
Intersection Capacity Utilization				79.0%				ICU Level of Service			D	
Analysis Period (min)				15								
c Critical Lane Group												



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	132	1434	1395	531	367	143
Act Effct Green (s)	94.5	94.5	82.9	120.0	17.5	17.5
Actuated g/C Ratio	0.79	0.79	0.69	1.00	0.15	0.15
v/c Ratio	0.56	0.36	0.40	0.34	0.73	0.41
Control Delay	28.5	0.8	3.7	0.5	57.7	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.5	0.8	3.7	0.5	57.7	10.4
LOS	C	A	A	A	E	B
Approach Delay	3.1 2.8 44.4					
Approach LOS	A A D					
Queue Length 50th (ft)	33	11	45	0	142	0
Queue Length 95th (ft)	m74	19	150	0	175	48
Internal Link Dist (ft)	1490 547 375					
Turn Bay Length (ft)	165	481	4004	3511	1583	887
Base Capacity (vph)	481	4004	3511	1583	887	515
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.36	0.40	0.34	0.41	0.28

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 14 (12%), Referenced to phase 2:WBT and 6:EBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 8.3
Intersection Capacity Utilization 51.5%
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	1.00
Flt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.85	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	3433	1583
Flt Permitted	0.15	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	280	5085	5085	1583	3433	1583
Volume (vph)	124	1348	1325	504	316	123
Peak-hour factor, PHF	0.94	0.94	0.95	0.95	0.86	0.86
Adj. Flow (vph)	132	1434	1395	531	367	143
RTOR Reduction (vph)	0	0	0	0	0	122
Lane Group Flow (vph)	132	1434	1395	531	367	21
Turn Type	pm+pt Free Perm					
Protected Phases	1	6	2		8	
Permitted Phases	6			Free		8
Actuated Green, G (s)	94.5	94.5	82.9	120.0	17.5	17.5
Effective Green, g (s)	94.5	94.5	82.9	120.0	17.5	17.5
Actuated g/C Ratio	0.79	0.79	0.69	1.00	0.15	0.15
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	315	4004	3513	1583	501	231
v/s Ratio Prot	0.03	0.28	0.27		0.11	
v/s Ratio Perm	0.30			0.34		0.01
v/c Ratio	0.42	0.36	0.40	0.34	0.73	0.09
Uniform Delay, d1	4.4	3.8	7.9	0.0	49.0	44.4
Progression Factor	3.07	0.14	0.40	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.2	0.3	0.5	5.5	0.2
Delay (s)	14.4	0.8	3.4	0.5	54.5	44.5
Level of Service	B	A	A	A	D	D
Approach Delay (s)	1.9 2.6 51.7					
Approach LOS	A A D					

Intersection Summary

HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
8: Riverstone Parkway & Reinhardt College Parkway

Future AM
12/28/2006

	EBL	EBT	WBT	WBR	NBT	SBL	SBT
Lane Group	EBL	EBT	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	254	1306	1360	254	15	351	109
Act Effct Green (s)	91.2	91.2	72.2	120.0	20.8	20.8	20.8
Actuated g/C Ratio	0.76	0.76	0.60	1.00	0.17	0.17	0.17
v/c Ratio	0.80	0.34	0.44	0.16	0.07	0.75	0.17
Control Delay	19.5	8.7	9.5	0.2	39.4	27.5	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.5	8.7	9.5	0.2	39.4	27.5	0.3
LOS	B	A	A	A	D	C	A
Approach Delay	10.5 8.1 39.4 21.1						
Approach LOS	B A D D C						
Queue Length 50th (ft)	79	220	90	0	10	88	0
Queue Length 95th (ft)	m115	m281	133	0	28	m75	m0
Internal Link Dist (ft)	1839 1490 1997 2482						
Turn Bay Length (ft)	190						
Base Capacity (vph)	534	3848	3058	1583	312	698	738
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.34	0.44	0.16	0.05	0.50	0.15

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 16 (13%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 10.9
 Intersection Capacity Utilization 67.5%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
8: Riverstone Parkway & Reinhardt College Parkway

Future AM
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBT
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	1.00	0.85	1.00	0.97	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	5060	5085	1583	1770	3433	1583	1770	3433	1583	1770	3433
Flt Permitted	0.14	1.00	1.00	1.00	1.00	0.61	0.75	1.00	0.75	1.00	0.75	1.00
Satd. Flow (perm)	266	5060	5085	1583	1132	2702	1583	1132	2702	1583	1132	2702
Volume (vph)	236	1175	40	0	1265	236	14	0	333	0	104	0
Peak-hour factor, PHF	0.93	0.93	0.92	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	254	1263	43	0	1360	254	15	0	351	0	109	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	254	1304	0	0	1360	254	0	15	0	351	19	0
Turn Type	pm+pt	Perm	Perm	Free	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	6	2	2	Free	4	4	4	4	8	8	8
Permitted Phases	6	91.2	91.2	72.2	120.0	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Actuated Green, G (s)	91.2	91.2	91.2	72.2	120.0	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Effective Green, g (s)	91.2	91.2	91.2	72.2	120.0	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Actuated g/C Ratio	0.76	0.76	0.76	0.60	1.00	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	390	3846	3059	1583	196	468	274	196	468	274	196	468
v/s Ratio Prot	c0.08	0.26	0.27	0.16	0.01	c0.13	0.01	c0.13	0.01	c0.13	0.01	c0.13
v/s Ratio Perm	c0.41	0.65	0.34	0.44	0.16	0.07	0.07	0.07	0.07	0.07	0.07	0.07
v/c Ratio	9.1	4.7	13.0	0.0	41.6	47.1	41.5	47.1	41.5	47.1	41.5	47.1
Uniform Delay, d1	0.54	1.71	0.62	1.00	1.00	0.46	1.00	0.46	1.00	0.46	1.00	0.46
Progression Factor	1.4	0.1	0.4	0.2	0.2	3.9	0.1	3.9	0.1	3.9	0.1	3.9
Incremental Delay, d2	6.3	8.0	8.5	0.2	41.7	25.5	41.6	25.5	41.6	25.5	41.6	25.5
Delay (s)	A	A	A	A	A	C	D	C	D	C	D	C
Level of Service	A	A	A	A	A	C	D	C	D	C	D	C
Approach Delay (s)	7.8	7.2	7.2	7.2	41.7	29.3	41.7	29.3	41.7	29.3	41.7	29.3
Approach LOS	A	A	A	A	D	C	D	C	D	C	D	C

Intersection Summary

HCM Average Control Delay 10.4 HCM Level of Service B
 HCM Volume to Capacity ratio 0.66
 Actuated Cycle Length (s) 120.0 Sum of lost time (s) 8.0
 Intersection Capacity Utilization 67.5% ICU Level of Service C
 Analysis Period (min) 15
 c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	737	1403	480	1061	321	308	191	210	422	777
Act Effct Green (s)	67.0	43.0	51.0	31.0	45.0	32.0	32.0	37.0	28.0	28.0
Actuated g/C Ratio	0.56	0.36	0.42	0.26	0.38	0.27	0.27	0.31	0.23	0.23
v/c Ratio	1.38	1.12	1.29	1.17	1.26	0.62	0.34	0.72	0.97	1.25
Control Delay	212.0	83.8	178.0	117.9	175.3	45.0	6.6	38.3	71.4	144.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	212.0	83.8	178.0	117.9	175.3	45.0	6.6	38.3	71.4	144.1
LOS	F	F	F	F	F	D	A	D	E	F
Approach Delay	128.0 136.0 87.1									
Approach LOS	F F F									
Queue Length 50th (ft)	~719 ~633 ~394 ~521 ~283 210 0 122 329 ~538									
Queue Length 95th (ft) m#592	m300 #584 #662 #448 308 56 m143 m#460 m#770									
Internal Link Dist (ft)	1240 3515 1145									
Turn Bay Length (ft)	150	150	150	150	160	254	497	562	291	435
Base Capacity (vph)	534	1248	357	907	254	497	562	291	435	623
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.38	1.12	1.29	1.17	1.26	0.62	0.34	0.72	0.97	1.25

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.38	
Intersection Signal Delay: 119.2	Intersection LOS: F
Intersection Capacity Utilization 116.8%	ICU Level of Service H
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
# Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
m Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3427		1770	3471		1770	1863	1583	1770	1863	1583
Flt Permitted	0.11	1.00		0.13	1.00		0.12	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)	213	3427		240	3471		233	1863	1583	680	1863	1583
Volume (vph)	693	1040	279	414	832	123	311	299	185	197	397	730
Peak-hour factor, PHF	0.94	0.94	0.94	0.90	0.90	0.90	0.97	0.97	0.97	0.94	0.94	0.94
Adj. Flow (vph)	737	1106	297	460	924	137	321	308	191	210	422	777
RTOR Reduction (vph)	0	20	0	0	10	0	0	0	0	140	0	0
Lane Group Flow (vph)	737	1383	0	460	1051	0	321	308	51	210	422	523
Turn Type	pm+pt	1	6	pm+pt	5	2	pm+pt	7	4	pm+pt	3	8
Protected Phases	1	6		pm+pt	5	2		7	4		3	8
Permitted Phases	6				2			4			4	8
Actuated Green, G (s)	67.0	43.0		51.0	31.0		45.0	32.0	32.0	37.0	28.0	28.0
Effective Green, g (s)	67.0	43.0		51.0	31.0		45.0	32.0	32.0	37.0	28.0	28.0
Actuated g/C Ratio	0.56	0.36		0.42	0.26		0.38	0.27	0.27	0.31	0.23	0.23
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	534	1228		357	897		254	497	422	291	435	369
v/s Ratio Prot	c0.37	0.40		0.21	0.30		c0.14	0.17		0.05	0.23	
v/s Ratio Perm	c0.40			0.33			0.34			0.03	0.17	c0.33
v/c Ratio	1.38	1.13		1.29	1.17		1.26	0.62	0.12	0.72	0.97	1.42
Uniform Delay, d1	46.2	38.5		52.2	44.5		33.1	38.7	33.3	34.9	45.6	46.0
Progression Factor	1.35	0.56		0.88	0.71		1.00	1.00	1.00	1.00	1.01	1.17
Incremental Delay, d2	175.9	61.7		148.2	88.5		146.3	2.3	0.1	4.6	24.0	196.4
Delay (s)	238.4	83.4		194.0	120.1		179.4	41.0	33.5	39.6	70.2	250.2
Level of Service	F	F		F	F		F	D	C	D	E	F
Approach Delay (s)	136.8			142.4			93.4			164.9		
Approach LOS	F			F			F			F		
Intersection Summary												
HCM Average Control Delay	138.9											
HCM Volume to Capacity ratio	1.36											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	116.8%											
Analysis Period (min)	15											
Critical Lane Group												

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	118	336	755	63	534	1314
Act Effct Green (s)	12.8	12.8	63.7	120.0	99.2	99.2
Actuated g/C Ratio	0.11	0.11	0.53	1.00	0.83	0.83
v/c Ratio	0.62	0.72	0.76	0.04	0.89	0.85
Control Delay	58.7	15.9	13.9	0.0	47.6	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.7	15.9	13.9	0.0	47.6	14.2
LOS	E	B	B	A	D	B
Approach Delay	27.0	12.8				23.9
Approach LOS	C	B				C
Queue Length 50th (ft)	91	55	262	0	289	471
Queue Length 95th (ft)	m117	m99	m226	m0	#469	895
Internal Link Dist (ft)	3912	4852				2585
Turn Bay Length (ft)	236	502	988	1583	638	1540
Base Capacity (vph)	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.67	0.76	0.04	0.84	0.85
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 19 (16%), Referenced to phase 2:SBTL and 6:NBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.89						
Intersection Signal Delay: 21.4						
Intersection Capacity Utilization 79.6%						
Analysis Period (min) 15						
# 95th percentile volume exceeds capacity, queue may be longer.						
Queue shown is maximum after two cycles.						
m Volume for 95th percentile queue is metered by upstream signal.						

	WBL	WBR	NBT	NBR	SBL	SBT
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt	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)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.17	1.00
Satd. Flow (perm)	1770	1583	1863	1583	324	1863
Volume (vph)	103	292	702	59	486	1196
Peak-hour factor, PHF	0.87	0.87	0.93	0.93	0.91	0.91
Adj. Flow (vph)	118	336	755	63	534	1314
RTOR Reduction (vph)	0	300	0	0	0	0
Lane Group Flow (vph)	118	36	755	63	534	1314
Turn Type	Perm	Perm	Free	Free	pm+pt	
Protected Phases	4	6	5	2		
Permitted Phases	4	4	Free	2		
Actuated Green, G (s)	12.8	12.8	63.7	120.0	99.2	99.2
Effective Green, g (s)	12.8	12.8	63.7	120.0	99.2	99.2
Actuated g/C Ratio	0.11	0.11	0.53	1.00	0.83	0.83
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	189	169	989	1583	647	1540
v/s Ratio Prot	c0.07	0.02	0.41	0.22	c0.71	
v/s Ratio Perm	0.62	0.21	0.76	0.04	0.47	
Uniform Delay, d1	51.3	49.0	22.2	0.0	25.4	6.1
Progression Factor	0.90	1.44	0.53	1.00	1.00	1.00
Incremental Delay, d2	5.6	0.6	0.5	0.0	8.5	6.2
Delay (s)	51.6	71.3	12.2	0.0	33.8	12.3
Level of Service	D	E	B	A	C	B
Approach Delay (s)	66.2		11.2		18.5	
Approach LOS	E		B		B	
Intersection Summary						
HCM Average Control Delay	23.6					
HCM Volume to Capacity ratio	0.83					
Actuated Cycle Length (s)	120.0					
Intersection Capacity Utilization	79.6%					
Analysis Period (min)	15					
c Critical Lane Group						

Lanes, Volumes, Timings
11: Reinhardt College Parkway & College Street

Future AM
12/28/2006

→	←	←	→	→
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	720	434	528	599
Sign Control	Stop	Stop	Stop	Stop
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 103.0%				
Analysis Period (min) 15				
ICU Level of Service G				

HCM Unsignalized Intersection Capacity Analysis
11: Reinhardt College Parkway & College Street

Future AM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	83	476	53	41	150	134	95	176	130	265	115	82
Peak Hour Factor	0.85	0.85	0.85	0.75	0.75	0.75	0.76	0.76	0.76	0.77	0.77	0.77
Hourly flow rate (vph)	98	560	62	55	200	179	125	232	171	344	149	106
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	720	433	528	600								
Volume Left (vph)	98	55	125	344								
Volume Right (vph)	62	179	171	106								
HadJ (s)	0.01	-0.19	-0.11	0.04								
Departure Headway (s)	9.6	9.4	9.5	9.6								
Degree Utilization, x	1.91	1.13	1.39	1.60								
Capacity (veh/h)	381	396	390	378								
Control Delay (s)	443.3	116.2	214.9	306.6								
Approach Delay (s)	443.3	116.2	214.9	306.6								
Approach LOS	F	F	F	F								
Intersection Summary												
Delay	292.4											
HCM Level of Service	F											
Intersection Capacity Utilization	103.0%											
Analysis Period (min)	15											
G												

Lanes, Volumes, Timings
12: Knox Bridge Highway & Fincher Road

Future AM
12/28/2006

	↖	→	↗	←	↑	↓
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	172	674	43	598	56	417
Sign Control	Free	Free	Free	Free	Stop	Stop
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 78.6%						
Analysis Period (min) 15						
ICU Level of Service D						

HCM Unsignalized Intersection Capacity Analysis
12: Knox Bridge Highway & Fincher Road

Future AM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱	↰	↱	↰	↱
Sign Control	Free	Free		Free	Free		Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%			0%			0%				0%	
Volume (veh/h)	155	600	6	41	502	72	3	2	35	115	14	251
Peak Hour Factor	0.90	0.90	0.90	0.96	0.96	0.96	0.72	0.72	0.72	0.91	0.91	0.91
Hourly flow rate (vph)	172	667	7	43	523	75	4	3	49	126	15	276
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	598		673				1906	1698	670	1707	1664	560
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCu, unblocked vol	598		673				1906	1698	670	1707	1664	560
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 %	82		95				76	96	89	0	80	48
cM capacity (veh/h)	979		918				18	73	457	52	76	528
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	172	673	43	598	56	418						
Volume Left	172	0	43	0	4	126						
Volume Right	0	7	0	75	49	276						
cSH	979	1700	918	1700	146	133						
Volume to Capacity	0.18	0.40	0.05	0.35	0.38	3.15						
Queue Length 95th (ft)	16	0	4	0	40	Err						
Control Delay (s)	9.5	0.0	9.1	0.0	44.2	Err						
Lane LOS	A		A		E	F						
Approach Delay (s)	1.9		0.6		44.2	Err						
Approach LOS					E	F						
Intersection Summary												
Average Delay	2133.3											
Intersection Capacity Utilization	78.6%					ICU Level of Service D						
Analysis Period (min)	15											

Lanes, Volumes, Timings
13: N Etowah Drive & Riverstone Parkway

Future AM
12/28/2006

	→	←	↖	↗	↑	↘	↙	↓	↕
Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group Flow (vph)	1936	72	298	1361	32	9	1729	395	
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	
Intersection Summary									
Control Type: Unsignalized									
Intersection Capacity Utilization 158.3%									
Analysis Period (min) 15									
ICU Level of Service H									

HCM Unsignalized Intersection Capacity Analysis
13: N Etowah Drive & Riverstone Parkway

Future AM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↱	↰	↰	↰	↰	↰	↰	↰	↰	↰
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	585	184	663	9	29	6	280	1279	30	8	1573	359
Peak Hour Factor	0.74	0.74	0.74	0.62	0.62	0.62	0.94	0.94	0.94	0.91	0.91	0.91
Hourly flow rate (vph)	791	249	896	15	47	10	298	1361	32	9	1729	395
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type						None						
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	3046	3734	864	2963	4097	680	2123			1393		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3046	3734	864	2963	4097	680	2123			1393		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	0	0	0	98	0			98		
cM capacity (veh/h)	0	0	297	0	0	393	253			487		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	1935	71	298	680	680	32	9	864	864	395		
Volume Left	791	15	298	0	0	0	9	0	0	0		
Volume Right	896	10	0	0	0	32	0	0	0	395		
cSH	0	0	253	1700	1700	1700	487	1700	1700	1700		
Volume to Capacity	Err	Err	1.18	0.40	0.40	0.02	0.02	0.51	0.51	0.23		
Queue Length 95th (ft)	Err	Err	343	0	0	0	1	0	0	0		
Control Delay (s)	Err	Err	154.5	0.0	0.0	0.0	12.5	0.0	0.0	0.0		
Lane LOS	F	F	F				B					
Approach Delay (s)	Err	Err	27.2				0.1					
Approach LOS	F	F										
Intersection Summary												
Average Delay	Err											
Intersection Capacity Utilization	158.3%											
Analysis Period (min)	15											
										H		

Lanes, Volumes, Timings
14: Broad Water Bay Road & Fincher Road

Future AM
12/28/2006



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	84	317	240	242
Sign Control	Stop	Stop	Free	Free
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 55.6%				
Analysis Period (min) 15				
ICU Level of Service B				

HCM Unsignalized Intersection Capacity Analysis
14: Broad Water Bay Road & Fincher Road

Future AM
12/28/2006



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	21	36	18	179	10	102	8	96	88	67	129	15
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.80	0.80	0.80	0.87	0.87	0.87
Hourly flow rate (vph)	24	40	20	195	11	111	10	120	110	77	148	17
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	622	561	157	546	515	175	166			230		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	622	561	157	546	515	175	166			230		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	90	98	49	97	87	99			94		
cM capacity (veh/h)	325	408	889	385	434	868	1413			1338		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	84	316	240	243								
Volume Left	24	195	10	77								
Volume Right	20	111	110	17								
cSH	433	481	1413	1338								
Volume to Capacity	0.19	0.66	0.01	0.06								
Queue Length 95th (ft)	18	117	1	5								
Control Delay (s)	15.3	25.7	0.4	2.8								
Lane LOS	C	D	A	A								
Approach Delay (s)	15.3	25.7	0.4	2.8								
Approach LOS	C	D										
Intersection Summary												
Average Delay	11.6											
Intersection Capacity Utilization	55.6%											
Analysis Period (min)	15											
	ICU Level of Service											
	B											

Lanes, Volumes, Timings
15: Bells Ferry Road & Marietta Highway

Future AM
12/28/2006

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	684	260	27	614	110	757	401
Act Effct Green (s)	54.0	54.0	58.0	58.0	58.0	58.0	58.0
Actuated g/C Ratio	0.45	0.45	0.48	0.48	0.48	0.48	0.48
v/c Ratio	1.34	0.34	0.27	0.68	0.55	0.84	0.43
Control Delay	194.9	15.6	27.3	28.8	34.5	37.3	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	194.9	15.6	27.3	28.8	34.5	37.3	5.0
LOS	F	B	C	C	C	D	A
Approach Delay	194.9	15.6	28.7	26.8			
Approach LOS	F	B	C	C	C		
Queue Length 50th (ft)	~695	93	12	357	58	496	26
Queue Length 95th (ft)	#870	126	39	493	118	627	72
Internal Link Dist (ft)	1761	266		463		416	
Turn Bay Length (ft)		150		150		250	
Base Capacity (vph)	511	773	100	897	201	900	940
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.34	0.34	0.27	0.68	0.55	0.84	0.43

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.34

Intersection Signal Delay: 66.5

Intersection Capacity Utilization 94.2%

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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HCM Signalized Intersection Capacity Analysis
15: Bells Ferry Road & Marietta Highway

Future AM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.93	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85
Flt Protected	0.97			1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1799			1733	1770	1856	1770	1856	1770	1863	1583	
Flt Permitted	0.61			0.95	0.11	1.00	0.22	1.00	1.00	1.00	1.00	
Satd. Flow (perm)	1133			1651	207	1856	415	1863	1583			
Volume (vph)	359	210	20	12	86	97	26	569	14	95	651	345
Peak-hour factor, PHF	0.86	0.86	0.86	0.75	0.75	0.95	0.95	0.95	0.95	0.86	0.86	0.86
Adj. Flow (vph)	417	244	23	16	115	129	27	599	15	110	757	401
RTOR Reduction (vph)	0	1	0	0	30	0	0	1	0	0	0	175
Lane Group Flow (vph)	0	683	0	0	230	0	27	613	0	110	757	226
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	8	8		4	4		6	6		2	2	
Permitted Phases	8			4			6			2		2
Actuated Green, G (s)	54.0			54.0			58.0	58.0		58.0		58.0
Effective Green, g (s)	54.0			54.0			58.0	58.0		58.0		58.0
Actuated g/C Ratio	0.45			0.45			0.48	0.48		0.48		0.48
Clearance Time (s)	4.0			4.0			4.0	4.0		4.0		4.0
Vehicle Extension (s)	3.0			3.0			3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	510			743			100	897		201	900	765
v/s Ratio Prot							0.33			c0.41		
v/s Ratio Perm	c0.60			0.14			0.13			0.27		0.14
v/c Ratio	1.34			0.31			0.27	0.68		0.55		0.84
Uniform Delay, d1	33.0			21.1			18.4	23.9		21.8		27.0
Progression Factor	1.00			0.86			1.00	1.00		1.00		1.00
Incremental Delay, d2	165.4			0.2			6.5	4.2		10.3		9.4
Delay (s)	198.4			18.3			24.9	28.1		32.1		36.4
Level of Service	F			B			C	C		C		D
Approach Delay (s)	198.4			18.3			28.0			30.7		
Approach LOS	F			B			C			C		

Intersection Summary

HCM Average Control Delay 69.2 HCM Level of Service E

HCM Volume to Capacity ratio 1.08

Actuated Cycle Length (s) 120.0 Sum of lost time (s) 8.0

Intersection Capacity Utilization 94.2% ICU Level of Service F

Analysis Period (min) 15

c Critical Lane Group

Baseline
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Future 2020 AM Improved

Lanes, Volumes, Timings
2: Cumming Highway & I-575 Southbound Ramp

Future AM - Improved
12/28/2006

Lane Group	EBT	EBR	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	368	173	789	973	322	314
v/c Ratio	0.30	0.11	0.67	0.61	0.85	0.41
Control Delay	25.8	0.1	34.9	2.9	64.4	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.8	0.1	34.9	2.9	64.4	5.3
Queue Length 50th (ft)	81	0	227	53	241	0
Queue Length 95th (ft)	m131	m0	331	75	319	69
Internal Link Dist (ft)	2177	1047				
Turn Bay Length (ft)	150	150				320
Base Capacity (vph)	1243	1583	1180	1583	575	760
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.11	0.67	0.61	0.56	0.41
Intersection Summary						
m Volume for 95th percentile queue is metered by upstream signal.						

Baseline
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Future PM
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HCM Signalized Intersection Capacity Analysis
2: Cumming Highway & I-575 Southbound Ramp

Future AM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.85	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	3539	1583	3539	1583	3539	1583	1770	1770	1583	1583
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	3539	1583	3539	1583	3539	1583	1770	1770	1583	1583
Volume (vph)	0	346	163	0	773	954	0	0	0	290	0	283
Peak-hour factor, PHF	0.94	0.94	0.94	0.98	0.98	0.98	0.92	0.92	0.92	0.90	0.90	0.90
Adj. Flow (vph)	0	368	173	0	789	973	0	0	0	322	0	314
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	368	173	0	789	973	0	0	0	322	0	110
Turn Type		Free	Free		Free	Free		Prot	Prot	custom		
Protected Phases		6			2			1				
Permitted Phases		Free	Free		Free	Free		25.8				
Actuated Green, G (s)		42.2	120.0		40.0	120.0		42.2				
Effective Green, g (s)		42.2	120.0		40.0	120.0		25.8				
Actuated g/C Ratio		0.35	1.00		0.33	1.00		0.22				
Clearance Time (s)		4.0			4.0			4.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1245	1583		1180	1583		381				
v/s Ratio Prot		0.10			0.22			c0.18				
v/c Ratio Perm		0.30	0.11		0.67	0.61		0.85				
Uniform Delay, d1		28.1	0.0		34.3	0.0		45.2				
Progression Factor		0.86	1.00		0.93	1.00		1.00				
Incremental Delay, d2		0.3	0.1		2.8	1.7		15.7				
Delay (s)		24.4	0.1		34.6	1.7		60.8				
Level of Service		C	A		C	A		E				
Approach Delay (s)		16.6			16.4			44.6				
Approach LOS		B			B			A				
Intersection Summary												
HCM Average Control Delay			22.5					HCM Level of Service			C	
HCM Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			120.0					Sum of lost time (s)			4.0	
Intersection Capacity Utilization			45.6%					ICU Level of Service			A	
Analysis Period (min)			15									
c Critical Lane Group												

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
3: Bobo Grinding Co Driveway & Marietta Street

Future AM - Improved
12/28/2006

	→	↖	↗	↖	↗	↖	↗	↖	↗
Lane Group	EBT	WBL	WBT	NBT	SBL	SBT			
Lane Group Flow (vph)	25	173	651	716	448	435			
v/c Ratio	0.10	0.60	0.93	0.76	0.77	0.32			
Control Delay	29.4	50.2	33.6	26.3	38.0	7.3			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0			
Total Delay	29.4	50.2	33.6	26.3	38.0	7.3			
Queue Length 50th (ft)	12	120	160	503	77	46			
Queue Length 95th (ft)	22	181	#343	#712	#238	390			
Internal Link Dist (ft)	95	143	3002			1058			
Turn Bay Length (ft)		150				90			
Base Capacity (vph)	332	391	783	947	611	1349			
Starvation Cap Reductn	0	0	0	0	0	0			
Spillback Cap Reductn	0	0	0	0	0	0			
Storage Cap Reductn	0	0	0	0	0	0			
Reduced v/c Ratio	0.08	0.44	0.83	0.76	0.73	0.32			
Intersection Summary									
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.									

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
3: Bobo Grinding Co Driveway & Marietta Street

Future AM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↖	↗	↖	↖	↔		↖	↗	↖
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Flt	0.97	0.97	1.00	0.85	0.85	0.96	0.96	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.99	0.99	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1795	1795	1770	1591	1591	1795	1795	3433	1860	3433	1860	1860
Flt Permitted	0.60	0.60	0.74	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1082	1082	1380	1591	1591	1793	1793	3433	1860	3433	1860	1860
Volume (vph)	3	9	3	157	17	575	3	495	182	421	404	5
Peak-hour factor, PHF	0.62	0.62	0.62	0.91	0.91	0.91	0.95	0.95	0.95	0.94	0.94	0.94
Adj. Flow (vph)	5	15	5	173	19	632	3	521	192	448	430	5
RTOR Reduction (vph)	0	4	0	0	367	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	21	0	173	284	0	0	706	0	448	435	0
Turn Type	Perm			Perm			Perm			Prot		
Protected Phases	8			4			6			5		
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	25.0			25.0			62.7			20.3		
Effective Green, g (s)	25.0			25.0			62.7			20.3		
Actuated g/C Ratio	0.21			0.21			0.52			0.17		
Clearance Time (s)	4.0			4.0			4.0			4.0		
Vehicle Extension (s)	3.0			3.0			3.0			3.0		
Lane Grp Cap (vph)	225			288			937			581		
v/s Ratio Prot				0.13			c0.13			0.23		
v/c Ratio	0.02			0.60			0.86			0.77		
Uniform Delay, d1	38.4			43.0			45.8			22.6		
Progression Factor	1.00			1.00			1.00			0.81		
Incremental Delay, d2	0.2			3.5			19.1			5.1		
Delay (s)	38.5			46.5			64.9			23.9		
Level of Service	D			D			E			C		
Approach Delay (s)	38.5			61.0			23.9			20.6		
Approach LOS	D			E			C			C		
Intersection Summary												
HCM Average Control Delay	35.3			HCM Level of Service			D					
HCM Volume to Capacity ratio	0.78											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			12.0					
Intersection Capacity Utilization	105.3%			ICU Level of Service			G					
Analysis Period (min)	15											
Critical Lane Group												

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
4: Big K-Mart Driveway & Marietta Highway

[illegible]

Baseline
A & R Engineering Inc.

HCM Signalized Intersection Capacity Analysis
4: Big K-Mart Driveway & Marietta Highway

Movement	EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBR			
	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Configurations		4																						
Ideal Flow (vphpl)	1900		1900		1900		1900		1900		1900		1900		1900		1900		1900		1900			
Total Lost time (s)	4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0			
Lane Util. Factor	1.00		0.95		0.95		1.00		0.95		1.00		0.91		1.00		0.97		0.95		1.00			
Frft	0.99		1.00		1.00		0.85		1.00		0.85		1.00		0.85		1.00		1.00		0.85			
FLIT Protected	0.98		0.95		0.96		1.00		0.95		1.00		0.95		1.00		0.95		1.00		1.00			
Satd. Flow (prot)	1810		1681		1695		1563		1770		5085		1583		3433		3539		1583		1583			
FLIT Permitted	0.98		0.95		0.96		1.00		0.95		1.00		0.95		1.00		0.95		1.00		1.00			
Satd. Flow (perm)	1810		1681		1695		1583		1770		5085		1583		3433		3539		1583		1583			
Volume (vph)	61		73		8		534		36		811		8		1391		542		855		1349			
Peak-hour factor, PHF	0.70		0.70		0.70		0.85		0.85		0.85		0.95		0.95		0.95		0.89		0.89			
Adj. Flow (vph)	87		104		11		628		42		954		8		1464		571		1516		24			
RTOR Reduction (vph)	0		2		0		0		0		0		0		0		324		0		0			
Lane Group Flow (vph)	0		200		0		326		344		954		8		1464		247		961		1516			
Turn Type	Split		Split		Split		Split		Split		Free		Prot		Prot		Perm		Prot		Perm			
Protected Phases	8		8		4		4		4		4		1		6		5		2		2			
Permitted Phases																								
Actuated Green, G (s)	15.4		23.0		23.0		23.0		23.0		120.0		1.6		34.0		34.0		31.6		64.0			
Actuated Green, g (s)	15.4		23.0		23.0		23.0		23.0		120.0		1.6		34.0		34.0		31.6		64.0			
Actuated g/C Ratio	0.13		0.19		0.19		1.00		1.00		0.01		0.01		0.28		0.28		0.26		0.53			
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0			
Vehicle Extension (s)	3.0		3.0		3.0		3.0		3.0		3.0		3.0		3.0		3.0		3.0		3.0			
Lane Grp Cap (vph)	232		322		325		1583		24		1441		449		904		1887		844		844			
v/s Ratio Prot	0.11		0.19		0.20		0.60		0.60		0.60		0.29		0.29		0.28		0.43		0.43			
v/s Ratio Perm																								
v/s Ratio	0.86		1.01		1.06		0.60		0.33		1.02		0.55		1.06		0.80		0.02		0.01			
Uniform Delay, d1	51.3		48.5		48.5		0.0		58.7		43.0		36.5		44.2		22.9		13.2		13.2			
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		0.66		0.82		0.34			
Incremental Delay, d2	28.5		53.3		66.2		1.7		8.0		27.8		4.8		40.5		2.0		0.0		0.0			
Delay (s)	77.8		101.8		114.7		1.7		66.7		70.8		41.3		69.6		20.6		4.6		4.6			
Level of Service	E		F		F		A		E		D		E		D		E		C		A			
Approach Delay (s)	77.8				45.7				D				62.5				39.3							
Approach LOS	E												E				D							
Intersection Summary																								
HCM Average Control Delay	49.6				HCM Level of Service								D											
HCM Volume to Capacity ratio	1.02																							
Actuated Cycle Length (s)	120.0				Sum of lost time (s)								16.0											
Intersection Capacity Utilization	83.7%				ICU Level of Service								E											
Analysis Period (min)	15																							
Critical Lane Group																								

Baseline
A & R Engineering Inc.

Lanes, Volumes, Timings
5: Riverstone Parkway & I - 575 Northbound Ramp

Future AM - Improved
12/28/2006

	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	515	593	749	80	816	519
v/c Ratio	0.53	0.26	0.63	0.05	0.85	0.59
Control Delay	27.4	0.6	36.3	0.1	49.7	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.4	0.6	36.3	0.1	49.7	5.6
Queue Length 50th (ft)	221	0	250	0	309	0
Queue Length 95th (ft)	277	26	334	0	350	83
Internal Link Dist (ft)	1330	1370				
Turn Bay Length (ft)	370		300	490		
Base Capacity (vph)	969	2314	1197	1583	1202	879
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.26	0.63	0.05	0.68	0.59
Intersection Summary						

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
5: Riverstone Parkway & I - 575 Northbound Ramp

Future AM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	0.97	0.95		0.95	1.00	0.97	1.00	0.95	1.00			
Flt	1.00	1.00		1.00	0.85	1.00	0.85	1.00	0.85			
Flt Protected	0.95	1.00		1.00	1.00	0.95	1.00	0.95	1.00			
Satd. Flow (prot)	3433	3539		3539	1583	3433	1583	3539	1583			
Flt Permitted	0.95	1.00		1.00	1.00	0.95	1.00	0.95	1.00			
Satd. Flow (perm)	3433	3539		3539	1583	3433	1583	3539	1583			
Volume (vph)	484	557	0	0	719	77	783	0	498	0	0	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	515	593	0	0	749	80	816	0	519	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	343	0	0	0
Lane Group Flow (vph)	515	593	0	0	749	80	816	0	176	0	0	0
Turn Type	Prot	Free	custom	Free	custom	custom	custom	custom	custom	custom	custom	custom
Protected Phases	1	6		2								
Permitted Phases												
Actuated Green, G (s)	33.9	78.5		40.6	120.0	33.5	40.6		40.6			
Effective Green, g (s)	33.9	78.5		40.6	120.0	33.5	40.6		40.6			
Actuated g/C Ratio	0.28	0.65		0.34	1.00	0.28	0.34		0.34			
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	970	2315		1197	1583	958	536					
v/s Ratio Prot	c0.15	0.17		c0.21								
v/c Ratio Perm	0.53	0.26		0.63	0.05	c0.24	0.11					
Uniform Delay, d1	36.3	8.6		33.3	0.0	40.9	29.5					
Progression Factor	0.69	0.05		1.00	1.00	1.00	1.00					
Incremental Delay, d2	0.3	0.2		2.5	0.1	7.4	1.6					
Delay (s)	25.6	0.6		35.8	0.1	48.3	31.2					
Level of Service	C	A		D	A	D	C					
Approach Delay (s)	12.2			32.4		41.6	0.0					
Approach LOS	B			C		D	A					
Intersection Summary												
HCM Average Control Delay			29.3									
HCM Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			120.0									
Intersection Capacity Utilization			68.3%									
Analysis Period (min)			15									
c Critical Lane Group												

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
9: Riverstone Parkway & Waleska Road

Future AM - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	737	1106	297	460	924	137	321	308	191	210	422	777
v/c Ratio	0.87	0.80	0.38	0.85	0.86	0.25	0.86	0.74	0.30	0.77	0.94	0.93
Control Delay	41.9	26.2	8.8	43.2	28.8	4.3	51.8	54.5	12.6	44.1	66.1	35.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.9	26.2	8.8	43.2	28.8	4.3	51.8	54.5	12.6	44.1	66.1	35.8
Queue Length 50th (ft)	250	389	78	186	377	37	90	220	51	118	304	256
Queue Length 95th (ft)	#371	470	m148	#260	#473	27	#151	323	92	m157	m#430	m#579
Internal Link Dist (ft)	822			3515			1145			4852		
Turn Bay Length (ft)	150	150	150	150	150	150	160	150	150	80	90	90
Base Capacity (vph)	858	1389	782	544	1073	539	374	435	638	274	466	838
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.80	0.38	0.85	0.86	0.25	0.86	0.71	0.30	0.77	0.91	0.93

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
9: Riverstone Parkway & Waleska Road

Future AM - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.85	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.95	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.23	1.00	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	1770	1863	1583
Volume (vph)	693	1040	279	414	832	123	311	299	185	197	397	730
Peak-hour factor, PHF	0.94	0.94	0.94	0.90	0.90	0.90	0.97	0.97	0.97	0.94	0.94	0.94
Adj. Flow (vph)	737	1106	297	460	924	137	321	308	191	210	422	777
RTOR Reduction (vph)	0	0	42	0	0	59	0	0	31	0	0	8
Lane Group Flow (vph)	737	1106	255	460	924	78	321	308	160	210	422	769
Turn Type	Prot	pm+ov	Prot	Perm	pm+pt	pm+ov	pm+pt	pm+ov	pm+pt	pm+ov	pm+pt	pm+ov
Protected Phases	1	6	7	5	2	7	4	5	3	8	1	8
Permitted Phases	29.7	47.0	56.0	19.0	36.3	36.3	36.0	27.0	46.0	40.0	29.0	58.7
Actuated Green, G (s)	29.7	47.0	56.0	19.0	36.3	36.3	36.0	27.0	46.0	40.0	29.0	58.7
Effective Green, g (s)	0.25	0.39	0.47	0.16	0.30	0.30	0.30	0.22	0.38	0.33	0.24	0.49
Actuated g/C Ratio	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	850	1386	739	544	1071	479	378	419	607	267	450	827
Lane Grp Cap (vph)	0.21	0.31	0.03	0.13	0.26	0.06	0.17	0.04	0.07	0.23	0.23	0.23
v/s Ratio Prot	0.87	0.80	0.35	0.85	0.86	0.16	0.85	0.74	0.26	0.79	0.94	0.93
v/c Ratio Perm	43.3	32.3	20.3	49.1	39.5	30.7	34.7	43.2	25.4	31.8	44.6	28.7
Uniform Delay, d1	0.74	0.68	0.98	0.59	0.50	0.24	1.00	1.00	1.00	1.11	1.05	0.91
Progression Factor	7.3	3.8	0.2	10.1	8.1	0.6	16.1	6.6	0.2	7.8	17.3	10.0
Incremental Delay, d2	39.4	25.8	20.1	39.3	27.9	8.0	50.8	49.8	25.6	43.1	64.1	36.1
Delay (s)	D	C	C	D	C	A	D	D	C	D	E	D
Level of Service	D	C	C	D	C	A	D	D	C	D	E	D
Approach Delay (s)	29.7	C		29.5	C		44.5	D		45.5	D	
Approach LOS	C			C			D			D		

Intersection Summary
HCM Average Control Delay 35.5 HCM Level of Service D
HCM Volume to Capacity ratio 0.91
Actuated Cycle Length (s) 120.0 Sum of lost time (s) 12.0
Intersection Capacity Utilization 87.1% ICU Level of Service E
Analysis Period (min) 15
c Critical Lane Group

Lanes, Volumes, Timings
10: Reinhardt College Parkway & Waleska Road

HCM Signalized Intersection Capacity Analysis
10: Reinhardt College Parkway & Waleska Road

Future AM - Improved
12/28/2006

Future AM - Improved
12/28/2006

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	118	336	755	63	534	1314
v/c Ratio	0.64	0.52	0.67	0.04	0.81	0.85
Control Delay	66.2	20.7	5.8	0.0	53.7	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.2	20.7	5.8	0.0	53.7	13.0
Queue Length 50th (ft)	91	113	33	0	201	501
Queue Length 95th (ft)	157	189	m125	m0	m228	m689
Internal Link Dist (ft)	3912	4852				2585
Turn Bay Length (ft)			250	275		
Base Capacity (vph)	236	679	1125	1583	749	1545
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.49	0.67	0.04	0.71	0.85
Intersection Summary						
m	Volume for 95th percentile queue is metered by upstream signal.					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Flt	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)	1770	1583	1863	1583	3433	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	3433	1863
Volume (vph)	103	292	702	59	486	1196
Peak-hour factor, PHF	0.87	0.87	0.93	0.93	0.91	0.91
Adj. Flow (vph)	118	336	755	63	534	1314
RTOR Reduction (vph)	0	127	0	0	0	0
Lane Group Flow (vph)	118	209	755	63	534	1314
Turn Type	pn+ov Free Prot					
Protected Phases	4	5	6	5	2	
Permitted Phases	Free					
Actuated Green, G (s)	12.5	35.6	72.4	120.0	23.1	99.5
Effective Green, g (s)	12.5	35.6	72.4	120.0	23.1	99.5
Actuated g/C Ratio	0.10	0.30	0.60	1.00	0.19	0.83
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	184	522	1124	1583	661	1545
v/s Ratio Prot	c0.07	0.08	0.41		0.16	c0.71
v/s Ratio Perm		0.06		0.04		
v/c Ratio	0.64	0.40	0.67	0.04	0.81	0.85
Uniform Delay, d1	51.6	33.7	15.9	0.0	46.3	5.9
Progression Factor	1.00	1.33	0.21	1.00	0.97	1.00
Incremental Delay, d2	7.2	0.5	2.0	0.0	6.1	5.2
Delay (s)	58.6	45.2	5.4	0.0	51.3	11.1
Level of Service	E	D	A	A	D	B
Approach Delay (s)	48.7	5.0			22.7	
Approach LOS	D		A		C	
Intersection Summary						
HCM Average Control Delay	21.8					HCM Level of Service C
HCM Volume to Capacity ratio	0.83					
Actuated Cycle Length (s)	120.0					Sum of lost time (s) 8.0
Intersection Capacity Utilization	75.3%					ICU Level of Service D
Analysis Period (min)	15					
c	Critical Lane Group					

Lanes, Volumes, Timings
11: Reinhardt College Parkway & College Street

Future AM - Improved
12/28/2006

	EBT	WBT	NBT	SBL	SBT
Lane Group	720	434	528	344	255
Lane Group Flow (vph)	0.98	0.62	0.78	0.99	0.30
v/c Ratio	61.8	15.6	35.4	80.0	17.7
Control Delay	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	61.8	15.6	35.4	80.0	17.7
Queue Length 50th (ft)	534	144	321	259	100
Queue Length 95th (ft)	#729	174	354	#355	128
Internal Link Dist (ft)	952	6443	4497		4161
Turn Bay Length (ft)				150	
Base Capacity (vph)	732	698	673	346	837
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.98	0.62	0.78	0.99	0.30

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection Summary

HCM Signalized Intersection Capacity Analysis
11: Reinhardt College Parkway & College Street

Future AM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔		↔		↔		↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt	0.99	0.99		0.94	0.94		0.96	0.96		1.00	0.94	
Flt Protected	0.99	0.99		0.99	0.99		0.99	0.99		0.95	1.00	
Satd. Flow (prot)	1829	1829		1748	1748		1760	1760		1770	1747	
Flt Permitted	0.85	0.85		0.82	0.82		0.79	0.79		0.40	1.00	
Satd. Flow (perm)	1563	1563		1450	1450		1412	1412		742	1747	
Volume (vph)	83	476	53	41	150	134	95	176	130	265	115	82
Peak-hour factor, PHF	0.85	0.85	0.85	0.75	0.75	0.75	0.76	0.76	0.76	0.77	0.77	0.77
Adj. Flow (vph)	98	560	62	55	200	179	125	232	171	344	149	106
RTOR Reduction (vph)	0	3	0	0	21	0	0	14	0	0	21	0
Lane Group Flow (vph)	0	717	0	0	413	0	0	514	0	344	234	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	2	2	4	4				8		
Permitted Phases	6						4				8	
Actuated Green, G (s)	56.0			56.0			56.0			56.0		56.0
Effective Green, g (s)	56.0			56.0			56.0			56.0		56.0
Actuated g/C Ratio	0.47			0.47			0.47			0.47		0.47
Clearance Time (s)	4.0			4.0			4.0			4.0		4.0
Vehicle Extension (s)	3.0			3.0			3.0			3.0		3.0
Lane Grp Cap (vph)	729			677			659			346		815
v/s Ratio Prot												0.13
v/s Ratio Perm	0.46			0.28			0.36			0.46		0.29
v/c Ratio	0.98			0.61			0.78			0.99		0.29
Uniform Delay, d1	31.6			23.9			26.8			31.8		19.7
Progression Factor	1.00			0.55			1.00			1.00		1.00
Incremental Delay, d2	29.7			3.2			5.8			46.6		0.2
Delay (s)	61.2			16.4			32.6			78.4		19.9
Level of Service	E			B			C			E		B
Approach Delay (s)	61.2			16.4			32.6			53.5		D
Approach LOS	E			B			C			D		
Intersection Summary												
HCM Average Control Delay				44.0			HCM Level of Service			D		
HCM Volume to Capacity ratio				0.99								
Actuated Cycle Length (s)				120.0			Sum of lost time (s)			8.0		
Intersection Capacity Utilization				91.9%			ICU Level of Service			F		
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings
12: Knox Bridge Highway & Fincher Road

Future AM - Improved
12/28/2006

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	172	674	43	598	56	417
v/c Ratio	0.50	0.54	0.16	0.48	0.12	0.91
Control Delay	18.5	13.5	11.6	12.4	10.0	57.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.5	13.5	11.6	12.4	10.0	57.1
Queue Length 50th (ft)	59	238	11	197	4	251
Queue Length 95th (ft)	169	461	38	385	20	333
Internal Link Dist (ft)	1486	1519	60	3460	3239	
Turn Bay Length (ft)	640					
Base Capacity (vph)	347	1259	277	1240	672	658
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.54	0.16	0.48	0.08	0.63
Intersection Summary						

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
12: Knox Bridge Highway & Fincher Road

Future AM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	1.00	1.00	0.98	0.88	1.00	0.88	1.00	0.91	0.91	0.91
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
Satd. Flow (prot)	1770	1860	1770	1828	1828	1828	1637	1637	1671	1671	1671	1671
Flt Permitted	0.36	1.00	0.31	1.00	0.98	0.89	0.98	0.98	0.98	0.89	0.89	0.89
Satd. Flow (perm)	663	1860	581	1828	1828	1828	1609	1609	1504	1504	1504	1504
Volume (vph)	155	600	6	41	502	72	3	2	35	115	14	251
Peak-hour factor, PHF	0.90	0.90	0.90	0.96	0.96	0.96	0.72	0.72	0.72	0.91	0.91	0.91
Adj. Flow (vph)	172	667	7	43	523	75	4	3	49	126	15	276
RTOR Reduction (vph)	0	0	0	0	3	0	0	36	0	0	73	0
Lane Group Flow (vph)	172	674	0	43	595	0	0	20	0	0	344	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	2	2	4	4	4	4	4	8	8	8
Permitted Phases	6	6	2	2	4	4	4	4	4	8	8	8
Actuated Green, G (s)	81.2	81.2	81.2	81.2	81.2	81.2	30.8	30.8	30.8	30.8	30.8	30.8
Effective Green, g (s)	81.2	81.2	81.2	81.2	81.2	81.2	30.8	30.8	30.8	30.8	30.8	30.8
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.68	0.68	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	449	1259	393	1237	1237	1237	413	413	386	386	386	386
v/s Ratio Prot	0.26	0.36	0.07	0.33	0.33	0.33	0.01	0.01	c0.23	c0.23	c0.23	c0.23
v/c Ratio	0.38	0.54	0.11	0.48	0.48	0.48	0.05	0.05	0.89	0.89	0.89	0.89
Uniform Delay, d1	8.5	9.8	6.8	9.3	9.3	9.3	33.6	33.6	43.0	43.0	43.0	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	2.5	1.6	0.6	1.3	1.3	1.3	0.0	0.0	21.8	21.8	21.8	21.8
Delay (s)	10.9	11.5	7.3	10.6	10.6	10.6	33.6	33.6	64.8	64.8	64.8	64.8
Level of Service	B	B	A	B	B	B	C	C	E	E	E	E
Approach Delay (s)	11.4	11.4	10.4	10.4	10.4	10.4	33.6	33.6	64.8	64.8	64.8	64.8
Approach LOS	B	B	B	B	B	B	C	C	E	E	E	E
Intersection Summary												
HCM Average Control Delay	23.1					HCM Level of Service			C			
HCM Volume to Capacity ratio	0.63					Sum of lost time (s)			8.0			
Actuated Cycle Length (s)	120.0					ICU Level of Service			D			
Intersection Capacity Utilization	78.6%					Analysis Period (min)			15			
Critical Lane Group												

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
15: Bells Ferry Road & Marietta Highway

Future AM - Improved
12/28/2006

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	417	267	16	115	129	27	614	110	757	401
v/c Ratio	0.88	0.45	0.29	0.60	0.46	0.15	0.54	0.38	0.66	0.36
Control Delay	60.1	32.8	40.1	43.0	13.7	15.8	17.3	19.1	20.8	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.1	32.8	40.1	43.0	13.7	15.8	17.3	19.1	20.8	3.0
Queue Length 50th (ft)	285	160	12	91	38	9	260	41	363	10
Queue Length 95th (ft)	330	196	m22	103	37	31	448	98	571	51
Internal Link Dist (ft)	1761		266				463		416	
Turn Bay Length (ft)	150				150	150		150		250
Base Capacity (vph)	575	754	71	248	323	176	1135	293	1139	1111
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.35	0.23	0.46	0.40	0.15	0.54	0.38	0.66	0.36
Intersection Summary										
m	Volume for 95th percentile queue is metered by upstream signal.									

HCM Signalized Intersection Capacity Analysis
15: Bells Ferry Road & Marietta Highway

Future AM - Improved
12/28/2006

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Movement	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.99	1.00	1.00	0.85	1.00	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1839	1770	1863	1583	1770	1856	1770	1863	1583
Flt Permitted	0.54	1.00	0.32	1.00	1.00	0.22	1.00	0.31	1.00	1.00
Satd. Flow (perm)	1013	1839	601	1863	1583	418	1856	584	1863	1583
Volume (vph)	359	210	20	12	86	97	26	569	14	95
Peak-hour factor, PHF	0.86	0.86	0.86	0.75	0.75	0.75	0.95	0.95	0.86	0.86
Adj. Flow (vph)	417	244	23	16	115	129	27	599	15	110
RTOR Reduction (vph)	0	3	0	0	0	116	0	1	0	0
Lane Group Flow (vph)	417	264	0	16	115	13	27	613	0	110
Turn Type	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	3	8		4		4	6		2	2
Permitted Phases	8		4		4	6		2		
Actuated Green, G (s)	38.6	38.6	12.4	12.4	12.4	12.4	73.4	73.4	73.4	73.4
Effective Green, g (s)	38.6	38.6	12.4	12.4	12.4	12.4	73.4	73.4	73.4	73.4
Actuated g/C Ratio	0.32	0.32	0.10	0.10	0.10	0.10	0.61	0.61	0.61	0.61
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	466	592	62	193	164	256	1135	357	1140	968
v/s Ratio Prot	c0.17	0.14		0.06		0.01	0.06		0.19	0.16
v/s Ratio Perm	c0.12		0.03		0.26	0.60	0.08	0.11	0.54	0.31
Uniform Delay, d1	38.9	32.2	49.6	51.4	48.6	9.7	13.5	11.1	15.2	10.8
Progression Factor	1.00	1.00	0.57	0.61	1.04	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	19.3	0.5	2.1	4.6	0.2	0.8	1.8	2.2	3.1	0.7
Delay (s)	58.2	32.8	30.2	35.9	50.8	10.5	15.4	13.4	18.3	11.5
Level of Service	E	C	C	D	D	B	B	B	B	B
Approach Delay (s)		48.2		42.9		15.2		15.7		
Approach LOS		D		D		B		B		
Intersection Summary										
HCM Average Control Delay	25.9									
HCM Volume to Capacity ratio	0.74									
Actuated Cycle Length (s)	120.0									
Intersection Capacity Utilization	74.2%									
Analysis Period (min)	15									
c	Critical Lane Group									

Future PM Intersection Analysis

Future 2020 PM

Lanes, Volumes, Timings
1: Cumming Highway & I -575 Northbound Ramp

Future PM
12/28/2006

	EBL	EBT	WBT	WBR	NBR	SBR
Lane Group	EBL	EBT	WBT	WBR	NBR	SBR
Lane Group Flow (vph)	426	1064	1407	491	1107	187
v/c Ratio	0.83	0.30	0.56	0.40	0.52	0.12
Control Delay	37.1	0.0	10.7	4.2	5.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	0.0	10.7	4.2	5.8	0.1
Queue Length 50th (ft)	198	0	245	41	98	0
Queue Length 95th (ft)	m138	m0	415	123	207	0
Internal Link Dist (ft)	1047	677				
Turn Bay Length (ft)	150		325			
Base Capacity (vph)	774	3539	2517	1215	2121	1611
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.30	0.56	0.40	0.52	0.12
Intersection Summary						
m	Volume for 95th percentile queue is metered by upstream signal.					

Baseline
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HCM Signalized Intersection Capacity Analysis
1: Cumming Highway & I -575 Northbound Ramp

Future PM
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.85		1.00	0.86	
Flt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Satd. Flow (prot)	1770	3539		3539	1583		2787	2787		1611	1611	
Flt Permitted	0.14	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Satd. Flow (perm)	259	3539		3539	1583		2787	2787		1611	1611	
Volume (vph)	392	979	0	0	1379	481	0	0	1018	0	0	183
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.98	0.98	0.92	0.92	0.92	0.98	0.98	0.98
Adj. Flow (vph)	426	1064	0	0	1407	491	0	0	1107	0	0	187
RTOR Reduction (vph)	0	0	0	0	0	89	0	0	139	0	0	0
Lane Group Flow (vph)	426	1064	0	0	1407	402	0	0	988	0	0	187
Turn Type	pm+pt					Perm		custom				custom
Protected Phases	1	6			2							
Permitted Phases	6				2				2			6
Actuated Green, G (s)	116.0	120.0			85.3	85.3			85.3			120.0
Effective Green, g (s)	116.0	120.0			85.3	85.3			85.3			120.0
Actuated g/C Ratio	0.97	1.00			0.71	0.71			0.71			1.00
Clearance Time (s)	4.0	4.0			4.0	4.0			4.0			4.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0			3.0			3.0
Lane Grp Cap (vph)	587	3539			2516	1125			1981			1611
v/s Ratio Prot	c0.16	0.30			0.40							
v/s Ratio Perm	c0.54					0.25			0.35			0.12
v/c Ratio	0.73	0.30			0.56	0.36			0.49			0.12
Uniform Delay, d1	21.8	0.0			8.3	6.7			7.7			0.0
Progression Factor	1.37	1.00			1.00	1.00			1.00			1.00
Incremental Delay, d2	0.4	0.0			0.9	0.9			0.9			0.1
Delay (s)	30.4	0.0			9.2	7.6			8.6			0.1
Level of Service	C	A			A	A			A			A
Approach Delay (s)		8.7			8.8			8.6				0.1
Approach LOS		A			A			A				A
Intersection Summary												
HCM Average Control Delay	8.4						HCM Level of Service					
HCM Volume to Capacity ratio	0.72						A					
Actuated Cycle Length (s)	120.0						Sum of lost time (s)					
Intersection Capacity Utilization	69.3%						ICU Level of Service					
Analysis Period (min)	15						C					
c	Critical Lane Group											

Baseline
A & R Engineering Inc.

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Lanes, Volumes, Timings
2: Cumming Highway & I-575 Southbound Ramp

Future PM
12/28/2006



Lane Group	EBT	EBR	WBT	SBL	SBR
Lane Group Flow (vph)	777	577	1767	676	193
v/c Ratio	1.15	0.36	1.28dr	1.18	0.46
Control Delay	113.4	0.5	86.4	133.2	16.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	113.4	0.5	86.4	133.2	16.1
Queue Length 50th (ft)	~365	0	~688	~626	31
Queue Length 95th (ft) m#415	2177	m0	#368	#857	101
Internal Link Dist (ft)	2177	1047			
Turn Bay Length (ft)	150				320
Base Capacity (vph)	678	1583	1561	575	421
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.15	0.36	1.13	1.18	0.46

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis
2: Cumming Highway & I-575 Southbound Ramp

Future PM
12/28/2006



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔↔	↔	↔↔	↔↔	↔↔				↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.85	0.95	1.00	0.90				1.00	1.00	0.85
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00				0.95	0.95	1.00
Satd. Flow (prot)	3539	1583	3169	3169	1770	1770				1770	1583	1583
Flt Permitted	1.00	1.00	1.00	1.00	1.00	0.95				0.95	1.00	1.00
Satd. Flow (perm)	3539	1583	3169							1770	1583	
Volume (vph)	0	699	519	0	509	1169	0	0	0	656	0	187
Peak-hour factor, PHF	0.90	0.90	0.90	0.95	0.95	0.95	0.92	0.92	0.92	0.97	0.97	0.97
Adj. Flow (vph)	0	777	577	0	536	1231	0	0	0	676	0	193
RTOR Reduction (vph)	0	0	0	0	345	0	0	0	0	0	0	118
Lane Group Flow (vph)	0	777	577	0	1422	0	0	0	0	676	0	75
Turn Type		Free	Free							Prot	custom	
Protected Phases		6	2							1		6
Permitted Phases		Free	Free							39.0		23.0
Actuated Green, G (s)		23.0	120.0		46.0					39.0		23.0
Effective Green, g (s)		23.0	120.0		46.0					39.0		23.0
Actuated g/C Ratio		0.19	1.00		0.38					0.32		0.19
Clearance Time (s)		4.0	4.0		4.0					4.0		4.0
Vehicle Extension (s)		3.0	3.0		3.0					3.0		3.0
Lane Grp Cap (vph)		678	1583		1215					575		303
v/s Ratio Prot		c0.22	c0.45							c0.38		
v/c Ratio Perm		1.15	0.36		1.28dr					1.18		0.05
Uniform Delay, d1		48.5	0.0		37.0					40.5		41.2
Progression Factor		0.76	1.00		0.69					1.00		1.00
Incremental Delay, d2		78.3	0.5		84.9					96.3		1.9
Delay (s)		115.2	0.5		110.4					136.8		43.1
Level of Service		F	A		F					F		D
Approach Delay (s)		66.3			110.4			0.0				116.0
Approach LOS		E			F			A				F
Intersection Summary												
HCM Average Control Delay			96.6									F
HCM Volume to Capacity ratio			1.17									
Actuated Cycle Length (s)			120.0									12.0
Intersection Capacity Utilization			94.8%									F
Analysis Period (min)			15									
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

Lanes, Volumes, Timings
3: Bobo Grinding Co Driveway & Marietta Street

Future PM
12/28/2006

	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	30	392	547	705	792	700
Lane Group Flow (vph)	0.13	1.18	0.69	1.16	1.20	0.54
v/c Ratio	32.8	148.5	8.5	124.7	128.0	10.2
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	32.8	148.5	8.5	124.7	128.0	10.2
Total Delay	15	~364	4	~636	~670	231
Queue Length 50th (ft)	23	#559	106	#692	m#697	m269
Queue Length 95th (ft)	95	1440	3002			1058
Internal Link Dist (ft)						
Turn Bay Length (ft)		150			90	
Base Capacity (vph)	237	332	794	606	660	1286
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.13	1.18	0.69	1.16	1.20	0.54

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Baseline
A & R Engineering Inc.

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HCM Signalized Intersection Capacity Analysis
3: Bobo Grinding Co Driveway & Marietta Street

Future PM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794
Flt Permitted	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53
Satd. Flow (perm)	965	965	965	1374	1586		1773	230	1859			
Volume (vph)	5	9	3	380	6	525	5	443	215	657	573	8
Peak-hour factor, PHF	0.55	0.55	0.55	0.97	0.97	0.97	0.94	0.94	0.94	0.83	0.83	0.83
Adj. Flow (vph)	9	16	5	392	6	541	5	471	229	792	690	10
RTOR Reduction (vph)	0	4	0	0	410	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	26	0	392	137	0	0	690	0	792	700	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	pm+pt				
Protected Phases	8	8	4	4	4	6	6	5	2			
Permitted Phases	8	8	4	4	4	6	6	5	2			
Actuated Green, G (s)	29.0	29.0	29.0	29.0	29.0	40.0	40.0	83.0	83.0			
Effective Green, g (s)	29.0	29.0	29.0	29.0	29.0	40.0	40.0	83.0	83.0			
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.33	0.33	0.69	0.69			
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	233	332	383			591		660	1286			
v/s Ratio Prot												
v/s Ratio Perm	0.03	c0.29	0.09			0.39		c0.39	0.38			
v/c Ratio	0.11	1.18	0.36	1.17	1.20	0.54		0.54				
Uniform Delay, d1	35.5	45.5	37.8	40.0	32.7	9.1		32.7	9.1			
Progression Factor	1.00	1.00	1.00	0.99	0.99	0.78		0.78	0.93			
Incremental Delay, d2	0.2	108.0	0.6	91.5	102.9	1.5		102.9	1.5			
Delay (s)	35.7	153.5	38.3	131.0	128.5	10.0		128.5	10.0			
Level of Service	D	F	D	F	F	A		F	A			
Approach Delay (s)	35.7		86.4			72.9						
Approach LOS	D		F			E						
Intersection Summary												
HCM Average Control Delay		89.5										
HCM Volume to Capacity ratio		1.18										
Actuated Cycle Length (s)		120.0										
Intersection Capacity Utilization		115.9%										
Analysis Period (min)		15										
c Critical Lane Group												

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
4: Big K-Mart Driveway & Marietta Highway

Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	249	648	1041	21	1465	696	626	1623	36
v/c Ratio	1.02	1.50	1.43	0.21	1.46	0.93	1.70	0.94	0.05
Control Delay	114.3	271.9	222.3	58.8	245.9	37.2	348.6	31.9	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	114.3	271.9	222.3	58.8	245.9	37.2	348.6	31.9	9.8
Queue Length 50th (ft)	~202	-697	-813	16	-817	247	-718	552	4
Queue Length 95th (ft)	#320	#924	#1072	43	#956	#508	m#866	m566	m13
Internal Link Dist. (ft)	162	491			2132			4585	
Turn Bay Length (ft)			395	150			150		90
Base Capacity (vph)	243	431	728	118	1003	747	369	1718	774
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.02	1.50	1.43	0.18	1.46	0.93	1.70	0.94	0.05
Intersection Summary									
~	Volume exceeds capacity, queue is theoretically infinite.								
	Queue shown is maximum after two cycles.								
#	95th percentile volume exceeds capacity, queue may be longer.								
	Queue shown is maximum after two cycles.								
%	Volume for 95th percentile queue is metered by upstream signal.								

HCM Signalized Intersection Capacity Analysis
4: Big K-Mart Driveway & Marietta Highway

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00			1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	0.98			1.00	0.85	1.00	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.97			0.96	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1781			1782	1583	1770	3539	1583	1770	3539	1583	1770
Flt Permitted	0.97			0.96	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1781			1782	1583	1770	3539	1583	1770	3539	1583	1770
Volume (vph)	106	70	29	552	57	979	20	1421	675	576	1493	33
Peak-hour factor, PHF	0.82	0.82	0.82	0.94	0.94	0.94	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	129	85	35	587	61	1041	21	1465	696	626	1623	36
RTOR Reduction (vph)	0	5	0	0	0	345	0	0	306	0	0	5
Lane Group Flow (vph)	0	244	0	0	648	696	21	1465	390	626	1623	31
Turn Type	Split			Split			Perm	Prot	Perm	Prot	Perm	Prot
Protected Phases	8	8		4	4		1	6	1	5	2	
Permitted Phases	8			4			4		6		2	
Actuated Green, G (s)	16.0			29.0	29.0	29.0	3.1	31.6	31.6	27.4	55.9	55.9
Effective Green, g (s)	16.0			29.0	29.0	29.0	3.1	31.6	31.6	27.4	55.9	55.9
Actuated g/C Ratio	0.13			0.24	0.24	0.24	0.03	0.26	0.26	0.23	0.47	0.47
Clearance Time (s)	4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	237			431	383	46	932	417	404	1649	737	
v/s Ratio Prot	c0.14			0.36			0.01	c0.41		c0.35	0.46	
v/s Ratio Perm				c0.44					0.25			0.02
v/c Ratio	1.03			1.50	1.82	0.46	1.57	0.93	1.55	0.98	0.04	
Uniform Delay, d1	52.0			45.5	45.5	57.6	44.2	43.2	46.3	31.6	17.5	
Progression Factor	1.00			1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.76	
Incremental Delay, d2	66.1			238.4	377.9	7.0	262.6	30.3	254.2	13.3	0.1	
Delay (s)	118.1			283.9	423.4	64.6	306.8	73.5	293.8	37.3	11.5	
Level of Service	F			F	F	F	E	E	F	F	D	B
Approach Delay (s)	118.1			369.9			230.0		107.2			
Approach LOS	F			F			F		F			
Intersection Summary												
HCM Average Control Delay	218.7			HCM Level of Service								
HCM Volume to Capacity ratio	1.55			F								
Actuated Cycle Length (s)	120.0			Sum of lost time (s)								
Intersection Capacity Utilization	121.4%			16.0								
Analysis Period (min)	15			H								
Critical Lane Group												

Lanes, Volumes, Timings
5: Riverstone Parkway & I - 575 Northbound Ramp

Future PM
12/28/2006

	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	753	977	1161	309	1168	808
v/c Ratio	1.34	0.47	1.19	0.20	1.00	1.30
Control Delay	182.3	0.7	135.9	0.3	65.0	175.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	182.3	0.7	135.9	0.3	65.0	175.6
Queue Length 50th (ft)	~693	1	~572	0	462	~739
Queue Length 95th (ft) m#765	m8	#707	0	#615	#985	
Internal Link Dist (ft)	1330	1370				
Turn Bay Length (ft)	370		300	490		
Base Capacity (vph)	563	2094	973	1583	1173	622
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.34	0.47	1.19	0.20	1.00	1.30

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
5: Riverstone Parkway & I - 575 Northbound Ramp

Future PM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.85	1.00	0.85			
Flt Protected	0.95	1.00		1.00	1.00	1.00	0.95	1.00	0.95			
Satd. Flow (prot)	1770	3539		3539	1583	3433	1583					
Flt Permitted	0.11	1.00		1.00	1.00	0.95	1.00					
Satd. Flow (perm)	201	3539		3539	1583	3433	1583					
Volume (vph)	723	938	0	0	1091	290	1121	0	776	0	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.94	0.94	0.94	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	753	977	0	0	1161	309	1168	0	808	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	81	0	0	0
Lane Group Flow (vph)	753	977	0	0	1161	309	1168	0	727	0	0	0
Turn Type	pm+pt Free custom custom											
Protected Phases	1	6			2							
Permitted Phases	6				Free	4			4			
Actuated Green, G (s)	71.0	71.0			33.0	120.0	41.0		41.0			
Effective Green, g (s)	71.0	71.0			33.0	120.0	41.0		41.0			
Actuated g/C Ratio	0.59	0.59			0.28	1.00	0.34		0.34			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	563	2094			973	1583	1173		541			
v/s Ratio Prot	c0.38	0.28			0.33							
v/s Ratio Perm	c0.41				1.19	0.20	1.00		c0.46			
v/c Ratio	1.34	0.47			1.19	0.20	1.00		1.34			
Uniform Delay, d1	45.2	13.8			43.5	0.0	39.4		39.5			
Progression Factor	0.78	0.03			1.00	1.00	1.00		1.00			
Incremental Delay, d2	156.2	0.3			97.2	0.3	25.1		166.8			
Delay (s)	191.6	0.7			140.7	0.3	64.5		206.3			
Level of Service	F	A			F	A	E		F			
Approach Delay (s)		83.8			111.2		122.5				0.0	
Approach LOS		F			F		F				A	
Intersection Summary												
HCM Average Control Delay					106.3		HCM Level of Service		F			
HCM Volume to Capacity ratio					1.32							
Actuated Cycle Length (s)					120.0		Sum of lost time (s)		8.0			
Intersection Capacity Utilization					112.2%		ICU Level of Service		H			
Analysis Period (min)					15							
c Critical Lane Group												

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
6: Riverstone Parkway & I - 575 Southbound Ramp

Future PM
12/28/2006

Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	1683	794	542	1648	122	758
v/c Ratio	0.95	0.50	0.93	0.56	0.64	0.48
Control Delay	30.1	1.1	35.8	0.1	66.3	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.1	1.1	35.8	0.1	66.3	1.0
Queue Length 50th (ft)	408	0	193	0	92	0
Queue Length 95th (ft)	#812	m2	m175	m0	153	0
Internal Link Dist (ft)	752		1330			
Turn Bay Length (ft)		225	375			
Base Capacity (vph)	1764	1583	583	2923	236	1583
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.50	0.93	0.56	0.52	0.48
Intersection Summary						
#	95th percentile volume exceeds capacity, queue may be longer.					
m	Queue shown is maximum after two cycles.					
	Volume for 95th percentile queue is metered by upstream signal.					

HCM Signalized Intersection Capacity Analysis
6: Riverstone Parkway & I - 575 Southbound Ramp

Future PM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔↔	↔	↔	↔↔					↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0					4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	1.00	0.95					1.00	1.00	1.00
Flt	1.00	0.85	1.00	1.00	1.00					1.00	0.85	1.00
Flt Protected	1.00	1.00	1.00	0.95	1.00					0.95	1.00	1.00
Satd. Flow (prot)	3539	1583	1770	3539						1770	1583	1583
Flt Permitted	1.00	1.00	0.06	1.00						0.95	1.00	1.00
Satd. Flow (perm)	3539	1583	117	3539						1770	1583	1583
Volume (vph)	0	1599	754	520	1582	0	0	0	0	112	0	697
Peak-hour factor, PHF	0.95	0.95	0.95	0.96	0.96	0.96	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1683	794	542	1648	0	0	0	0	122	0	758
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1683	794	542	1648	0	0	0	0	122	0	758
Turn Type		Free pm+pt								custom		Free
Protected Phases		6	5	2								
Permitted Phases			Free	2						8		Free
Actuated Green, G (s)		59.8	120.0	99.1	99.1					12.9		120.0
Effective Green, g (s)		59.8	120.0	99.1	99.1					12.9		120.0
Actuated g/C Ratio		0.50	1.00	0.83	0.83					0.11		1.00
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0		4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		1764	1583	583	2923					190		1583
v/s Ratio Prot		0.48		c0.27	0.47							
v/s Ratio Perm		0.95	0.50	0.93	0.56					0.07		0.48
v/c Ratio		28.8	0.0	36.4	3.4					51.3		0.0
Uniform Delay, d1		0.63	1.00	0.94	0.02					1.00		1.00
Progression Factor		10.8	0.9	2.9	0.1					7.2		1.0
Incremental Delay, d2		28.9	0.9	37.3	0.1					58.6		1.0
Delay (s)		C	A	D	A					E		A
Level of Service		B								A		A
Approach Delay (s)		19.9			9.3		0.0			9.0		
Approach LOS		B			A		A			A		
Intersection Summary												
HCM Average Control Delay			14.0				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			4.0		
Intersection Capacity Utilization			112.2%				ICU Level of Service			H		
Analysis Period (min)			15									
c	Critical Lane Group											

Lanes, Volumes, Timings
7: Riverstone Parkway & Riverstone Boulevard

Future PM
12/28/2006

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	220	1771	1688	694	796	225
Lane Group Flow (vph)	0.58	0.53	0.73	0.44	0.85	0.43
v/c Ratio	35.3	4.2	17.9	0.8	50.8	16.9
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.3	4.2	17.9	0.8	50.8	16.9
Queue Length 50th (ft)	111	100	313	0	299	57
Queue Length 95th (ft)	m189	122	417	0	354	121
Internal Link Dist (ft)	1490	547			375	
Turn Bay Length (ft)	165			290		110
Base Capacity (vph)	377	3364	2304	1583	1059	577
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.53	0.73	0.44	0.75	0.39

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

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
7: Riverstone Parkway & Riverstone Boulevard

Future PM
12/28/2006



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	1.00
Flt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	3433	1583
Flt Permitted	0.07	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	128	5085	5085	1583	3433	1583
Volume (vph)	205	1647	1620	666	708	200
Peak-hour factor, PHF	0.93	0.93	0.96	0.96	0.89	0.89
Adj. Flow (vph)	220	1771	1688	694	796	225
RTOR Reduction (vph)	0	0	0	0	0	94
Lane Group Flow (vph)	220	1771	1688	694	796	131
Turn Type	pm+pt	Free	Free	Free	Perm	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6			Free		8
Actuated Green, G (s)	79.4	79.4	54.4	120.0	32.6	32.6
Effective Green, g (s)	79.4	79.4	54.4	120.0	32.6	32.6
Actuated g/C Ratio	0.66	0.66	0.45	1.00	0.27	0.27
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	372	3365	2305	1583	933	430
v/s Ratio Prot	c0.10	0.35	c0.33		c0.23	
v/s Ratio Perm	0.29			0.44		0.08
v/c Ratio	0.59	0.53	0.73	0.44	0.85	0.30
Uniform Delay, d1	31.9	10.5	26.8	0.0	41.4	34.7
Progression Factor	0.84	0.33	0.58	1.00	1.00	1.00
Incremental Delay, d2	2.2	0.5	1.8	0.8	7.6	0.4
Delay (s)	29.1	4.0	17.4	0.8	49.1	35.1
Level of Service	C	A	B	A	D	D
Approach Delay (s)		6.8	12.5		46.0	
Approach LOS		A	B		D	
Intersection Summary						
HCM Average Control Delay			16.7		HCM Level of Service	B
HCM Volume to Capacity ratio			0.72			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			72.9%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
8: Riverstone Parkway & Reinhardt College Parkway

Future PM
12/28/2006



Lane Group	EBL	EBT	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	400	1660	1489	268	41	373	207
v/c Ratio	0.88	0.45	0.60	0.17	0.25	0.70	0.29
Control Delay	22.2	9.3	6.4	0.2	43.8	43.1	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.2	9.3	6.4	0.2	43.8	43.1	0.9
Queue Length 50th (ft)	223	312	58	0	26	93	0
Queue Length 95th (ft)	m180	m287	74	m0	61	m102	m0
Internal Link Dist (ft)	1839	1490			2053		2482
Turn Bay Length (ft)	190						
Base Capacity (vph)	611	3722	2481	1583	174	579	731
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.45	0.60	0.17	0.24	0.64	0.28

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

HCM Signalized Intersection Capacity Analysis
8: Riverstone Parkway & Reinhardt College Parkway

Future PM
12/28/2006



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		0.91	1.00		0.85	1.00		0.97	1.00	
Flt	1.00	1.00		1.00	1.00		0.85	1.00		1.00	0.85	
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5075		5085	1583		1770	3433		1583		
Flt Permitted	0.09	1.00		1.00	1.00		0.41	0.74		1.00		
Satd. Flow (perm)	175	5075		5085	1583		757	2678		1583		
Volume (vph)	380	1555	21	0	1444	260	38	0	0	366	0	203
Peak-hour factor, PHF	0.95	0.95	0.92	0.92	0.97	0.92	0.92	0.92	0.92	0.98	0.92	0.98
Adj. Flow (vph)	400	1637	23	0	1489	268	41	0	0	373	0	207
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	0	166
Lane Group Flow (vph)	400	1659	0	0	1489	268	0	41	0	373	41	0
Turn Type	pm+pt		Perm	Perm	Free	Perm	Perm					
Protected Phases	1	6		2		2		4				8
Permitted Phases	6											
Actuated Green, G (s)	88.0	88.0		58.6	120.0		24.0			24.0		24.0
Effective Green, g (s)	88.0	88.0		58.6	120.0		24.0			24.0		24.0
Actuated g/C Ratio	0.73	0.73		0.49	1.00		0.20			0.20		0.20
Clearance Time (s)	4.0	4.0		4.0			4.0			4.0		4.0
Vehicle Extension (s)	3.0	3.0		3.0			3.0			3.0		3.0
Lane Grp Cap (vph)	466	3722		2483	1583		151			536		317
v/s Ratio Prot	c0.18	0.33		0.29						c0.14		0.03
v/s Ratio Perm	c0.45											
v/c Ratio	0.86	0.45		0.60	0.17		0.05			0.70		0.13
Uniform Delay, d1	31.4	6.3		22.2	0.0		40.6			44.6		39.4
Progression Factor	0.66	1.39		0.23	1.00		1.00			0.85		1.00
Incremental Delay, d2	1.6	0.0		0.8	0.2		1.0			2.8		0.1
Delay (s)	22.2	8.9		5.9	0.2		41.6			40.8		39.6
Level of Service	C	A		A	A		D			D		D
Approach Delay (s)		11.5		5.0			41.6			40.3		
Approach LOS		B		A			D			D		
Intersection Summary												
HCM Average Control Delay				13.0			HCM Level of Service			B		
HCM Volume to Capacity ratio				0.81								
Actuated Cycle Length (s)				120.0			Sum of lost time (s)			8.0		
Intersection Capacity Utilization				87.6%			ICU Level of Service			E		
Analysis Period (min)				15								
c Critical Lane Group												

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group Flow (vph)	643	1344	413	1505	538	442	548	293	275	534	
v/c Ratio	1.44	1.05	1.07	1.29	1.39	1.09	0.90	1.23	1.11	1.11	
Control Delay	236.2	51.5	106.0	161.9	220.1	116.7	36.2	166.4	131.3	91.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	236.2	51.5	106.0	161.9	220.1	116.7	36.2	166.4	131.3	91.5	
Queue Length 50th (ft)	~635	~576	~289	~792	~508	~387	172	~233	~242	~250	
Queue Length 95th (ft) m#496	m279	#484	#941	#728	#590	#389	#413	#414	#462		
Internal Link Dist (ft)	1240	3515							4852		
Turn Bay Length (ft)	150	150			160			80		90	
Base Capacity (vph)	446	1283	387	1166	387	404	610	239	248	479	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	1.44	1.05	1.07	1.29	1.39	1.09	0.90	1.23	1.11	1.11	

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	3472	1770	3463	1770	3463	1770	1863	1583	1770	1863
Flt Permitted	0.09	1.00	0.10	1.00	0.20	1.00	0.20	1.00	0.25	1.00	0.25
Satd. Flow (perm)	169	3472	186	3463	373	1863	373	1863	466	1863	1583
Volume (vph)	611	1114	162	380	1187	198	495	407	504	278	261
Peak-hour factor, PHF	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.95
Adj. Flow (vph)	643	1173	171	413	1290	215	538	442	548	293	275
RTOR Reduction (vph)	0	10	0	0	11	0	0	0	267	0	0
Lane Group Flow (vph)	643	1335	0	413	1494	0	538	442	281	293	275
Turn Type	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	1	6	5	5	2	7	4	4	3	8	8
Permitted Phases	6		2			4		4		8	
Actuated Green, G (s)	70.0	44.0	62.0	40.0	40.0	42.0	26.0	26.0	28.0	16.0	16.0
Effective Green, g (s)	70.0	44.0	62.0	40.0	40.0	42.0	26.0	26.0	28.0	16.0	16.0
Actuated g/C Ratio	0.58	0.37	0.52	0.33	0.33	0.35	0.22	0.22	0.23	0.13	0.13
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	445	1273	387	1154	387	404	343	239	248	211	
v/s Ratio Prot	c0.31	0.38	0.20	0.43	c0.26	0.24		0.12	0.15		
v/s Ratio Perm	c0.53		0.36		c0.23			0.18	0.16		
v/c Ratio	1.44	1.05	1.07	1.29	1.39	1.09	0.82	1.23	1.11	1.26	
Uniform Delay, d1	49.2	38.0	51.2	40.0	34.6	47.0	44.8	56.2	52.0	52.0	
Progression Factor	1.24	0.58	1.31	0.63	1.00	1.00	1.00	1.23	0.90	0.68	
Incremental Delay, d2	203.9	28.4	61.9	138.2	190.8	72.6	14.1	131.2	87.5	148.2	
Delay (s)	265.1	50.5	129.0	163.4	225.5	119.6	58.8	200.4	134.1	183.3	
Level of Service	F	D	F	F	F	F	F	E	F	F	
Approach Delay (s)	119.9			156.0			135.1		175.6		
Approach LOS	F			F			F		F		

Intersection Summary

HCM Average Control Delay 143.4 HCM Level of Service F

HCM Volume to Capacity ratio 1.39

Actuated Cycle Length (s) 120.0 Sum of lost time (s) 8.0

Intersection Capacity Utilization 127.5% ICU Level of Service H

Analysis Period (min) 15

c Critical Lane Group

Lanes, Volumes, Timings
10: Reinhardt College Parkway & Waleska Road

Future PM
12/28/2006

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group	128	635	1062	194	350	730
Lane Group Flow (vph)	0.32	1.08	1.09	0.12	1.07	0.55
v/c Ratio	39.1	78.3	56.7	0.0	104.2	10.3
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	78.3	56.7	0.0	104.2	10.3
Queue Length 50th (ft)	61	~186	~901	0	~248	242
Queue Length 95th (ft)	m98 m#571	m161	m0	#440	333	2585
Internal Link Dist (ft)	3912	4852		250	275	
Turn Bay Length (ft)						
Base Capacity (vph)	398	589	978	1583	328	1320
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	1.08	1.09	0.12	1.07	0.55

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
10: Reinhardt College Parkway & Waleska Road

Future PM
12/28/2006

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt	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)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.06	1.00
Satd. Flow (perm)	1770	1583	1863	1583	111	1863
Volume (vph)	118	584	1051	192	322	672
Peak-hour factor, PHF	0.92	0.92	0.99	0.99	0.92	0.92
Adj. Flow (vph)	128	635	1062	194	350	730
RTOR Reduction (vph)	0	233	0	0	0	0
Lane Group Flow (vph)	128	403	1062	194	350	730
Turn Type	Perm	Perm	Free	pm+pt		
Protected Phases	4	6	5	2		
Permitted Phases	4	4	Free	2		
Actuated Green, G (s)	27.0	27.0	63.0	120.0	85.0	85.0
Effective Green, g (s)	27.0	27.0	63.0	120.0	85.0	85.0
Actuated g/C Ratio	0.22	0.22	0.52	1.00	0.71	0.71
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	398	356	978	1583	327	1320
v/s Ratio Prot	0.07	0.57	0.12	0.16	0.39	
v/s Ratio Perm	0.32	1.13	1.09	1.12	1.07	0.55
Uniform Delay, d1	38.8	46.5	28.5	0.0	53.2	8.4
Progression Factor	0.94	0.82	0.44	1.00	1.00	1.00
Incremental Delay, d2	0.4	85.0	40.6	0.0	69.7	1.7
Delay (s)	37.1	122.9	53.2	0.0	122.9	10.1
Level of Service	D	F	D	A	F	B
Approach Delay (s)	108.5		45.0		46.6	
Approach LOS	F		D		D	
Intersection Summary						
HCM Average Control Delay			61.2		HCM Level of Service	E
HCM Volume to Capacity ratio			1.07			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			98.1%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
11: Reinhardt College Parkway & College Street

Future PM
12/28/2006

	→	←	↑	↓	
Lane Group	EBT	WBT	NBT	SBT	
Lane Group Flow (vph)	585	810	286	381	
Intersection Summary					

Future PM
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Baseline
A & R Engineering Inc.

HCM Unsignalized Intersection Capacity Analysis
11: Reinhardt College Parkway & College Street

Future PM
12/28/2006

	→	↗	↘	↖	←	↖	↗	↘	↖	↗	↘	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	79	319	129	98	483	164	109	116	41	153	98	80
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.93	0.93	0.93	0.87	0.87	0.87
Hourly flow rate (vph)	88	354	143	107	525	178	117	125	44	176	113	92
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	586	810	286	380								
Volume Left (vph)	88	107	117	176								
Volume Right (vph)	143	178	44	92								
HadJ (s)	-0.08	-0.07	0.02	-0.02								
Departure Headway (s)	8.7	8.7	9.4	8.9								
Degree Utilization, x	1.42	1.96	0.75	0.94								
Capacity (veh/h)	418	419	372	380								
Control Delay (s)	225.2	461.5	35.7	61.2								
Approach Delay (s)	225.2	461.5	35.7	61.2								
Approach LOS	F	F	E	F								
Intersection Summary												
Delay			261.5									
HCM Level of Service			F									
Intersection Capacity Utilization			84.3%							E		
Analysis Period (min)			15									

Future PM
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Baseline
A & R Engineering Inc.

Lanes, Volumes, Timings
12: Knox Bridge Highway & Fincher Road

Future PM
12/28/2006

	↖	→	↗	←	↑	↓
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	305	527	34	843	72	327
Intersection Summary						

Future PM
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Baseline
A & R Engineering Inc.

HCM Unsignalized Intersection Capacity Analysis
12: Knox Bridge Highway & Fincher Road

Future PM
12/28/2006

	↖	→	↗	←	↑	↓
Movement	EBL	EBT	WBL	WBT	NBT	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	278	473	6	33	896	113
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.96
Hourly flow rate (vph)	305	520	7	34	725	118
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	843		526		2153	2046
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	843		526		2153	2046
tC, single (s)	4.1		4.1		7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		2.2		3.5	4.0
p0 queue free %	61		97		0	17
cM capacity (veh/h)	793		1040		9	33
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	305	526	34	843	72	327
Volume Left	305	0	34	0	12	99
Volume Right	0	7	0	118	32	222
cSH	793	1700	1040	1700	32	28
Volume to Capacity	0.39	0.31	0.03	0.50	2.23	11.79
Queue Length 95th (ft)	46	0	3	0	207	Err
Control Delay (s)	12.4	0.0	8.6	0.0	827.8	Err
Lane LOS	B	A	A	F	F	F
Approach Delay (s)	4.5		0.3		827.8	
Approach LOS	F		F		F	
Intersection Summary						
Average Delay	1581.1					
Intersection Capacity Utilization	92.9%					
Analysis Period (min)	15					

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
13: N Etowah Drive & Riverstone Parkway

Future PM
12/28/2006

→	←	↔	↑	↗	↘	↓	↖	
Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1428	174	759	1557	18	23	1582	975
Intersection Summary								

HCM Unsignalized Intersection Capacity Analysis
13: N Etowah Drive & Riverstone Parkway

Future PM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵			↵			↵	↵	↵	↵	↵	↵
Sign Control	Stop			Stop			Free	Free	Free	Free	Free	Free
Grade	0%			0%			0%	0%	0%	0%	0%	0%
Volume (veh/h)	518	127	426	6	83	26	698	1432	17	20	1392	858
Peak Hour Factor	0.75	0.75	0.75	0.66	0.66	0.66	0.92	0.92	0.92	0.88	0.88	0.88
Hourly flow rate (vph)	691	169	568	9	126	39	759	1557	18	23	1582	975
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3986	4720	791	3995	5676	778	2557			1575		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3986	4720	791	3995	5676	778	2557			1575		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	0	0	0	88	0			95		
cM capacity (veh/h)	0	0	333	0	0	339	170			414		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	1428	174	759	778	778	18	23	791	791	975		
Volume Left	691	9	759	0	0	0	23	0	0	0		
Volume Right	568	39	0	0	0	18	0	0	0	975		
cSH	0	0	170	1700	1700	414	1700	1700	1700	1700		
Volume to Capacity	Err	Err	4.45	0.46	0.46	0.01	0.05	0.47	0.47	0.57		
Queue Length 95th (ft)	Err	Err	Err	0	0	0	4	0	0	0		
Control Delay (s)	Err	Err	1607.5	0.0	0.0	0.0	14.2	0.0	0.0	0.0		
Lane LOS	F	F	F				B					
Approach Delay (s)	Err	Err	522.6				0.1					
Approach LOS	F	F	F									
Intersection Summary												
Average Delay	Err											
Intersection Capacity Utilization	155.2%											
Analysis Period (min)	15											

Lanes, Volumes, Timings
14: Broad Water Bay Road & Fincher Road

Future PM
12/28/2006

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	111	381	409	285
Intersection Summary				

Future PM
12/28/2006

HCM Unsignalized Intersection Capacity Analysis
14: Broad Water Bay Road & Fincher Road

Future PM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	15	66	18	171	54	125	36	136	180	108	120	35
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.86	0.86	0.86	0.92	0.92	0.92
Hourly flow rate (vph)	17	74	20	186	59	136	42	158	209	117	130	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	896	835	149	788	750	263	168			367		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	896	835	149	788	750	263	168			367		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	72	98	14	80	82	97			90		
cM capacity (veh/h)	166	265	897	215	298	776	1409			1191		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	111	380	409	286								
Volume Left	17	186	42	117								
Volume Right	20	136	209	38								
cSH	276	308	1409	1191								
Volume to Capacity	0.40	1.24	0.03	0.10								
Queue Length 95th (ft)	47	433	2	8								
Control Delay (s)	26.6	166.7	1.0	4.0								
Lane LOS	D	F	A	A								
Approach Delay (s)	26.6	166.7	1.0	4.0								
Approach LOS	D	F										
Intersection Summary												
Average Delay					57.2							
Intersection Capacity Utilization					71.2%					C		
Analysis Period (min)					15							

Lanes, Volumes, Timings
15: Bells Ferry Road & Marietta Highway

Future PM
12/28/2006

	EBT	WBT	NBL	NBT	SBL	SBT	SBR	
Lane Group	623	477	38	943	89	760	391	
V/c Ratio	1.48	0.58	0.61	1.19	1.44	0.96	0.46	
Control Delay	254.9	12.2	71.5	131.2	297.0	57.8	8.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	254.9	12.2	71.5	131.2	297.0	57.8	8.0	
Queue Length 50th (ft)	~669	178	23	~886	~94	562	45	
Queue Length 95th (ft)	#898	m196	#87	#1141	#159	#624	122	
Internal Link Dist (ft)	1761	266		463		416		
Turn Bay Length (ft)			150		150		250	
Base Capacity (vph)	421	821	62	791	62	792	842	
Starvation Cap Reductn	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	
Reduced V/c Ratio	1.48	0.58	0.61	1.19	1.44	0.96	0.46	
Intersection Summary								
~ Volume exceeds capacity, queue is theoretically infinite.								
Queue shown is maximum after two cycles.								
# 95th percentile volume exceeds capacity, queue may be longer.								
Queue shown is maximum after two cycles.								
m Volume for 95th percentile queue is metered by upstream signal.								

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
15: Bells Ferry Road & Marietta Highway

Future PM
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. 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
Frt	0.99	0.99		0.95	0.95		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.96	0.96		0.99	0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1781	1781		1758	1758		1770	1859		1770	1863	1583
Flt Permitted	0.45	0.45		0.89	0.89		0.08	1.00		0.08	1.00	1.00
Satd. Flow (perm)	825	825		1578	1578		146	1859		146	1863	1583
Volume (vph)	427	107	33	45	204	151	35	865	12	83	707	364
Peak-hour factor, PHF	0.91	0.91	0.91	0.84	0.84	0.84	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	469	118	36	54	243	180	38	930	13	89	760	391
RTOR Reduction (vph)	0	2	0	0	18	0	0	0	1	0	0	170
Lane Group Flow (vph)	0	621	0	0	459	0	38	942	0	89	760	221
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	8	8		4	4		6	6		2	2	2
Permitted Phases	8	8		4	4		6	6		2	2	2
Actuated Green, G (s)	61.0	61.0		61.0	61.0		51.0	51.0		51.0	51.0	51.0
Effective Green, g (s)	61.0	61.0		61.0	61.0		51.0	51.0		51.0	51.0	51.0
Actuated g/C Ratio	0.51	0.51		0.51	0.51		0.42	0.42		0.42	0.42	0.42
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	419			802			62	790		62	792	673
v/s Ratio Prot							0.26	0.51		0.61	0.41	0.14
v/s Ratio Perm	0.75			0.29	0.57		0.61	1.19		1.44	0.96	0.33
v/c Ratio	1.48			0.57	20.5		26.8	34.5		34.5	23.1	23.1
Uniform Delay, d1	29.5			20.5	20.5		26.8	34.5		34.5	23.1	23.1
Progression Factor	1.00			0.54	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	229.5			0.6	0.6		37.8	99.2		266.4	23.5	1.3
Delay (s)	259.0			11.6	11.6		64.6	133.7		300.9	57.0	24.4
Level of Service	F			B	B		E	F		F	E	C
Approach Delay (s)	259.0			11.6	11.6		131.0			64.2		
Approach LOS	F			B	B		F			E		
Intersection Summary												
HCM Average Control Delay	112.9			HCM Level of Service			F					
HCM Volume to Capacity ratio	1.46											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	117.9%			ICU Level of Service			H					
Analysis Period (min)	15											
Critical Lane Group												

Baseline
A & R Engineering Inc.

Future PM
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Future 2020 PM Improved

Lanes, Volumes, Timings
2: Cumming Highway & I-575 Southbound Ramp

Future PM - Improved
12/28/2006

Lane Group	EBT	EBR	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	777	577	536	1231	676	193
v/c Ratio	0.72	0.36	0.79	0.78	0.95	0.32
Control Delay	33.7	0.5	55.1	12.5	58.0	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.7	0.5	55.1	12.5	58.0	10.2
Queue Length 50th (ft)	290	0	182	489	482	19
Queue Length 95th (ft)	m348	m0	249	704	#678	81
Internal Link Dist (ft)	2177		1047			
Turn Bay Length (ft)		150		150		320
Base Capacity (vph)	1085	1583	678	1583	797	595
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.36	0.79	0.78	0.85	0.32

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Baseline
A & R Engineering Inc.

Future PM
Page 1

HCM Signalized Intersection Capacity Analysis
2: Cumming Highway & I-575 Southbound Ramp

Future PM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔↔	↔	↔↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.85	1.00
Flt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3539	1583	3539	1583	3539	1583	1770	1770	1583	1770	1583	1583
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3539	1583	3539	1583	3539	1583	1770	1770	1583	1770	1583	1583
Volume (vph)	0	699	519	0	509	1169	0	0	0	656	0	187
Peak-hour factor, PHF	0.90	0.90	0.90	0.95	0.95	0.95	0.92	0.92	0.92	0.97	0.97	0.97
Adj. Flow (vph)	0	777	577	0	536	1231	0	0	0	676	0	193
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	110
Lane Group Flow (vph)	0	777	577	0	536	1231	0	0	0	676	0	83
Turn Type		Free	Free		Free	Free				Prot		custom
Protected Phases		6			2					1		
Permitted Phases		Free	Free		Free	Free						6
Actuated Green, G (s)		36.8	120.0		23.0	120.0				48.2		36.8
Effective Green, g (s)		36.8	120.0		23.0	120.0				48.2		36.8
Actuated g/C Ratio		0.31	1.00		0.19	1.00				0.40		0.31
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		1085	1583		678	1583				711		485
v/s Ratio Prot		0.22			0.15					0.38		
v/c Ratio Perm		0.72	0.36		0.79	0.78				0.95		0.05
Uniform Delay, d1		37.0	0.0		46.2	0.0				34.8		30.4
Progression Factor		0.78	1.00		1.00	1.00				1.00		1.00
Incremental Delay, d2		3.2	0.5		8.4	3.5				22.4		0.8
Delay (s)		32.2	0.5		54.7	3.5				57.1		31.2
Level of Service		C	A		D	A				E		C
Approach Delay (s)		18.7			19.1			0.0				51.4
Approach LOS		B			B			A				D

Intersection Summary

HCM Average Control Delay 26.0 HCM Level of Service C

HCM Volume to Capacity ratio 0.85

Actuated Cycle Length (s) 120.0 Sum of lost time (s) 4.0

Intersection Capacity Utilization 62.3% ICU Level of Service B

Analysis Period (min) 15

c Critical Lane Group

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
3: Bobo Grinding Co Driveway & Marietta Street

Future PM - Improved
12/28/2006

	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	30	392	547	705	792	700
V/c Ratio	0.10	1.01	0.65	0.99	1.03	0.58
Control Delay	28.9	90.3	7.2	68.8	70.0	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	90.3	7.2	68.8	70.0	12.8
Queue Length 50th (ft)	14	~308	3	527	~335	426
Queue Length 95th (ft)	22	#513	98 m#713	#384	508	
Internal Link Dist (ft)	95	143	3002		1058	
Turn Bay Length (ft)		150			90	
Base Capacity (vph)	293	390	837	709	772	1209
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.10	1.01	0.65	0.99	1.03	0.58

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
3: Bobo Grinding Co Driveway & Marietta Street

Future PM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.98	0.98	0.98	1.00	0.85	1.00	0.96	1.00	0.96	1.00	1.00	1.00
Flt Protected	0.99	0.99	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1794	1794	1770	1586	1586	1586	1780	1780	3433	1859	3433	1859
Flt Permitted	0.56	0.56	0.74	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1020	1020	1374	1586	1586	1586	1774	1774	3433	1859	3433	1859
Volume (vph)	5	9	3	380	6	525	5	443	215	657	573	8
Peak-hour factor, PHF	0.55	0.55	0.55	0.97	0.97	0.97	0.94	0.94	0.94	0.83	0.83	0.83
Adj. Flow (vph)	9	16	5	392	6	541	5	471	229	792	690	10
RTOR Reduction (vph)	0	4	0	0	388	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	26	0	392	159	0	0	690	0	792	700	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot	Prot
Protected Phases	8	8	4	4	4	4	6	6	5	5	2	2
Permitted Phases	8	8	4	4	4	4	6	6	5	5	2	2
Actuated Green, G (s)	34.0	34.0	34.0	34.0	34.0	34.0	47.0	47.0	27.0	27.0	78.0	78.0
Effective Green, g (s)	34.0	34.0	34.0	34.0	34.0	34.0	47.0	47.0	27.0	27.0	78.0	78.0
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28	0.28	0.39	0.39	0.22	0.22	0.65	0.65
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	289	389	449	389	449	449	695	695	772	1208	772	1208
v/s Ratio Prot									c0.23	c0.38		
v/s Ratio Perm	0.03	0.03	c0.29	1.01	0.35	0.99	c0.39	c0.39	1.03	0.58		
v/c Ratio	0.09	0.09	1.01	0.35	0.99	0.99	1.03	1.03	0.58	0.58		
Uniform Delay, d1	31.6	31.6	43.0	34.3	34.3	34.3	36.3	36.3	46.5	11.8		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.03	1.03	0.65	0.89		
Incremental Delay, d2	0.1	0.1	47.6	0.5	0.5	0.5	32.3	32.3	38.5	2.0		
Delay (s)	31.8	31.8	90.6	34.7	34.7	34.7	69.8	69.8	68.7	12.5		
Level of Service	C	C	F	C	C	C	E	E	E	B		
Approach Delay (s)	31.8	31.8	58.1	34.7	34.7	34.7	69.8	69.8	68.7	12.5		
Approach LOS	C	C	E	C	C	C	E	E	E	D		
Intersection Summary												
HCM Average Control Delay			53.0				HCM Level of Service			D		
HCM Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			110.1%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
4: Big K-Mart Driveway & Marietta Highway

Future PM - Improved
12/28/2006

	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	249	316	332	1041	21	1465	696	626	1623	36
v/c Ratio	1.02	0.98	1.02	0.66	0.21	0.85	0.79	0.89	0.86	0.04
Control Delay	114.3	94.4	102.8	2.2	58.6	43.0	16.5	33.4	28.8	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	114.3	94.4	102.8	2.2	58.6	43.0	16.5	33.4	28.8	6.2
Queue Length 50th (ft)	~202	258	~286	0	16	387	124	204	646	7
Queue Length 95th (ft)	#320	#452	#480	0	43	451	308	m203	m663	m12
Internal Link Dist (ft)	162	324	324			429			419	
Turn Bay Length (ft)	150	395	150			150			150	90
Base Capacity (vph)	243	322	326	1583	118	1717	879	715	1893	852
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.02	0.98	1.02	0.66	0.18	0.85	0.79	0.88	0.86	0.04

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
4: Big K-Mart Driveway & Marietta Highway

Future PM - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	0.95	0.95	1.00
Lane Util. Factor	0.98	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.98
Flt Protected	0.97	0.95	0.95	0.96	0.96	0.96	0.95	0.95	0.95	0.95	0.95	1.00
Satd. Flow (prot)	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Flt Permitted	0.97	0.95	0.95	0.96	0.96	0.96	0.95	0.95	0.95	0.95	0.95	1.00
Satd. Flow (perm)	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Volume (vph)	106	70	29	552	57	979	20	1421	675	576	1493	33
Peak-hour factor, PHF	0.82	0.82	0.82	0.94	0.94	0.94	0.97	0.97	0.97	0.97	0.92	0.92
Adj. Flow (vph)	129	85	35	587	61	1041	21	1465	696	626	1623	36
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	344	0	5
Lane Group Flow (vph)	0	244	0	316	332	1041	21	1465	352	626	1623	31
Turn Type	Split	Split	Split	Split	Split	Split	Free	Free	Free	Free	Free	Free
Protected Phases	8	8	8	4	4	4	1	6	6	5	2	2
Permitted Phases	16.0	23.0	23.0	120.0	120.0	120.0	3.2	40.5	40.5	24.5	61.8	61.8
Actuated Green, G (s)	16.0	23.0	23.0	120.0	120.0	120.0	3.2	40.5	40.5	24.5	61.8	61.8
Effective Green, g (s)	0.13	0.19	0.19	1.00	1.00	1.00	0.03	0.34	0.34	0.20	0.52	0.52
Actuated g/C Ratio	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	237	322	326	1583	47	1716	534	701	1823	815		
Lane Grp Cap (vph)	c0.14	0.98	1.02	0.66	0.45	0.85	0.22	0.22	0.22	0.22	0.02	0.02
v/s Ratio Prot	1.03	48.3	48.5	0.0	57.5	37.0	33.9	46.5	26.1	14.4		
v/s Ratio Perm	52.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.49	1.02	0.51
Uniform Delay, d1	66.1	44.9	54.6	2.2	6.6	5.6	6.3	7.9	3.9	0.0		
Progression Factor	118.1	93.2	103.1	2.2	64.2	42.6	40.1	30.8	30.4	7.4		
Incremental Delay, d2	F	F	F	F	F	F	F	F	F	F	F	F
Level of Service	118.1	93.2	103.1	2.2	64.2	42.6	40.1	30.8	30.4	7.4		
Approach Delay (s)	118.1	93.2	103.1	2.2	64.2	42.6	40.1	30.8	30.4	7.4		
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F

Intersection Summary

HCM Average Control Delay 40.0 HCM Level of Service D

HCM Volume to Capacity ratio 0.92

Actuated Cycle Length (s) 120.0 Sum of lost time (s) 12.0

Intersection Capacity Utilization 79.5% ICU Level of Service D

Analysis Period (min) 15

c Critical Lane Group

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
5: Riverstone Parkway & I - 575 Northbound Ramp

Future PM - Improved
12/28/2006

	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	753	977	1161	309	1168	808
v/c Ratio	0.98	0.47	0.98	0.20	1.00	0.83
Control Delay	28.8	0.2	62.6	0.3	65.0	15.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.8	0.2	62.6	0.3	65.0	15.5
Queue Length 50th (ft)	303	0	467	0	462	95
Queue Length 95th (ft)	m284	m0	#620	0	#615	313
Internal Link Dist (ft)	1330	1370				
Turn Bay Length (ft)	370		300	490		
Base Capacity (vph)	772	2094	1180	1583	1173	970
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.47	0.98	0.20	1.00	0.83
Intersection Summary						
#	95th percentile volume exceeds capacity, queue may be longer.					
m	Queue shown is maximum after two cycles.					
m	Volume for 95th percentile queue is metered by upstream signal.					

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
5: Riverstone Parkway & I - 575 Northbound Ramp

Future PM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔↔	↔	↔↔	↔↔	↔	↔↔	↔↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	0.97	0.95		0.95	1.00	0.97	1.00	0.97	1.00			
Flt	1.00	1.00		1.00	0.85	1.00	0.85	1.00	0.85			
Flt Protected	0.95	1.00		1.00	1.00	0.95	1.00	0.95	1.00			
Satd. Flow (prot)	3433	3539		3539	1583	3433	3539	1583	1583			
Flt Permitted	0.95	1.00		1.00	1.00	0.95	1.00	0.95	1.00			
Satd. Flow (perm)	3433	3539		3539	1583	3433	3539	1583	1583			
Volume (vph)	723	938	0	0	1091	290	1121	0	776	0	0	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.94	0.94	0.94	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	753	977	0	0	1161	309	1168	0	808	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	443	0	0	0
Lane Group Flow (vph)	753	977	0	0	1161	309	1168	0	365	0	0	0
Turn Type	Prot	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Protected Phases	1	6	2									
Permitted Phases												
Actuated Green, G (s)	27.0	71.0		40.0	120.0	41.0	40.0		40.0			
Effective Green, g (s)	27.0	71.0		40.0	120.0	41.0	40.0		40.0			
Actuated g/C Ratio	0.22	0.59		0.33	1.00	0.34	0.33		0.33			
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	772	2094		1180	1583	1173	1528		528			
v/s Ratio Prot	c0.22	0.28		c0.33								
v/s Ratio Perm				0.20	c0.34		0.23					
v/c Ratio	0.98	0.47		0.98	0.20	1.00	0.69		0.23			
Uniform Delay, d1	46.2	13.8		39.7	0.0	39.4	34.7		34.7			
Progression Factor	0.46	0.01		1.00	1.00	1.00	1.00		1.00			
Incremental Delay, d2	5.3	0.1		22.6	0.3	25.1	7.3		7.3			
Delay (s)	26.5	0.2		62.3	0.3	64.5	41.9		41.9			
Level of Service	C	A		E	A	E	D		D			
Approach Delay (s)	11.7			49.3			55.3		0.0			
Approach LOS	B			D			E		A			
Intersection Summary												
HCM Average Control Delay	39.0						HCM Level of Service					
HCM Volume to Capacity ratio	0.99						D					
Actuated Cycle Length (s)	120.0						Sum of lost time (s)					
Intersection Capacity Utilization	92.8%						F					
Analysis Period (min)	15											
Critical Lane Group												

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
9: Riverstone Parkway & Waleska Road

Future PM - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	643	1173	171	413	1290	215	538	442	548	293	275	534
v/c Ratio	1.07	0.83	0.20	0.96	1.04	0.35	0.82	1.05	0.95	1.09	0.66	0.77
Control Delay	85.8	28.9	4.4	67.7	57.6	4.2	40.7	104.2	55.3	112.4	45.2	35.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.8	28.9	4.4	67.7	57.6	4.2	40.7	104.2	55.3	112.4	45.2	35.4
Queue Length 50th (ft)	~279	490	23	165	~570	42	157	~375	270	~203	173	372
Queue Length 95th (ft) m#375	m521	m40	#268	#708	#708	19	#215	#578	#548	#381	268	496
Internal Link Dist (ft)	822			3515			1145			4852		
Turn Bay Length (ft)	150	150	150	150	150	150	160	150	150	80	80	90
Base Capacity (vph)	601	1416	876	429	1239	620	653	419	577	269	419	692
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.07	0.83	0.20	0.96	1.04	0.35	0.82	1.05	0.95	1.09	0.66	0.77

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
9: Riverstone Parkway & Waleska Road

Future PM - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.95	1.00	0.95	1.00
Fit Protected	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	611	1114	162	380	1187	198	495	407	504	278	261	507
Peak-hour factor, PHF	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.95
Adj. Flow (vph)	643	1173	171	413	1290	215	538	442	548	293	275	534
RTOR Reduction (vph)	0	0	58	0	0	66	0	0	23	0	0	7
Lane Group Flow (vph)	643	1173	113	413	1290	149	538	442	525	293	275	527
Turn Type	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov	pm+pt	pm+ov	pm+pt	pm+ov	pm+pt	pm+ov
Protected Phases	1	6	7	5	2	7	4	5	3	8	1	8
Permitted Phases			6			2	4		4			8
Actuated Green, G (s)	21.0	48.0	62.0	15.0	42.0	42.0	41.0	27.0	42.0	41.0	27.0	48.0
Effective Green, g (s)	21.0	48.0	62.0	15.0	42.0	42.0	41.0	27.0	42.0	41.0	27.0	48.0
Actuated g/C Ratio	0.18	0.40	0.52	0.12	0.35	0.35	0.34	0.22	0.35	0.34	0.22	0.40
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	601	1416	818	429	1239	554	653	419	554	269	419	686
v/s Ratio Prot	c0.19	0.33	0.02	0.12	c0.36	0.09	0.19	0.24	0.12	c0.13	0.15	0.13
v/s Ratio Perm	1.07	0.83	0.14	0.96	1.04	0.27	0.82	1.05	0.95	1.09	0.66	0.77
Uniform Delay, d1	49.5	32.3	15.1	52.2	39.0	28.0	32.3	46.5	37.9	33.8	42.3	31.2
Progression Factor	0.74	0.77	1.50	0.65	0.53	0.19	1.00	1.00	1.00	1.07	0.88	0.95
Incremental Delay, d2	49.5	36.0	0.0	30.7	35.1	1.0	8.3	59.2	25.4	79.0	3.5	4.9
Delay (s)	85.9	28.6	22.7	64.6	55.8	6.4	40.6	105.7	63.3	115.1	40.7	34.5
Level of Service	F	C	C	E	E	A	D	F	E	F	D	C
Approach Delay (s)		46.6			52.2		67.6			57.5		
Approach LOS		D			D		E			E		

Intersection Summary

HCM Average Control Delay	55.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	100.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
10: Reinhardt College Parkway & Waleska Road

HCM Signalized Intersection Capacity Analysis
10: Reinhardt College Parkway & Waleska Road

Future PM - Improved
12/28/2006

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	128	635	1062	194	350	730
v/c Ratio	0.65	1.01	0.99	0.12	0.48	0.48
Control Delay	63.4	73.5	24.5	0.1	43.4	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.4	73.5	24.5	0.1	43.4	4.4
Queue Length 50th (ft)	105	~430	380	0	122	142
Queue Length 95th (ft)	m155	#698	m825	m0	m172	m208
Internal Link Dist (ft)	3912	4852				2585
Turn Bay Length (ft)			250	275		
Base Capacity (vph)	236	628	1071	1583	734	1532
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.54	1.01	0.99	0.12	0.48	0.48

Intersection Summary
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Flt	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)	1770	1583	1863	1583	3433	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	3433	1863
Volume (vph)	118	584	1051	192	322	672
Peak-hour factor, PHF	0.92	0.92	0.99	0.99	0.92	0.92
Adj. Flow (vph)	128	635	1062	194	350	730
RTOR Reduction (vph)	0	63	0	0	0	0
Lane Group Flow (vph)	128	572	1062	194	350	730
Turn Type	pn+ov			Free Prot		
Protected Phases	4	5	6		5	2
Permitted Phases	4			Free		
Actuated Green, G (s)	13.3	39.0	69.0	120.0	25.7	98.7
Effective Green, g (s)	13.3	39.0	69.0	120.0	25.7	98.7
Actuated g/C Ratio	0.11	0.32	0.57	1.00	0.21	0.82
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	196	567	1071	1583	735	1532
v/s Ratio Prot	0.07	c0.22	c0.57		0.10	0.39
v/s Ratio Perm		0.15		0.12		
v/c Ratio	0.65	1.01	0.99	0.12	0.48	0.48
Uniform Delay, d1	51.1	40.5	25.2	0.0	41.3	3.1
Progression Factor	0.97	1.11	0.31	1.00	0.98	0.97
Incremental Delay, d2	6.9	38.0	14.0	0.1	0.5	1.0
Delay (s)	56.5	83.1	21.9	0.1	40.7	4.0
Level of Service	E	F	C	A	D	A
Approach Delay (s)	78.7		18.6		15.9	
Approach LOS	E		B		B	

Intersection Summary
 HCM Average Control Delay
 HCM Volume to Capacity ratio
 Actuated Cycle Length (s)
 Intersection Capacity Utilization
 Analysis Period (min)
 c Critical Lane Group

Lanes, Volumes, Timings
11: Reinhardt College Parkway & College Street

Future PM - Improved
12/28/2006

	EBT	WBT	NBT	SBL	SBT
Lane Group	585	810	286	176	205
Lane Group Flow (vph)	0.61	0.78	0.89	0.70	0.43
v/c Ratio	15.0	17.1	69.6	53.8	31.8
Control Delay	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.0	17.1	69.6	53.8	31.8
Queue Length 50th (ft)	229	426	205	121	107
Queue Length 95th (ft)	382	m513	#327	188	163
Internal Link Dist (ft)	952	6443	4497		4161
Turn Bay Length (ft)				150	
Base Capacity (vph)	968	1043	380	301	565
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.60	0.78	0.75	0.58	0.36
Intersection Summary					
#	95th percentile volume exceeds capacity, queue may be longer.				
m	Queue shown is maximum after two cycles.				
	Volume for 95th percentile queue is metered by upstream signal.				

HCM Signalized Intersection Capacity Analysis
11: Reinhardt College Parkway & College Street

Future PM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔		↔		↔		↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00		1.00	1.00		1.00	1.00	
Frt	0.97			0.97	0.97		0.98	0.98		1.00	0.93	
Flt Protected	0.99			0.99	0.99		0.98	0.98		0.95	1.00	
Satd. Flow (prot)	1788			1796	1796		1787	1787		1770	1737	
Flt Permitted	0.80			0.86	0.86		0.60	0.60		0.50	1.00	
Satd. Flow (perm)	1437			1545	1545		1091	1091		928	1737	
Volume (vph)	79	319	129	98	483	164	109	116	41	153	98	80
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.93	0.93	0.93	0.87	0.87	0.87
Adj. Flow (vph)	88	354	143	107	525	178	117	125	44	176	113	92
RTOR Reduction (vph)	0	9	0	0	8	0	0	6	0	0	26	0
Lane Group Flow (vph)	0	576	0	0	802	0	0	280	0	176	179	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	2	2	4	4	4	4	4	8	8	8
Permitted Phases	6	6	2	2	4	4	4	4	4	8	8	8
Actuated Green, G (s)	80.6	80.6		80.6	80.6		31.4	31.4		31.4	31.4	
Effective Green, g (s)	80.6	80.6		80.6	80.6		31.4	31.4		31.4	31.4	
Actuated g/C Ratio	0.67	0.67		0.67	0.67		0.26	0.26		0.26	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	965	965		1038	1038		285	285		243	455	
v/s Ratio Prot												
v/s Ratio Perm	0.40	0.40		0.52	0.52		0.26	0.26		0.19	0.10	
v/c Ratio	0.60	0.60		0.77	0.77		0.98	0.98		0.72	0.39	
Uniform Delay, d1	10.8	10.8		13.5	13.5		44.0	44.0		40.4	36.5	
Progression Factor	1.00	1.00		0.99	0.99		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	2.7		1.3	1.3		48.3	48.3		10.2	0.6	
Delay (s)	13.5	13.5		14.7	14.7		92.3	92.3		50.6	37.0	
Level of Service	B	B		B	B		F	F		D	D	
Approach Delay (s)	13.5	13.5		14.7	14.7		92.3	92.3		43.3	43.3	
Approach LOS	B	B		B	B		F	F		D	D	
Intersection Summary												
HCM Average Control Delay	30.4					HCM Level of Service						
HCM Volume to Capacity ratio	0.83					C						
Actuated Cycle Length (s)	120.0					Sum of lost time (s)						
Intersection Capacity Utilization	87.3%					ICU Level of Service						
Analysis Period (min)	15					E						
Critical Lane Group												

Lanes, Volumes, Timings
12: Knox Bridge Highway & Fincher Road

Future PM - Improved
12/28/2006

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	305	527	34	843	72	327
Lane Group Flow (vph)	0.89	0.38	0.06	0.62	0.22	0.93
v/c Ratio	44.9	7.0	5.1	10.3	26.5	68.8
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	44.9	7.0	5.1	10.3	26.5	68.8
Total Delay	169	138	7	287	27	192
Queue Length 50th (ft)	401	192	16	402	43	354
Queue Length 95th (ft)	1486	1519	60	3460	3239	
Internal Link Dist (ft)	640					
Turn Bay Length (ft)	341	1371	571	1349	353	369
Base Capacity (vph)	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.38	0.06	0.62	0.20	0.89

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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HCM Signalized Intersection Capacity Analysis
12: Knox Bridge Highway & Fincher Road

Future PM - Improved
12/28/2006

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Movement	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	1.00	0.98	0.94	0.99	0.94	0.91	0.91
Flt Protected	0.95	1.00	0.95	1.00	0.99	0.99	0.95	0.99	0.99
Satd. Flow (prot)	1770	1859	1770	1824	1737	1737	1667	1667	1667
Flt Permitted	0.26	1.00	0.42	1.00	0.89	0.89	0.86	0.86	0.86
Satd. Flow (perm)	476	1859	783	1824	1556	1556	1463	1463	1463
Volume (vph)	278	473	6	33	696	113	8	21	88
Peak-hour factor, PHF	0.91	0.91	0.91	0.96	0.96	0.65	0.65	0.65	0.89
Adj. Flow (vph)	305	520	7	34	725	118	12	28	99
RTOR Reduction (vph)	0	0	0	5	0	24	0	0	64
Lane Group Flow (vph)	305	527	0	34	838	0	0	0	263
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	2	2	4	4	8	8	8
Permitted Phases	6	6	2	2	4	4	8	8	8
Actuated Green, G (s)	88.5	88.5	88.5	88.5	23.5	23.5	23.5	23.5	23.5
Effective Green, g (s)	88.5	88.5	88.5	88.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.74	0.74	0.74	0.74	0.20	0.20	0.20	0.20	0.20
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	351	1371	577	1345	305	305	287	287	287
v/s Ratio Prot	c0.64	0.28	0.04	0.46	0.03	0.03	c0.18	c0.18	c0.18
v/c Ratio	0.87	0.38	0.06	0.62	0.16	0.16	0.92	0.92	0.92
Uniform Delay, d1	11.5	5.8	4.3	7.7	40.0	40.0	47.3	47.3	47.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	24.1	0.8	0.2	2.2	0.2	0.2	31.7	31.7	31.7
Delay (s)	35.6	6.6	4.5	9.8	40.3	40.3	78.9	78.9	78.9
Level of Service	D	A	A	A	D	D	E	E	E
Approach Delay (s)	17.2	9.6	9.6	40.3	78.9	78.9	78.9	78.9	78.9
Approach LOS	B	A	A	C	F	F	F	F	F
Intersection Summary									
HCM Average Control Delay	24.4	HCM Level of Service	C						
HCM Volume to Capacity ratio	0.88								
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0						
Intersection Capacity Utilization	92.9%	ICU Level of Service	F						
Analysis Period (min)	15								
c Critical Lane Group									

Lanes, Volumes, Timings
15: Bells Ferry Road & Marietta Highway

Future PM - Improved
12/28/2006

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group	469	154	54	243	180	38	943	89	760	391
v/c Ratio	1.02	0.21	0.31	0.92	0.57	0.24	0.95	1.46	0.76	0.39
Control Delay	81.1	22.2	38.9	69.1	18.9	19.9	46.2	304.1	28.4	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.1	22.2	38.9	69.1	18.9	19.9	46.2	304.1	28.4	3.2
Queue Length 50th (ft)	~334	69	33	176	47	15	664	~94	446	10
Queue Length 95th (ft)	#545	118	m53 m#255	m81	41	#973	#158	614	57	
Internal Link Dist (ft)	1761		266			463				
Turn Bay Length (ft)	150				150	150		150		250
Base Capacity (vph)	460	728	174	264	315	159	992	61	984	1014
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.02	0.21	0.31	0.92	0.57	0.24	0.95	1.46	0.76	0.39

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis
15: Bells Ferry Road & Marietta Highway

Future PM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1797	1770	1770	1863	1583	1770	1859	1770	1863	1583	1583
Flt Permitted	0.19	1.00	0.66	1.00	1.00	0.16	1.00	0.06	1.00	1.00	1.00	1.00
Satd. Flow (perm)	355	1797	1228	1863	1583	297	1859	116	1863	1583	1583	1583
Volume (vph)	427	107	33	45	204	151	35	865	12	83	707	364
Peak-hour factor, PHF	0.91	0.91	0.91	0.84	0.84	0.84	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	469	118	36	54	243	180	38	930	13	89	760	391
RTOR Reduction (vph)	0	9	0	0	0	91	0	0	0	0	0	170
Lane Group Flow (vph)	469	145	0	54	243	89	38	943	0	89	760	221
Turn Type	pm+pt			Perm	Perm	Perm	Perm			Perm	Perm	Perm
Protected Phases	3	8		4		4	6			2		2
Permitted Phases	8			4		4	6			2		2
Actuated Green, G (s)	48.0	48.0		17.0	17.0	17.0	64.0			64.0		64.0
Effective Green, g (s)	48.0	48.0		17.0	17.0	17.0	64.0			64.0		64.0
Actuated g/C Ratio	0.40	0.40		0.14	0.14	0.14	0.53			0.53		0.53
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0			4.0		4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0			3.0		3.0
Lane Grp Cap (vph)	460	719		174	264	224	158			991		844
v/s Ratio Prot	c0.23	0.08		0.04	0.13	0.06	0.13			0.41		0.14
v/s Ratio Perm	c0.18			0.31	0.92	0.40	0.24			0.76		0.26
Uniform Delay, d1	34.6	23.5		46.2	50.8	46.8	15.0			28.0		15.2
Progression Factor	1.00	1.00		0.76	0.75	0.67	1.00			1.00		1.00
Incremental Delay, d2	47.0	0.1		0.7	26.4	0.8	3.6			266.4		5.6
Delay (s)	81.6	23.6		35.8	64.7	32.1	18.6			294.4		15.9
Level of Service	F	C		D	E	C	B			F		C
Approach Delay (s)		67.3			49.1		44.4			43.1		D
Approach LOS		E			D		D			D		D

Intersection Summary

HCM Average Control Delay 48.9 HCM Level of Service D

HCM Volume to Capacity ratio 1.25

Actuated Cycle Length (s) 120.0 Sum of lost time (s) 8.0

Intersection Capacity Utilization 98.6% ICU Level of Service F

Analysis Period (min) 15

c Critical Lane Group

Future Saturday Intersection Analysis

Future 2020 Saturday

Lanes, Volumes, Timings
1: Cumming Highway & I -575 Northbound Ramp

Future SAT
12/28/2006

	EBL	EBT	WBT	WBR	NBR	SBR
Lane Group	140	800	962	580	703	152
V/c Ratio	0.29	0.23	0.31	0.40	0.28	0.09
Control Delay	1.8	0.1	1.4	0.9	0.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.8	0.1	1.4	0.9	0.3	0.1
Queue Length 50th (ft)	2	0	40	0	0	0
Queue Length 95th (ft)	m7	m0	45	8	5	0
Internal Link Dist (ft)	1047	677				
Turn Bay Length (ft)	150		325			
Base Capacity (vph)	829	3539	3133	1468	2546	1611
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.23	0.31	0.40	0.28	0.09
Intersection Summary						
m	Volume for 95th percentile queue is metered by upstream signal.					

Baseline
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HCM Signalized Intersection Capacity Analysis
1: Cumming Highway & I -575 Northbound Ramp

Future SAT
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0			4.0			4.0
Lane Util. Factor	1.00	0.95		0.95	1.00	0.85			0.88			1.00
Flt	1.00	1.00		1.00	1.00	1.00			0.85			0.86
Flt Protected	0.95	1.00		1.00	1.00	1.00			1.00			1.00
Satd. Flow (prot)	1770	3539		3539	1583				2787			1611
Flt Permitted	0.28	1.00		1.00	1.00	1.00			1.00			1.00
Satd. Flow (perm)	527	3539		3539	1583				2787			1611
Volume (vph)	133	760	0	0	924	557	0	0	647	0	0	143
Peak-hour factor, PHF	0.95	0.95	0.95	0.96	0.96	0.96	0.92	0.92	0.92	0.94	0.94	0.94
Adj. Flow (vph)	140	800	0	0	962	580	0	0	703	0	0	152
RTOR Reduction (vph)	0	0	0	0	0	67	0	0	79	0	0	0
Lane Group Flow (vph)	140	800	0	0	962	513	0	0	624	0	0	152
Turn Type	pm+pt			Perm				custom				custom
Protected Phases	1	6		2								6
Permitted Phases	6			2					2			6
Actuated Green, G (s)	116.0	120.0		106.2	106.2	106.2			106.2			120.0
Effective Green, g (s)	116.0	120.0		106.2	106.2	106.2			106.2			120.0
Actuated g/C Ratio	0.97	1.00		0.88	0.88	0.88			0.88			1.00
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0			4.0			4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0			3.0			3.0
Lane Grp Cap (vph)	570	3539		3132	1401				2466			1611
v/s Ratio Prot	0.01	c0.23		0.27								0.09
v/s Ratio Perm	0.23			c0.32					0.22			0.09
v/c Ratio	0.25	0.23		0.31	0.37	0.25			0.25			0.09
Uniform Delay, d1	0.2	0.0		1.1	1.2	1.0			1.0			0.0
Progression Factor	9.75	1.00		1.00	1.00	1.00			1.00			1.00
Incremental Delay, d2	0.2	0.1		0.3	0.7	0.2			0.2			0.1
Delay (s)	2.5	0.1		1.3	1.9	1.3			1.3			0.1
Level of Service	A	A		A	A	A			A			A
Approach Delay (s)		0.5		1.6				1.3				0.1
Approach LOS		A		A				A				A
Intersection Summary												
HCM Average Control Delay	1.1						HCM Level of Service					
HCM Volume to Capacity ratio	0.35						A					
Actuated Cycle Length (s)	120.0						Sum of lost time (s)					
Intersection Capacity Utilization	50.3%						ICU Level of Service					
Analysis Period (min)	15						A					
c	Critical Lane Group											

Baseline
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Lanes, Volumes, Timings
2: Cumming Highway & I-575 Southbound Ramp

Future SAT
12/28/2006

Lane Group	EBT	EBR	WBT	SBL	SBR
Lane Group Flow (vph)	462	120	1126	452	131
v/c Ratio	0.52	0.08	0.79	0.91	0.26
Control Delay	35.2	0.1	25.5	63.5	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	35.2	0.1	25.5	63.5	8.4
Queue Length 50th (ft)	162	0	231	335	0
Queue Length 95th (ft)	236	0	281	432	54
Internal Link Dist (ft)	2177		1047		
Turn Bay Length (ft)		150			320
Base Capacity (vph)	890	1583	1423	620	496
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.52	0.08	0.79	0.73	0.26
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
2: Cumming Highway & I-575 Southbound Ramp

Future SAT
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔↔	↔	↔↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.85	0.95	1.00	0.95	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected	1.00	1.00	0.85	0.91	1.00	0.91	1.00	0.85	1.00	0.95	1.00	0.85
Satd. Flow (prot)	3539	1583	3210	3210	1770	1770	1770	1583	3210	1770	1583	3210
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3539	1583	3210	3210	1770	1770	1770	1583	3210	1770	1583	3210
Volume (vph)	0	434	113	0	402	656	0	0	0	443	0	128
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.92	0.92	0.92	0.98	0.98	0.98
Adj. Flow (vph)	0	462	120	0	428	698	0	0	0	452	0	131
RTOR Reduction (vph)	0	0	0	0	246	0	0	0	0	0	0	98
Lane Group Flow (vph)	0	462	120	0	880	0	0	0	0	452	0	33
Turn Type	Free			Free			Prot			custom		
Protected Phases	6			2			1					
Permitted Phases	Free			Free			1					
Actuated Green, G (s)	30.2			44.0			33.8			30.2		
Effective Green, g (s)	30.2			44.0			33.8			30.2		
Actuated g/C Ratio	0.25			0.37			0.28			0.25		
Clearance Time (s)	4.0			4.0			4.0			4.0		
Vehicle Extension (s)	3.0			3.0			3.0			3.0		
Lane Grp Cap (vph)	891			1177			499			398		
v/s Ratio Prot	c0.13			c0.27			c0.26					
v/s Ratio Perm	0.08			0.08			0.91			0.02		
v/c Ratio	0.52			0.75			41.6			0.08		
Uniform Delay, d1	38.6			33.2			4.16			34.3		
Progression Factor	0.82			0.96			1.00			1.00		
Incremental Delay, d2	1.8			4.3			19.8			0.4		
Delay (s)	33.6			36.2			61.4			34.7		
Level of Service	C			A			D			E		
Approach Delay (s)	26.7			36.2			0.0			55.4		
Approach LOS	C			D			A			E		
Intersection Summary												
HCM Average Control Delay	38.7			HCM Level of Service			D					
HCM Volume to Capacity ratio	0.73											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			12.0					
Intersection Capacity Utilization	63.5%			ICU Level of Service			B					
Analysis Period (min)	15											
Critical Lane Group												

Lanes, Volumes, Timings
3: Bobo Grinding Co Driveway & Marietta Street

Future SAT
12/28/2006

	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	13	245	348	597	321	438
v/c Ratio	0.04	0.84	0.58	0.57	0.62	0.33
Control Delay	25.9	68.5	8.0	18.8	10.5	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.9	68.5	8.0	18.8	10.5	5.8
Queue Length 50th (ft)	5	183	3	227	44	62
Queue Length 95th (ft)	13	260	76	m421	m122	m200
Internal Link Dist (ft)	95	1440	3002			1058
Turn Bay Length (ft)		150			90	
Base Capacity (vph)	441	384	685	1051	592	1347
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.64	0.51	0.57	0.54	0.33
Intersection Summary						
m Volume for 95th percentile queue is metered by upstream signal.						

Baseline
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HCM Signalized Intersection Capacity Analysis
3: Bobo Grinding Co Driveway & Marietta Street

Future SAT
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.95	1.00	1.00	0.85	0.85	0.85	0.95	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.98	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1733	1770	1587	1770	1587	1770	1777	1777	1770	1861	1861	1861
Flt Permitted	0.79	0.75	1.00	1.00	1.00	1.00	1.00	1.00	0.35	1.00	1.00	1.00
Satd. Flow (perm)	1386	1395	1587	1776	1587	1776	1776	1776	659	1861	1861	1861
Volume (vph)	3	2	3	233	5	326	2	377	194	302	410	2
Peak-hour factor, PHF	0.62	0.62	0.62	0.95	0.95	0.95	0.96	0.96	0.96	0.94	0.94	0.94
Adj. Flow (vph)	5	3	5	245	5	343	2	393	202	321	436	2
RTOR Reduction (vph)	0	4	0	0	271	0	0	12	0	0	0	0
Lane Group Flow (vph)	0	9	0	245	77	0	0	585	0	321	438	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	8	8	4	4	4	6	6	5	5	2	2	2
Permitted Phases	8	8	4	4	4	6	6	5	5	2	2	2
Actuated Green, G (s)	25.2	25.2	25.2	25.2	25.2	70.2	70.2	86.8	86.8	86.8	86.8	86.8
Effective Green, g (s)	25.2	25.2	25.2	25.2	25.2	70.2	70.2	86.8	86.8	86.8	86.8	86.8
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21	0.59	0.59	0.72	0.72	0.72	0.72	0.72
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	291	291	293	333	333	1039	1039	593	593	1346	1346	1346
v/s Ratio Prot	0.01	0.01	0.18	0.05	0.05	0.06	0.06	0.24	0.24	0.24	0.24	0.24
v/c Ratio	0.03	0.03	0.84	0.23	0.23	0.56	0.56	0.33	0.33	0.33	0.33	0.33
Uniform Delay, d1	37.7	37.7	45.4	39.4	39.4	15.4	15.4	8.0	8.0	6.0	6.0	6.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.84	0.84	0.76	0.76	0.76
Incremental Delay, d2	0.0	0.0	18.3	0.4	0.4	2.0	2.0	0.9	0.9	0.6	0.6	0.6
Delay (s)	37.7	37.7	63.7	39.7	39.7	16.6	16.6	7.6	7.6	5.1	5.1	5.1
Level of Service	D	D	E	D	D	B	B	A	A	A	A	A
Approach Delay (s)	37.7	37.7	49.6	49.6	49.6	16.6	16.6	6.2	6.2	6.2	6.2	6.2
Approach LOS	D	D	D	D	D	B	B	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	22.7			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.63											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			12.0					
Intersection Capacity Utilization	83.9%			ICU Level of Service			E					
Analysis Period (min)	15											
Critical Lane Group												

Baseline
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Lanes, Volumes, Timings	Future SAT
4: Big K-Mart Driveway & Marietta Highway	12/28/2006

[illegible]

HCM Signalized Intersection Capacity Analysis
4: Big K-Mart Driveway & Marietta Highway

Movement	EBL	EBT	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBL	SBT	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. 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	1.00	1.00	
Frft	0.98	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	1.00	0.85	1.00	
Flt Protected	0.97	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1783	1788	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	
Flt Permitted	0.97	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1783	1788	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	
Volume (vph)	129	70	26	420	80	505	33	1290	476	488	1227	359	1583	1770	
Peak-hour factor, PHF	0.90	0.90	0.90	0.94	0.94	0.94	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Adj. Flow (vph)	143	78	29	447	85	537	34	1316	486	498	1252	372	1583	1770	
RTOR Reduction (vph)	0	4	0	0	0	326	0	0	0	232	0	0	15	15	
Lane Group Flow (vph)	0	246	0	0	532	211	34	1316	254	498	1252	57	1583	1770	
Turn Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	
Protected Phases	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
Permitted Phases	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	
Actuated Green, G (s)	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	
Effective Green, g (s)	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	
Actuated g/C Ratio	0.13	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	238	417	369	71	1062	475	354	1628	728	354	1628	728	354	1628	
v/s Ratio Prot	0.14	0.30	0.13	0.02	0.37	0.16	0.28	0.35	0.16	0.28	0.35	0.16	0.28	0.35	
v/s Ratio Perm	1.03	1.28	0.57	0.48	1.24	0.54	1.41	0.77	0.54	1.41	0.77	0.54	1.41	0.77	
Uniform Delay, d1	52.0	46.0	40.7	56.4	42.0	35.0	48.0	27.1	18.2	48.0	27.1	18.2	48.0	27.1	
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	1.00	1.00	
Incremental Delay, d2	67.0	141.6	2.1	5.0	115.8	4.3	192.6	0.65	0.46	192.6	0.65	0.46	192.6	0.65	
Delay (s)	119.0	187.6	42.8	61.4	157.8	39.3	239.3	19.6	8.4	239.3	19.6	8.4	239.3	19.6	
Level of Service	F	F	D	E	F	F	D	F	B	F	D	F	B	A	
Approach Delay (s)	119.0	114.9	F	124.6	F	79.2	F	79.2	E	79.2	F	79.2	E	79.2	
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
Intersection Summary															
HCM Average Control Delay	105.6	HCM Level of Service													F
HCM Volume to Capacity ratio	1.26														
Actuated Cycle Length (s)	120.0	Sum of lost time (s)													16.0
Intersection Capacity Utilization	106.8%	ICU Level of Service													G
Analysis Period (min)	15														
Critical Lane Group															

Lanes, Volumes, Timings
5: Riverstone Parkway & I - 575 Northbound Ramp

Future SAT
12/28/2006

	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group	508	1333	1662	153	1007	846
Lane Group Flow (vph)	1.37	0.66	1.31	0.10	0.80	1.39
v/c Ratio	201.2	5.2	178.8	0.1	39.9	214.4
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	201.2	5.2	178.8	0.1	39.9	214.4
Total Delay	~459	135	~872	0	357	~855
Queue Length 50th (ft)	~459	135	~872	0	357	~855
Queue Length 95th (ft) m#542	m158	#1011	0	441	#1102	
Internal Link Dist (ft)	1330	1370				
Turn Bay Length (ft)	370		300	490		
Base Capacity (vph)	372	2005	1268	1583	1259	610
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.37	0.66	1.31	0.10	0.80	1.39

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Intersection Summary

Baseline
A & R Engineering Inc.

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HCM Signalized Intersection Capacity Analysis
5: Riverstone Parkway & I - 575 Northbound Ramp

Future SAT
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		0.95	1.00		0.95	1.00		0.95	1.00	
Flt	1.00	1.00		1.00	0.85		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1770	3539		3539	1583		3433	1583		3433	1583	
Flt Permitted	0.09	1.00		1.00	1.00		0.95	1.00		1.00	1.00	
Satd. Flow (perm)	159	3539		3539	1583		3433	1583		3433	1583	
Volume (vph)	483	1266	0	0	1645	151	977	0	821	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.99	0.99	0.99	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	508	1333	0	0	1662	153	1007	0	846	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	29	0	0	0
Lane Group Flow (vph)	508	1333	0	0	1662	153	1007	0	817	0	0	0
Turn Type	pm+pt											
Protected Phases	1	6			2				custom			
Permitted Phases	6				Free	4			4			
Actuated Green, G (s)	68.0	68.0			43.0	120.0	44.0		44.0			
Effective Green, g (s)	68.0	68.0			43.0	120.0	44.0		44.0			
Actuated g/C Ratio	0.57	0.57			0.36	1.00	0.37		0.37			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	372	2005			1268	1583	1259		580			
v/s Ratio Prot	c0.24	0.38			0.47							
v/s Ratio Perm	c0.54				0.10	0.29			c0.52			
v/c Ratio	1.37	0.66			1.31	0.10	0.80		1.41			
Uniform Delay, d1	51.7	18.1			38.5	0.0	34.1		38.0			
Progression Factor	0.90	0.24			1.00	1.00	1.00		1.00			
Incremental Delay, d2	172.4	0.8			145.6	0.1	3.7		193.9			
Delay (s)	218.9	5.1			184.1	0.1	37.7		231.9			
Level of Service	F	A			F	A	D		F			
Approach Delay (s)	64.1				168.6		126.4		0.0			
Approach LOS	E				F		F		A			
Intersection Summary												
HCM Average Control Delay			119.5				HCM Level of Service		F			
HCM Volume to Capacity ratio			1.37									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			110.1%				ICU Level of Service		H			
Analysis Period (min)			15									
c Critical Lane Group												

Baseline
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Future PM
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Lanes, Volumes, Timings
6: Riverstone Parkway & I - 575 Southbound Ramp

Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	1513	879	534	2110	246	615
v/c Ratio	0.91	0.56	0.95	0.76	0.93	0.39
Control Delay	29.9	1.9	32.1	4.1	90.6	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.9	1.9	32.1	4.1	90.6	0.7
Queue Length 50th (ft)	416	28	144	576	190	0
Queue Length 95th (ft)	#720	m46	m134	m0	#347	0
Internal Link Dist. (ft)	752			1330		
Turn Bay Length (ft)		225	375			
Base Capacity (vph)	1658	1583	579	2774	266	1583
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.91	0.56	0.92	0.76	0.92	0.39
Intersection Summary						
#	95th percentile volume exceeds capacity, queue may be longer.					
m	Queue shown is maximum after two cycles.					
	Volume for 95th percentile queue is metered by upstream signal.					

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HCM Signalized Intersection Capacity Analysis
6: Riverstone Parkway & I - 575 Southbound Ramp

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Lanes, Volumes, Timings
7: Riverstone Parkway & Riverstone Boulevard

Future SAT
12/28/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	281	1576	1812	846	780	206
v/c Ratio	0.69	0.46	0.80	0.53	0.87	0.41
Control Delay	44.5	7.1	19.2	0.9	53.4	17.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.5	7.1	19.2	0.9	53.4	17.9
Queue Length 50th (ft)	164	147	405	0	291	53
Queue Length 95th (ft)	m255	178	454	0	364	122
Internal Link Dist (ft)	1490	547			375	
Turn Bay Length (ft)	165			290		110
Base Capacity (vph)	405	3416	2272	1583	973	532
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.46	0.80	0.53	0.80	0.39

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

Baseline
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Future PM
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HCM Signalized Intersection Capacity Analysis
7: Riverstone Parkway & Riverstone Boulevard

Future SAT
12/28/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	AAA	AAA	AAA	AAA	AAA	AAA
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	0.97	1.00
Flt Protected	1.00	1.00	1.00	0.85	1.00	0.85
Satd. Flow (prot)	1770	5085	5085	1583	3433	1583
Flt Permitted	0.07	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	129	5085	5085	1583	3433	1583
Volume (vph)	275	1544	1758	821	749	198
Peak-hour factor, PHF	0.98	0.98	0.97	0.97	0.96	0.96
Adj. Flow (vph)	281	1576	1812	846	780	206
RTOR Reduction (vph)	0	0	0	0	0	86
Lane Group Flow (vph)	281	1576	1812	846	780	120
Turn Type	pm+pt	Free	Free	Free	Perm	Perm
Protected Phases	1	6	2		8	
Permitted Phases	6			Free		8
Actuated Green, G (s)	80.6	80.6	53.6	120.0	31.4	31.4
Effective Green, g (s)	80.6	80.6	53.6	120.0	31.4	31.4
Actuated g/C Ratio	0.67	0.67	0.45	1.00	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	401	3415	2271	1583	898	414
v/s Ratio Prot	c0.13	0.31	c0.36		c0.23	
v/s Ratio Perm	0.34			0.53		0.08
v/c Ratio	0.70	0.46	0.80	0.53	0.87	0.29
Uniform Delay, d1	34.0	9.4	28.5	0.0	42.3	35.4
Progression Factor	0.97	0.88	0.58	1.00	1.00	1.00
Incremental Delay, d2	4.9	0.4	2.2	0.9	8.9	0.4
Delay (s)	37.9	6.8	18.8	0.9	51.3	35.8
Level of Service	D	A	B	A	D	D
Approach Delay (s)		11.5	13.1		48.0	
Approach LOS		B	B		D	

Intersection Summary
HCM Average Control Delay
HCM Volume to Capacity ratio
Actuated Cycle Length (s)
Intersection Capacity Utilization
Analysis Period (min)
c Critical Lane Group

Baseline
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Lanes, Volumes, Timings
8: Riverstone Parkway & Reinhardt College Parkway

Future SAT
12/28/2006



Lane Group	EBL	EBT	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	380	1594	1679	286	26	373	159
v/c Ratio	0.85	0.41	0.64	0.18	0.16	0.81	0.25
Control Delay	36.3	1.1	3.3	0.2	42.7	62.6	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	1.1	3.3	0.2	42.7	62.6	1.9
Queue Length 50th (ft)	171	17	35	0	17	144	3
Queue Length 95th (ft)	m158	m27	48	m0	43	196	m14
Internal Link Dist (ft)	1839	1490		2029		2482	
Turn Bay Length (ft)	190						
Base Capacity (vph)	568	3865	2632	1583	202	557	685
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.41	0.64	0.18	0.13	0.67	0.23

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

HCM Signalized Intersection Capacity Analysis
8: Riverstone Parkway & Reinhardt College Parkway

Future SAT
12/28/2006



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		0.91	1.00		1.00	1.00		0.97	1.00	
Flt	1.00	1.00		1.00	1.00		0.85	1.00		1.00	0.85	
Flt Protected	0.95	1.00		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5074		5085	1583		1770	3433		1583		
Flt Permitted	0.07	1.00		1.00	1.00		0.48	0.74		1.00		
Satd. Flow (perm)	136	5074		5085	1583		888	2675		1583		
Volume (vph)	357	1477	21	0	1595	272	24	0	0	339	0	145
Peak-hour factor, PHF	0.94	0.94	0.92	0.92	0.95	0.95	0.92	0.92	0.92	0.91	0.92	0.91
Adj. Flow (vph)	380	1571	23	0	1679	286	26	0	0	373	0	159
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	132	0
Lane Group Flow (vph)	380	1593	0	0	1679	286	0	26	0	373	27	0
Turn Type	pm+pt			Perm			Free			Perm		
Protected Phases	1	6		2		2		4			8	
Permitted Phases	6			2		Free	4				8	
Actuated Green, G (s)	91.4	91.4		62.1	120.0		20.6			20.6	20.6	
Effective Green, g (s)	91.4	91.4		62.1	120.0		20.6			20.6	20.6	
Actuated g/C Ratio	0.76	0.76		0.52	1.00		0.17			0.17	0.17	
Clearance Time (s)	4.0	4.0		4.0			4.0			4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0			3.0			3.0	3.0	
Lane Grp Cap (vph)	448	3865		2631	1583		152			459	272	
v/s Ratio Prot	c0.18	0.31		0.33			0.03			c0.14	0.02	
v/s Ratio Perm	c0.47											
v/c Ratio	0.85	0.41		0.64	0.18		0.17			0.81	0.10	
Uniform Delay, d1	33.9	5.0		20.9	0.0		42.4			47.8	41.9	
Progression Factor	1.00	0.19		0.11	1.00		1.00			1.07	1.00	
Incremental Delay, d2	4.9	0.1		0.8	0.2		0.5			8.5	0.1	
Delay (s)	38.7	1.0		3.1	0.2		43.0			59.8	42.0	
Level of Service	D	A		A	A		D			E	D	
Approach Delay (s)		8.3		2.6			43.0			54.5		
Approach LOS		A		A			D			D		
Intersection Summary												
HCM Average Control Delay				11.5	HCM Level of Service			B				
HCM Volume to Capacity ratio				0.83								
Actuated Cycle Length (s)				120.0	Sum of lost time (s)			8.0				
Intersection Capacity Utilization				86.2%	ICU Level of Service			E				
Analysis Period (min)				15								
Critical Lane Group												

Lane Group					NBL	NBT	NBR	SBL	SBT	SBR
E Lane Group Flow (vph)	EBL	EBT	WBL	WBt	NBL	NBT	NBR	SBL	SBT	SBR
	542	1448	405	1456	359	174	488	260	242	580
v/c Ratio	1.18	1.02	1.05	1.14	1.15	0.45	0.81	0.93	0.98	1.07
Control Delay	126.0	48.1	77.6	86.4	131.1	45.8	25.2	75.9	99.3	73.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	126.0	48.1	77.6	86.4	131.1	45.8	25.2	75.9	99.3	73.4
Queue Length 50th (ft)	-456	-621	-273	-687	-275	119	109	169	190	~225
Queue Length 95th (ft) m#496	m578	#468	#811	#469	190	#286	#280	#333	#396	#396
Internal Link Dist (ft)	1240	3515			1145			4852		
Turn Bay Length (ft)	150	150	150	160	160		80			90
Base Capacity (vph)	460	1426	387	1280	313	388	601	279	248	542
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.18	1.02	1.05	1.14	1.15	0.45	0.81	0.93	0.98	1.07
Intersection Summary										
Volume exceeds capacity, queue is theoretically infinite.										
Queue shown is maximum after two cycles.										
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.										
Volume for 95th percentile queue is metered by upstream signal.										

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Fr	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Fr	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Fr	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Fr	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3464		1770	3462		1770	1863	1583	1770	1863	1583
Fr	0.18	1.00		0.18	1.00		0.20	1.00	1.00	0.65	1.00	1.00
Fr	0.18	1.00		0.18	1.00		0.20	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	339	3464		339	3462		373	1863	1583	1206	1863	1583
Volume (vph)	526	1206		199	389		203	348	169	473	224	208
Peak-hour factor, PHF	0.97	0.97		0.97	0.96		0.96	0.97	0.97	0.97	0.86	0.86
Adj. Flow (vph)	542	1243		205	405		211	359	174	488	260	242
RTOR Reduction (vph)	0	11		0	0		0	0	0	272	0	0
Lane Group Flow (vph)	542	1437		0	405		1445	0	359	174	216	260
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			4	3	8
Actuated Green, G (s)	49.0	49.0		44.0	44.0		37.0	25.0	25.0	24.0	16.0	16.0
Effective Green, g (s)	49.0	49.0		44.0	44.0		37.0	25.0	25.0	24.0	16.0	16.0
Actuated g/C Ratio	0.41	0.41		0.37	0.37		0.31	0.21	0.21	0.20	0.13	0.13
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	480	1414		387	1269		313	388	330	279	248	211
v/s Ratio Prot	c0.26	0.41		0.19	c0.42		c0.16	0.09		0.06	0.13	
v/s Ratio Perm	0.22			0.19			c0.19			0.14	0.12	
v/c Ratio	1.18	1.02		1.05	1.14		1.15	0.45	0.66	0.93	0.98	1.18
Uniform Delay, d1	43.1	35.5		51.2	38.0		36.8	41.5	43.6	46.1	51.8	52.0
Progression Factor	0.74	0.67		0.63	0.33		1.00	1.00	1.00	0.94	0.96	0.88
Incremental Delay, d2	95.0	23.8		53.7	70.6		96.8	0.8	4.6	34.2	47.7	116.7
Level of Service	126.7	47.5		85.8	83.0		133.6	42.3	48.2	77.5	97.2	162.4
Approach Delay (s)	F	D		F	F		F	D	D	E	F	F
Approach LOS	E			83.6			77.2			127.4		F
Intersection Summary												
HCM Average Control Delay			85.6	HCM Level of Service								
HCM Volume to Capacity ratio			1.10	F								
Actuated Cycle Length (s)			120.0	Sum of lost time (s)					8.0			
Intersection Capacity Utilization			112.2%	ICU Level of Service					H			
Analysis Period (min)			15									
Critical Lane Group												

Lanes, Volumes, Timings
10: Reinhardt College Parkway & Waleska Road

Future SAT
12/28/2006

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group	96	424	639	116	419	796
Lane Group Flow (vph)	0.48	0.76	0.57	0.07	0.76	0.52
v/c Ratio	56.0	15.6	10.3	0.0	29.7	5.4
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.0	15.6	10.3	0.0	29.7	5.4
Queue Length 50th (ft)	50	31	150	0	103	163
Queue Length 95th (ft)	m/4	m61	m386	m0	235	300
Internal Link Dist (ft)	3912	4852			2585	
Turn Bay Length (ft)			250	275		
Base Capacity (vph)	354	656	1128	1583	660	1529
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.65	0.57	0.07	0.63	0.52
Intersection Summary						
m	Volume for 95th percentile queue is metered by upstream signal.					

Baseline
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Future PM
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HCM Signalized Intersection Capacity Analysis
10: Reinhardt College Parkway & Waleska Road

Future SAT
12/28/2006

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑	↔	↔	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
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)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.30	1.00
Satd. Flow (perm)	1770	1583	1863	1583	561	1863
Volume (vph)	92	407	607	110	390	740
Peak-hour factor, PHF	0.96	0.96	0.95	0.95	0.93	0.93
Adj. Flow (vph)	96	424	639	116	419	796
RTOR Reduction (vph)	0	376	0	0	0	0
Lane Group Flow (vph)	96	48	639	116	419	796
Turn Type	Perm	Perm	Free	Free	pm+pt	
Protected Phases	4		6		5	2
Permitted Phases		4		Free		2
Actuated Green, G (s)	13.5	13.5	72.7	120.0	98.5	98.5
Effective Green, g (s)	13.5	13.5	72.7	120.0	98.5	98.5
Actuated g/C Ratio	0.11	0.11	0.61	1.00	0.82	0.82
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	199	178	1129	1583	680	1529
v/s Ratio Prot	c0.05		0.34		c0.11	0.43
v/s Ratio Perm		0.03		0.07		c0.39
v/c Ratio	0.48	0.27	0.57	0.07	0.62	0.52
Uniform Delay, d1	50.0	48.7	14.2	0.0	16.9	3.4
Progression Factor	1.02	1.63	0.59	1.00	1.00	1.00
Incremental Delay, d2	1.5	0.7	0.2	0.0	1.7	1.3
Delay (s)	52.3	80.3	8.6	0.0	18.6	4.6
Level of Service	D	F	A	A	B	A
Approach Delay (s)	75.1		7.3		9.4	
Approach LOS	E		A		A	
Intersection Summary						
HCM Average Control Delay	22.5				HCM Level of Service	
HCM Volume to Capacity ratio	0.59				C	
Actuated Cycle Length (s)	120.0				Sum of lost time (s)	
Intersection Capacity Utilization	68.7%				ICU Level of Service	
Analysis Period (min)	15				C	
Critical Lane Group						

Baseline
A & R Engineering Inc.

Future PM
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Lanes, Volumes, Timings
11: Reinhardt College Parkway & College Street

Future SAT
12/28/2006

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	522	440	346	290
Intersection Summary				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	4-way Stop											
Volume (vph)	39	310	132	45	287	82	126	110	44	98	90	70
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.81	0.81	0.81	0.89	0.89	0.89
Hourly flow rate (vph)	42	337	143	48	305	87	156	136	54	110	101	79
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	523	440	346	290								
Volume Left (vph)	42	48	156	110								
Volume Right (vph)	143	87	54	79								
HadJ (s)	-0.11	-0.06	0.03	-0.05								
Departure Headway (s)	8.4	8.5	8.9	9.1								
Degree Utilization, x	1.22	1.04	0.85	0.74								
Capacity (veh/h)	423	425	390	382								
Control Delay (s)	146.3	83.2	46.3	33.6								
Approach Delay (s)	146.3	83.2	46.3	33.6								
Approach LOS	F	F	E	D								
Intersection Summary												
Delay	86.9											
HCM Level of Service	F											
Intersection Capacity Utilization	60.8%											
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
11: Reinhardt College Parkway & College Street

Future SAT
12/28/2006

Lanes, Volumes, Timings
12: Knox Bridge Highway & Fincher Road

Future SAT
12/28/2006

	↖	→	↗	←	↑	↓
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	266	432	22	548	41	337
Intersection Summary						

HCM Unsignalized Intersection Capacity Analysis
12: Knox Bridge Highway & Fincher Road

Future SAT
12/28/2006

	↖	→	↗	←	↑	↓
Movement	EBL	EBT	WBL	WBT	NBT	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	234	371	9	21	408	118
Peak Hour Factor	0.88	0.88	0.88	0.96	0.86	0.86
Hourly flow rate (vph)	266	422	10	22	425	123
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	548		432		1658	1550
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	548		432		1658	1550
tC, single (s)	4.1		4.1		7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		2.2		3.5	4.0
p0 queue free %	74		98		69	92
cM capacity (veh/h)	1022		1128		34	82
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	266	432	22	548	42	337
Volume Left	266	0	22	0	10	100
Volume Right	0	10	0	123	24	225
cSH	1022	1700	1128	1700	97	173
Volume to Capacity	0.26	0.25	0.02	0.32	0.43	1.95
Queue Length 95th (ft)	26	0	1	0	45	636
Control Delay (s)	9.8	0.0	8.3	0.0	67.7	491.4
Lane LOS	A	A	A	F	F	F
Approach Delay (s)	3.7		0.3		67.7	491.4
Approach LOS			F		F	F
Intersection Summary						
Average Delay			103.9			
Intersection Capacity Utilization			76.9%		ICU Level of Service	D
Analysis Period (min)			15			

Lanes, Volumes, Timings
13: N Etowah Drive & Riverstone Parkway

Future SAT
12/28/2006

Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1330	100	592	592	1557	12	9	1394
Intersection Summary								

HCM Unsignalized Intersection Capacity Analysis
13: N Etowah Drive & Riverstone Parkway

Future SAT
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔		↔	↔	
Sign Control		Stop		Stop	Stop			Free		Free	Free	
Grade		0%		0%	0%			0%		0%	0%	
Volume (veh/h)	527	140	463	9	52	8	533	1401	11	9	1352	717
Peak Hour Factor	0.85	0.85	0.85	0.69	0.69	0.69	0.90	0.90	0.90	0.90	0.97	0.97
Hourly flow rate (vph)	620	165	545	13	75	12	592	1557	12	9	1394	739
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	3413	4166	697	3539	4893	778	2133			1569		
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
vCu, unblocked vol	3413	4166	697	3539	4893	778	2133			1569		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	0	0	0	0	97			98		
cM capacity (veh/h)	0	0	384	0	0	339	251			417		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	1329	100	592	778	778	12	9	697	697	739		
Volume Left	620	13	592	0	0	0	9	0	0	0		
Volume Right	545	12	0	0	0	12	0	0	0	739		
cSH	0	0	251	1700	1700	417	1700	1700	1700	1700		
Volume to Capacity	Err	Err	2.36	0.46	0.46	0.01	0.02	0.41	0.41	0.43		
Queue Length 95th (ft)	Err	Err	1184	0	0	0	2	0	0	0		
Control Delay (s)	Err	Err	655.7	0.0	0.0	0.0	13.8	0.0	0.0	0.0		
Lane LOS	F	F	F	F	F	B	B					
Approach Delay (s)	Err	Err	179.7				0.1					
Approach LOS	F	F	F									
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization			148.4%				ICU Level of Service			H		
Analysis Period (min)			15									

Lanes, Volumes, Timings
14: Broad Water Bay Road & Fincher Road

Future SAT
12/28/2006

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	171	421	337	269
Intersection Summary				



HCM Unsignalized Intersection Capacity Analysis
14: Broad Water Bay Road & Fincher Road

Future SAT
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	20	100	34	185	67	135	45	98	154	97	96	42
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.88	0.88	0.88	0.87	0.87	0.87
Hourly flow rate (vph)	22	111	38	201	73	147	51	111	175	111	110	48
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	842	746	134	752	683	199	159			286		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol	842	746	134	752	683	199	159			286		
vCu, unblocked vol	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, single (s)												
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	87	63	96	1	78	83	96			91		
cM capacity (veh/h)	177	301	914	204	327	842	1421			1276		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	171	421	338	270								
Volume Left	22	201	51	111								
Volume Right	38	147	175	48								
cSH	319	304	1421	1276								
Volume to Capacity	0.54	1.38	0.04	0.09								
Queue Length 95th (ft)	75	545	3	7								
Control Delay (s)	28.6	224.6	1.4	3.8								
Lane LOS	D	F	A	A								
Approach Delay (s)	28.6	224.6	1.4	3.8								
Approach LOS	D	F										
Intersection Summary												
Average Delay	84.1											
Intersection Capacity Utilization	69.1%											
Analysis Period (min)	15											

Lanes, Volumes, Timings
15: Bells Ferry Road & Marietta Highway

Future SAT
12/28/2006

Lane Group	EBT	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	612	361	28	690	98	683
v/c Ratio	1.43	0.47	0.21	0.79	0.78	0.79
Control Delay	236.2	7.6	24.3	35.4	67.9	34.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	236.2	7.6	24.3	35.4	67.9	34.9
Queue Length 50th (ft)	~646	44	13	442	62	435
Queue Length 95th (ft)	#876	m80	36	609	#169	598
Internal Link Dist (ft)	1761	266	463		416	
Turn Bay Length (ft)		150			150	250
Base Capacity (vph)	427	776	131	868	126	869
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.43	0.47	0.21	0.79	0.78	0.79

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Baseline
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HCM Signalized Intersection Capacity Analysis
15: Bells Ferry Road & Marietta Highway

Future SAT
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.96	0.96	0.96	0.92	0.92	0.92	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786
Satd. Flow (prot)	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Flt Permitted	913	913	913	913	913	913	913	913	913	913	913	913
Satd. Flow (perm)	438	113	18	35	95	210	27	647	9	92	642	336
Volume (vph)	0.93	0.93	0.93	0.94	0.94	0.94	0.95	0.95	0.95	0.94	0.94	0.94
Peak-hour factor, PHF	471	122	19	37	101	223	28	681	9	98	683	357
Adj. Flow (vph)	0	1	0	0	49	0	0	1	0	0	0	172
RTOR Reduction (vph)	0	611	0	0	312	0	28	689	0	98	683	185
Lane Group Flow (vph)	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Turn Type	8	8	4	4	4	4	6	6	2	2	2	2
Protected Phases	8	8	4	4	4	4	6	6	2	2	2	2
Permitted Phases	8	8	4	4	4	4	6	6	2	2	2	2
Actuated Green, G (s)	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0
Effective Green, g (s)	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	426	727	727	727	727	727	131	868	126	869	739	739
v/s Ratio Prot	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
v/s Ratio Perm	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43
Uniform Delay, d1	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
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	208.4	208.4	208.4	208.4	208.4	208.4	208.4	208.4	208.4	208.4	208.4	208.4
Delay (s)	240.4	240.4	240.4	240.4	240.4	240.4	240.4	240.4	240.4	240.4	240.4	240.4
Level of Service	F	F	F	F	F	F	F	F	F	F	F	F
Approach Delay (s)	240.4	240.4	240.4	240.4	240.4	240.4	240.4	240.4	240.4	240.4	240.4	240.4
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F

Intersection Summary

HCM Average Control Delay 74.7 HCM Level of Service E

HCM Volume to Capacity ratio 1.11

Actuated Cycle Length (s) 120.0 Sum of lost time (s) 8.0

Intersection Capacity Utilization 104.1% ICU Level of Service G

Analysis Period (min) 15

c Critical Lane Group

Baseline
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Future 2020 Saturday Improved

Lanes, Volumes, Timings
2: Cumming Highway & I-575 Southbound Ramp

HCM Signalized Intersection Capacity Analysis
2: Cumming Highway & I-575 Southbound Ramp

Future SAT - Improved
12/28/2006

Future SAT - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	462	120	428	698	452	131						
Act Effct Green (s)	34.1	120.0	40.0	120.0	33.9	34.1						
Actuated g/C Ratio	0.28	1.00	0.33	1.00	0.28	0.28						
v/c Ratio	0.46	0.08	0.36	0.44	0.91	0.24						
Control Delay	29.4	0.1	30.5	1.1	63.7	7.3						
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0						
Total Delay	29.4	0.1	30.5	1.1	63.7	7.3						
LOS	C	A	C	A	E	A						
Approach Delay	23.4			12.3								
Approach LOS	C			B								
Queue Length 50th (ft)	163	0	132	0	332	0						
Queue Length 95th (ft)	191	0	177	7	#455	50						
Internal Link Dist (ft)	2177			1047								
Turn Bay Length (ft)	150			150		320						
Base Capacity (vph)	1007	1583	1180	1583	575	544						
Starvation Cap Reductn	0	0	0	0	0	0						
Spillback Cap Reductn	0	0	0	0	0	0						
Storage Cap Reductn	0	0	0	0	0	0						
Reduced v/c Ratio	0.46	0.08	0.36	0.44	0.79	0.24						

Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 53 (44%), Referenced to phase 2:WBT, Start of Green												
Control Type: Actuated-Coordinated												
Maximum v/c Ratio: 0.91												
Intersection Signal Delay: 25.0												
Intersection Capacity Utilization 43.2%												
Analysis Period (min) 15												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔↔	↔	↔↔	↔↔	↔↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.85	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.85	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3539	1583	3539	1583	3539	1583	1770	1770	1583	1770	1583	1583
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3539	1583	3539	1583	3539	1583	1770	1770	1583	1770	1583	1583
Volume (vph)	0	434	113	0	402	656	0	0	0	443	0	128
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.92	0.92	0.92	0.98	0.98	0.98
Adj. Flow (vph)	0	462	120	0	428	698	0	0	0	452	0	131
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	94
Lane Group Flow (vph)	0	462	120	0	428	698	0	0	0	452	0	37
Turn Type		Free	Free		Free	Free				Prot		custom
Protected Phases	6		2							1		6
Permitted Phases		Free	Free		Free	Free				33.9		34.1
Actuated Green, G (s)	34.1	120.0	40.0	120.0	40.0	120.0				33.9		34.1
Effective Green, g (s)	34.1	120.0	40.0	120.0	40.0	120.0				33.9		34.1
Actuated g/C Ratio	0.28	1.00	0.33	1.00	0.33	1.00				0.28		0.28
Clearance Time (s)	4.0		4.0		4.0					4.0		4.0
Vehicle Extension (s)	3.0		3.0		3.0					3.0		3.0
Lane Grp Cap (vph)	1006	1583	1180	1583						500		450
v/s Ratio Prot	0.13		0.12							c0.26		
v/s Ratio Perm		0.08		0.08		c0.44					0.02	
v/c Ratio	0.46	0.08	0.36	0.44						0.90	0.08	
Uniform Delay, d1	35.4	0.0	30.3	0.0						41.5	31.5	
Progression Factor	0.77	1.00	0.97	1.00						1.00	1.00	
Incremental Delay, d2	1.2	0.1	0.8	0.9						19.6	0.4	
Delay (s)	28.3	0.1	30.3	0.9						61.1	31.8	
Level of Service	C	A	C	A						E	C	
Approach Delay (s)	22.5		12.1							54.5		
Approach LOS	C		B							D		
Intersection Summary												
HCM Average Control Delay	25.5											
HCM Volume to Capacity ratio	0.58											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	43.2%											
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
3: Bobo Grinding Co Driveway & Marietta Street

Future SAT - Improved
12/28/2006

	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group						
Lane Group Flow (vph)	13	245	348	597	321	438
Act Effct Green (s)	25.4	25.4	25.4	65.8	16.8	86.6
Actuated g/C Ratio	0.21	0.21	0.21	0.55	0.14	0.72
v/c Ratio	0.04	0.83	0.57	0.61	0.67	0.33
Control Delay	25.5	67.2	7.9	21.7	38.8	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.5	67.2	7.9	21.7	38.8	9.0
LOS	C	E	A	C	D	A
Approach Delay	25.5		32.4	21.7		21.6
Approach LOS	C		C	C		C
Queue Length 50th (ft)	5	183	3	251	91	221
Queue Length 95th (ft)	13	257	75	521	170	362
Internal Link Dist (ft)	95		143	3002		1058
Turn Bay Length (ft)	150				90	
Base Capacity (vph)	455	395	695	986	544	1343
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.62	0.50	0.61	0.59	0.33
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 44 (37%), Referenced to phase 2:SBT and 6:NBTL, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.83						
Intersection Signal Delay: 24.9	Intersection LOS: C					
Intersection Capacity Utilization 83.9%	ICU Level of Service E					
Analysis Period (min) 15						

Baseline
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Future PM
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HCM Signalized Intersection Capacity Analysis
3: Bobo Grinding Co Driveway & Marietta Street

Future SAT - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Flt Protected	0.95	0.95	1.00	0.85	0.85	0.85	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1733	1733	1770	1587	1587	1587	1777	3433	3433	1861		
Flt Permitted	0.79	0.79	0.75	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1399	1399	1395	1587	1587	1587	1776	3433	3433	1861		
Volume (vph)	3	2	3	233	5	326	2	377	194	302	410	2
Peak-hour factor, PHF	0.62	0.62	0.62	0.95	0.95	0.95	0.96	0.96	0.96	0.94	0.94	0.94
Adj. Flow (vph)	5	3	5	245	5	343	2	393	202	321	436	2
RTOR Reduction (vph)	0	4	0	0	270	0	0	13	0	0	0	0
Lane Group Flow (vph)	0	9	0	245	78	0	0	584	0	321	438	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Prot				
Protected Phases	8	8		4	4		6	5	2			
Permitted Phases	8											
Actuated Green, G (s)	25.4	25.4	25.4	25.4	25.4		65.8	16.8	86.6			
Effective Green, g (s)	25.4	25.4	25.4	25.4	25.4		65.8	16.8	86.6			
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21		0.55	0.14	0.72			
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	0	0	0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	296		295	336			974	481	1343			
v/s Ratio Prot								c0.09	0.24			
v/s Ratio Perm	0.01		c0.18				c0.33					
v/c Ratio	0.03		0.83	0.23			0.60	0.67	0.33			
Uniform Delay, d1	37.5		45.2	39.2			18.2	48.9	6.1			
Progression Factor	1.00		1.00	1.00			0.96	0.65	1.17			
Incremental Delay, d2	0.0		17.7	0.4			2.7	3.4	0.6			
Delay (s)	37.6		62.9	39.6			20.2	35.2	7.8			
Level of Service	D		E	D			C	D	A			
Approach Delay (s)	37.6			49.2			20.2		19.4			
Approach LOS	D			D			C		B			
Intersection Summary												
HCM Average Control Delay	28.8				HCM Level of Service				C			
HCM Volume to Capacity ratio	0.66											
Actuated Cycle Length (s)	120.0				Sum of lost time (s)				12.0			
Intersection Capacity Utilization	83.9%				ICU Level of Service				E			
Analysis Period (min)	15											
Critical Lane Group												

Baseline
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Lanes, Volumes, Timings
4: Big K-Mart Driveway & Marietta Highway

Future SAT - Improved
12/28/2006

	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	250	259	273	537	34	1316	486	498	1252	72
Act Effct Green (s)	17.4	21.6	21.6	120.0	7.2	41.9	41.9	23.1	61.8	61.8
Actuated g/C Ratio	0.14	0.18	0.18	1.00	0.06	0.35	0.35	0.19	0.52	0.52
v/c Ratio	0.95	0.85	0.88	0.34	0.32	0.74	0.57	0.75	0.69	0.09
Control Delay	95.6	73.1	77.0	0.6	62.0	38.2	6.6	28.2	25.4	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.6	73.1	77.0	0.6	62.0	38.2	6.6	28.2	25.4	5.9
LOS	F	E	E	A	E	D	A	C	C	A
Approach Delay	95.6	37.7			30.3				25.4	
Approach LOS	F	D			C				C	
Queue Length 50th (ft)	~205	203	215	0	26	321	11	156	510	17
Queue Length 95th (ft)	#373	#344	#366	0	60	#428	107	m173	m570	m25
Internal Link Dist (ft)	162	324	324		429				419	
Turn Bay Length (ft)	150	395	150	395	150	1777	855	887	1823	829
Base Capacity (vph)	262	322	328	1583	118	1777	855	887	1823	829
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.80	0.83	0.34	0.29	0.74	0.57	0.56	0.69	0.09

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 97 (81%), Referenced to phase 2:SBT and 6:NBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 33.4

Intersection Capacity Utilization 68.5%

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

m Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis
4: Big K-Mart Driveway & Marietta Highway

Future SAT - Improved
12/28/2006

	EBT	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.91	0.85	1.00	0.97	0.95
Lane Util. Factor	0.98	1.00	1.00	0.95	1.00	0.95	1.00	0.91	0.85	1.00	0.95	0.95
Flt Protected	0.97	0.97	0.97	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1783	1681	1711	1583	1770	1583	1770	5085	1583	3433	3539	1583
Flt Permitted	0.97	0.95	0.97	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1783	1681	1711	1583	1770	1583	1770	5085	1583	3433	3539	1583
Volume (vph)	129	70	26	420	80	505	33	1290	476	488	1227	71
Peak-hour factor, PHF	0.90	0.90	0.90	0.94	0.94	0.94	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	143	78	29	447	85	537	34	1316	486	498	1252	72
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	302	0	0	14
Lane Group Flow (vph)	0	246	0	259	273	537	34	1316	184	498	1252	58
Turn Type	Split	Split	Split	Free	Free	Free	Prot	Prot	Perm	Prot	Perm	Perm
Protected Phases	8	8	8	4	4	4	1	6	5	2	2	2
Permitted Phases												
Actuated Green, G (s)	17.4	21.6	21.6	120.0	4.8	41.9	41.9	23.1	60.2	60.2	60.2	60.2
Effective Green, g (s)	17.4	21.6	21.6	120.0	4.8	41.9	41.9	23.1	60.2	60.2	60.2	60.2
Actuated g/C Ratio	0.14	0.18	0.18	1.00	0.04	0.35	0.35	0.19	0.50	0.50	0.50	0.50
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	259	303	308	1583	71	1776	553	661	1775	794		
v/s Ratio Prot	c0.14	0.15	c0.16	0.34	0.02	c0.26			c0.15	0.35		
v/c Ratio Perm	0.95	0.85	0.89	0.34	0.48	0.74	0.33	0.75	0.71	0.07		
Uniform Delay, d1	50.9	47.7	48.0	0.0	56.4	34.3	28.8	45.8	23.1	15.5		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.52	1.04		
Incremental Delay, d2	41.5	20.3	24.8	0.6	5.0	2.8	1.6	3.0	1.5	0.1		
Delay (s)	92.4	68.0	72.8	0.6	61.4	37.1	30.4	26.6	25.5	8.3		
Level of Service	F	E	E	A	E	D	C	C	C	A		
Approach Delay (s)	92.4	35.4					35.8		25.1			
Approach LOS	F	D					D		C			

Intersection Summary

HCM Average Control Delay 34.6 HCM Level of Service C

HCM Volume to Capacity ratio 0.81

Actuated Cycle Length (s) 120.0 Sum of lost time (s) 16.0

Intersection Capacity Utilization 68.5% ICU Level of Service C

Analysis Period (min) 15

c Critical Lane Group

Lanes, Volumes, Timings
5: Riverstone Parkway & I - 575 Northbound Ramp

HCM Signalized Intersection Capacity Analysis
5: Riverstone Parkway & I - 575 Northbound Ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	508	1333	1662	153	1007	846						
Act Effct Green (s)	17.0	77.0	56.0	120.0	35.0	56.0						
Actuated g/C Ratio	0.14	0.64	0.47	1.00	0.29	0.47						
v/c Ratio	1.05	0.59	1.01	0.10	1.01	0.74						
Control Delay	72.8	1.7	55.9	0.1	72.5	7.5						
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0						
Total Delay	72.8	1.7	55.9	0.1	72.5	7.5						
LOS	E	A	E	A	E	A						
Approach Delay	21.3			51.2								
Approach LOS	C			D								
Queue Length 50th (ft)	~227	63	~672	0	~406	38						
Queue Length 95th (ft) m#219	m40	#848	0	#551	177							
Internal Link Dist (ft)	1330			1370								
Turn Bay Length (ft)	370			300	490							
Base Capacity (vph)	486	2271	1652	1583	1001	1142						
Starvation Cap Reductn	0	0	0	0	0	0						
Spillback Cap Reductn	0	0	0	0	0	0						
Storage Cap Reductn	0	0	0	0	0	0						
Reduced v/c Ratio	1.05	0.59	1.01	0.10	1.01	0.74						
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 108 (90%). Referenced to phase 2:WBT and 6:EBT, Start of Green												
Control Type: Actuated-Coordinated												
Maximum v/c Ratio: 1.05												
Intersection Signal Delay: 38.4												
Intersection Capacity Utilization 97.1%												
Analysis Period (min) 15												
~ Volume exceeds capacity, queue is theoretically infinite.												
Queue shown is maximum after two cycles.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↔↔		↔↔	↔↔	↔↔	↔↔	↔↔	↔↔	↔↔	↔↔	↔↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	0.97	0.95		0.95	1.00	0.97	1.00	0.85	1.00	0.85		
Flt	1.00	1.00		1.00	1.00	0.85	1.00	0.95	1.00	0.85		
Flt Protected	0.95	1.00		1.00	1.00	1.00	1.00	0.95	1.00	0.95		
Satd. Flow (prot)	3433	3539		3539	1583	3433	3433	1583				
Flt Permitted	0.95	1.00		1.00	1.00	0.95	1.00	0.95	1.00			
Satd. Flow (perm)	3433	3539		3539	1583	3433	3433	1583				
Volume (vph)	483	1266	0	0	1645	151	977	0	821	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.99	0.99	0.99	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	508	1333	0	0	1662	153	1007	0	846	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	404	0	0	0
Lane Group Flow (vph)	508	1333	0	0	1662	153	1007	0	442	0	0	0
Turn Type	Prot			Free			custom			custom		
Protected Phases	1			2								
Permitted Phases							Free			4		
Actuated Green, G (s)	17.0			77.0			56.0			120.0		
Effective Green, g (s)	17.0			77.0			56.0			120.0		
Actuated g/C Ratio	0.14			0.64			0.47			1.00		
Clearance Time (s)	4.0			4.0			4.0			4.0		
Vehicle Extension (s)	3.0			3.0			3.0			3.0		
Lane Grp Cap (vph)	486			2271			1652			1583		
v/s Ratio Prot	c0.15			0.38			c0.47					
v/s Ratio Perm							0.10			c0.29		
v/c Ratio	1.05			0.59			1.01			0.10		
Uniform Delay, d1	51.5			12.4			32.0			0.0		
Progression Factor	0.77			0.11			1.00			1.00		
Incremental Delay, d2	33.0			0.3			23.6			0.1		
Delay (s)	72.6			1.7			55.6			0.1		
Level of Service	E			A			E			A		
Approach Delay (s)	21.2			C			50.9			51.8		
Approach LOS							D			D		
Intersection Summary												
HCM Average Control Delay				41.3			HCM Level of Service			D		
HCM Volume to Capacity ratio				1.01								
Actuated Cycle Length (s)				120.0			Sum of lost time (s)			12.0		
Intersection Capacity Utilization				97.1%			ICU Level of Service			F		
Analysis Period (min)				15								
Critical Lane Group												

Lanes, Volumes, Timings
9: Riverstone Parkway & Waleska Road

Future SAT - Improved
12/28/2006

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	542	1243	205	405	211	359	174	488	260	242	580	
Act Effct Green (s)	29.8	56.7	65.7	19.0	45.9	45.9	26.3	17.3	36.3	30.3	19.3	53.1
Actuated g/C Ratio	0.25	0.47	0.55	0.16	0.38	0.38	0.22	0.14	0.30	0.25	0.16	0.44
v/c Ratio	0.63	0.74	0.22	0.74	0.92	0.32	0.74	0.65	0.95	0.85	0.81	0.81
Control Delay	34.8	18.9	3.5	35.4	29.4	3.4	46.5	59.0	56.1	60.0	64.8	35.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.8	18.9	3.5	35.4	29.4	3.4	46.5	59.0	56.1	60.0	64.8	35.7
LOS	C	B	A	D	C	A	D	E	E	E	E	D
Approach Delay	21.6											
Approach LOS	C											
Queue Length 50th (ft)	151	361	10	154	484	1	117	129	255	158	186	374
Queue Length 95th (ft)	214	481	m48	190	#740	m14	148	192	#357	185	222	427
Internal Link Dist (ft)	822											
Turn Bay Length (ft)	150	150	150	150	150	150	160	484	435	514	305	466
Base Capacity (vph)	916	1673	922	544	1353	665	484	435	514	305	466	741
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.74	0.22	0.74	0.92	0.32	0.74	0.40	0.95	0.85	0.52	0.78

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 8 (7%), Referenced to phase 2:WBT and 6:EBT, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 33.8	Intersection LOS: C
Intersection Capacity Utilization 85.0%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Baseline
A & R Engineering Inc.

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HCM Signalized Intersection Capacity Analysis
9: Riverstone Parkway & Waleska Road

Future SAT - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.85	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	1770	1863	1583
Volume (vph)	526	1206	199	389	1195	203	348	169	473	224	208	499
Peak-hour factor, PHF	0.97	0.97	0.97	0.96	0.96	0.96	0.97	0.97	0.97	0.86	0.86	0.86
Adj. Flow (vph)	542	1243	205	405	1245	211	359	174	488	260	242	580
RTOR Reduction (vph)	0	0	55	0	0	59	0	0	36	0	0	12
Lane Group Flow (vph)	542	1243	150	405	1245	152	359	174	452	260	242	568
Turn Type	Prot	pm+ov	Prot	pm	pm+pt	pm+ov	pm+pt	pm+ov	pm+pt	pm+ov	pm+pt	pm+ov
Protected Phases	1	6	7	5	2	7	4	5	3	8	1	
Permitted Phases			6			2	4		4		8	
Actuated Green, G (s)	29.8	56.7	65.7	19.0	45.9	45.9	26.3	17.3	36.3	30.3	19.3	49.1
Effective Green, g (s)	29.8	56.7	65.7	19.0	45.9	45.9	26.3	17.3	36.3	30.3	19.3	49.1
Actuated g/C Ratio	0.25	0.47	0.55	0.16	0.38	0.38	0.22	0.14	0.30	0.25	0.16	0.41
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	853	1672	867	544	1354	605	398	269	479	266	300	700
v/s Ratio Prot	0.16	0.35	0.01	0.12	0.35	0.07	0.09	0.15	0.09	0.13	0.20	0.20
v/s Ratio Perm			0.08			0.10	0.13			0.14	0.16	0.16
v/c Ratio	0.64	0.74	0.17	0.74	0.92	0.25	0.90	0.65	0.94	0.98	0.81	0.81
Uniform Delay, d1	40.3	25.7	13.6	48.2	35.3	25.3	43.0	48.5	40.9	42.5	48.6	31.4
Progression Factor	0.82	0.82	0.96	0.59	0.45	0.15	1.00	1.00	1.00	0.95	0.96	0.98
Incremental Delay, d2	1.0	2.0	0.1	4.1	9.1	0.7	23.0	5.3	27.5	46.3	13.6	6.6
Delay (s)	33.9	18.0	13.1	32.5	24.9	4.5	66.0	53.7	68.4	86.5	60.0	37.2
Level of Service	C	B	B	C	C	A	E	D	E	F	E	D
Approach Delay (s)	21.8											
Approach LOS	C											

Intersection Summary

HCM Average Control Delay	35.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

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Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	96	424	639	116	419	796
Act Effct Green (s)	11.5	38.3	73.7	120.0	22.8	100.5
Actuated g/C Ratio	0.10	0.32	0.61	1.00	0.19	0.84
v/c Ratio	0.56	0.77	0.56	0.07	0.64	0.51
Control Delay	42.3	45.1	9.0	0.1	51.2	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.3	45.1	9.0	0.1	51.2	4.4
LOS	D	D	A	A	D	A
Approach Delay	44.6	7.6			20.6	
Approach LOS	D	A			C	
Queue Length 50th (ft)	70	319	77	0	159	104
Queue Length 95th (ft)	m95	427	207	m0	m198	m296
Internal Link Dist (ft)	3912	4852			2585	
Turn Bay Length (ft)	369	855	1144	1583	1345	1560
Base Capacity (vph)	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.50	0.56	0.07	0.31	0.51

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 44 (37%), Referenced to phase 2:SBT and 6:NBT, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 21.6	Intersection LOS: C
Intersection Capacity Utilization 63.8%	ICU Level of Service B
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Flt	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)	1770	1583	1863	1583	3433	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	3433	1863
Volume (vph)	92	407	607	110	390	740
Peak-hour factor, PHF	0.96	0.96	0.95	0.95	0.93	0.93
Adj. Flow (vph)	96	424	639	116	419	796
RTOR Reduction (vph)	0	45	0	0	0	0
Lane Group Flow (vph)	96	379	639	116	419	796
Turn Type		pn+ov	Free	Prot		
Protected Phases	4	5	6	5	2	
Permitted Phases		4		Free		
Actuated Green, G (s)	11.5	34.3	73.7	120.0	22.8	100.5
Effective Green, g (s)	11.5	34.3	73.7	120.0	22.8	100.5
Actuated g/C Ratio	0.10	0.29	0.61	1.00	0.19	0.84
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	170	505	1144	1583	652	1560
v/s Ratio Prot	0.05	c0.14	c0.34	0.12	0.43	
v/s Ratio Perm		0.10		0.07		
v/c Ratio	0.56	0.75	0.56	0.07	0.64	0.51
Uniform Delay, d1	51.9	39.0	13.6	0.0	44.8	2.8
Progression Factor	0.60	1.19	0.47	1.00	1.05	1.02
Incremental Delay, d2	3.8	5.5	1.6	0.1	2.2	1.2
Delay (s)	34.9	52.1	8.0	0.1	49.4	4.0
Level of Service	C	D	A	A	D	A
Approach Delay (s)	48.9		6.8		19.7	
Approach LOS	D		A		B	

Intersection Summary

HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
11: Reinhardt College Parkway & College Street

Future SAT - Improved
12/28/2006

	→	←	↑	↓	
Lane Group	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	522	440	346	110	180
Act Effct Green (s)	79.5	79.5	32.5	32.5	32.5
Actuated g/C Ratio	0.66	0.66	0.27	0.27	0.27
v/c Ratio	0.47	0.40	0.92	0.41	0.36
Control Delay	12.7	8.6	70.4	38.3	26.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	8.6	70.4	38.3	26.4
LOS	B	A	E	D	C
Approach Delay	12.7	8.6	70.4	30.9	
Approach LOS	B	A	E	C	
Queue Length 50th (ft)	172	135	255	70	84
Queue Length 95th (ft)	336	183	281	107	125
Internal Link Dist (ft)	952	6443	4497	4161	
Turn Bay Length (ft)	150				
Base Capacity (vph)	1122	1089	639	463	835
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.47	0.40	0.54	0.24	0.22
Intersection Summary					
Cycle Length: 120					
Actuated Cycle Length: 120					
Offset: 114 (95%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.92					
Intersection Signal Delay: 27.4					
Intersection Capacity Utilization 67.2%					
Analysis Period (min) 15					
Intersection LOS: C					
ICU Level of Service C					

Baseline
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HCM Signalized Intersection Capacity Analysis
11: Reinhardt College Parkway & College Street

Future SAT - Improved
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96	0.96	0.96	0.97	0.97	0.97	0.98	0.98	1.00	0.93	0.93	0.93
Flt Protected	1.00	1.00	1.00	0.99	0.99	0.99	0.98	0.98	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1787	1803	1803	1803	1803	1783	1783	1770	1740	1740	1740
Flt Permitted	0.94	0.94	0.91	0.91	0.91	0.91	0.63	0.63	0.50	1.00	1.00	1.00
Satd. Flow (perm)	1685	1685	1642	1642	1642	1642	1157	1157	922	1740	1740	1740
Volume (vph)	39	310	132	45	287	82	126	110	44	98	90	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.81	0.81	0.81	0.89	0.89	0.89
Adj. Flow (vph)	42	337	143	48	305	87	156	136	54	110	101	79
RTOR Reduction (vph)	0	7	0	0	5	0	0	0	7	0	0	32
Lane Group Flow (vph)	0	515	0	0	435	0	0	339	0	110	148	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	2	2	4	4	4	4	4	8	8	8
Permitted Phases	6	6	2	2	4	4	4	4	4	8	8	8
Actuated Green, G (s)	79.5	79.5	79.5	79.5	79.5	79.5	32.5	32.5	32.5	32.5	32.5	32.5
Effective Green, g (s)	79.5	79.5	79.5	79.5	79.5	79.5	32.5	32.5	32.5	32.5	32.5	32.5
Actuated g/C Ratio	0.66	0.66	0.66	0.66	0.66	0.66	0.27	0.27	0.27	0.27	0.27	0.27
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1116	1116	1088	1088	1088	1088	313	313	250	471	471	471
v/s Ratio Prot												
v/s Ratio Perm	c0.31	c0.31	0.27	0.27	0.27	0.27	c0.29	c0.29	0.12	0.09	0.09	0.09
v/c Ratio	0.46	0.46	0.40	0.40	0.40	0.40	1.08	1.08	0.44	0.31	0.31	0.31
Uniform Delay, d1	9.8	9.8	9.3	9.3	9.3	9.3	43.8	43.8	36.2	34.9	34.9	34.9
Progression Factor	1.00	1.00	0.72	0.72	0.72	0.72	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	1.4	0.8	0.8	0.8	0.8	74.5	74.5	1.2	0.4	0.4	0.4
Delay (s)	11.2	11.2	7.5	7.5	7.5	7.5	118.3	118.3	37.5	35.3	35.3	35.3
Level of Service	B	B	A	A	A	A	F	F	D	D	D	D
Approach Delay (s)	11.2	11.2	7.5	7.5	7.5	7.5	118.3	118.3	36.1	36.1	36.1	36.1
Approach LOS	B	B	A	A	A	A	F	F	D	D	D	D
Intersection Summary												
HCM Average Control Delay	37.9					HCM Level of Service					D	
HCM Volume to Capacity ratio	0.64											
Actuated Cycle Length (s)	120.0					Sum of lost time (s)					8.0	
Intersection Capacity Utilization	67.2%					ICU Level of Service					C	
Analysis Period (min)	15											
Critical Lane Group												

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Lanes, Volumes, Timings
12: Knox Bridge Highway & Fincher Road

Future SAT - Improved
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	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	266	432	22	548	41	337
Act Effct Green (s)	88.6	88.6	88.6	88.6	23.4	23.4
Actuated g/C Ratio	0.74	0.74	0.74	0.74	0.20	0.20
v/c Ratio	0.62	0.32	0.04	0.41	0.13	0.90
Control Delay	18.1	7.1	6.4	7.9	19.5	58.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.1	7.1	6.4	7.9	19.5	58.1
LOS	B	A	A	A	B	E
Approach Delay	11.3					
Approach LOS	B					
Queue Length 50th (ft)	86	98	4	132	11	187
Queue Length 95th (ft)	244	194	16	269	35	272
Internal Link Dist (ft)	1486					
Turn Bay Length (ft)	640	1371	553	1333	644	666
Base Capacity (vph)	429	1371	553	1333	644	666
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.32	0.04	0.41	0.06	0.51
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBTL, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.90						
Intersection Signal Delay: 19.9	Intersection LOS: B					
Intersection Capacity Utilization 76.9%	ICU Level of Service D					
Analysis Period (min) 15						

Baseline
A & R Engineering Inc.

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HCM Signalized Intersection Capacity Analysis
12: Knox Bridge Highway & Fincher Road

Future SAT - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷	↷	↶	↶	↶		↷			↷	↷
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	0.97	1.00	0.97	0.92	0.99	0.99	0.91	0.99
Flt Protected												
Satd. Flow (prot)	1770	1856	1770	1770	1800	1770	1800	1695	1695	1670	1670	1670
Flt Permitted	0.41	1.00	0.48	1.00	0.48	1.00	0.48	0.86	0.86	0.90	0.90	0.90
Satd. Flow (perm)	762	1856	889	1800	889	1800	889	1469	1469	1520	1520	1520
Volume (vph)	234	371	9	21	408	118	9	6	21	93	11	209
Peak-hour factor, PHF	0.88	0.88	0.88	0.96	0.96	0.96	0.86	0.86	0.86	0.93	0.93	0.93
Adj. Flow (vph)	266	422	10	22	425	123	10	7	24	100	12	225
RTOR Reduction (vph)	0	1	0	0	5	0	0	19	0	0	81	0
Lane Group Flow (vph)	266	431	0	22	543	0	0	22	0	0	257	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	2	2	4	4	4	4	4	8	8	8
Permitted Phases	6	6	2	2	4	4	4	4	4	8	8	8
Actuated Green, G (s)	88.6	88.6	88.6	88.6	88.6	88.6	23.4	23.4	23.4	23.4	23.4	23.4
Effective Green, g (s)	88.6	88.6	88.6	88.6	88.6	88.6	23.4	23.4	23.4	23.4	23.4	23.4
Actuated g/C Ratio	0.74	0.74	0.74	0.74	0.74	0.74	0.19	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	563	1370	656	1329	1329	286	286	286	286	286	286	286
v/s Ratio Prot	c0.35	0.23	0.02	0.30	0.30	0.01	0.01	0.01	0.01	c0.17	c0.17	c0.17
v/s Ratio Perm	0.47	0.31	0.03	0.41	0.41	0.08	0.08	0.08	0.08	0.87	0.87	0.87
Uniform Delay, d1	6.3	5.4	4.2	5.9	5.9	39.5	39.5	39.5	39.5	46.8	46.8	46.8
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	2.8	0.6	0.1	0.9	0.9	0.1	0.1	0.1	0.1	22.3	22.3	22.3
Delay (s)	9.1	6.0	4.3	6.8	6.8	39.6	39.6	39.6	39.6	69.1	69.1	69.1
Level of Service	A	A	A	A	A	D	D	D	D	E	E	E
Approach Delay (s)	7.2	7.2	6.7	6.7	6.7	39.6	39.6	39.6	39.6	69.1	69.1	69.1
Approach LOS	A	A	A	A	A	D	D	D	D	E	E	E
Intersection Summary												
HCM Average Control Delay	20.5						HCM Level of Service					
HCM Volume to Capacity ratio	0.55						C					
Actuated Cycle Length (s)	120.0						Sum of lost time (s)					
Intersection Capacity Utilization	76.9%						ICU Level of Service					
Analysis Period (min)	15						D					
Critical Lane Group												

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Lanes, Volumes, Timings
15: Bells Ferry Road & Marietta Highway

Future SAT - Improved
12/28/2006

Movement	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	471	141	37	101	223	28	690	98	683
Act Effct Green (s)	41.1	41.1	12.5	12.5	12.5	70.9	70.9	70.9	70.9
Actuated g/C Ratio	0.34	0.34	0.10	0.10	0.10	0.59	0.59	0.59	0.59
v/c Ratio	0.91	0.22	0.33	0.52	0.65	0.12	0.63	0.44	0.62
Control Delay	61.2	25.7	39.5	43.3	21.6	15.2	20.7	24.2	20.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.2	25.7	39.5	43.3	21.6	15.2	20.7	24.2	20.6
LOS	E	C	D	D	C	B	C	C	A
Approach Delay	53.0								
Approach LOS	D								
Queue Length 50th (ft)	320	71	29	79	82	9	337	41	332
Queue Length 95th (ft)	410	110	m47	m107	m116	29	536	108	526
Internal Link Dist (ft)	1761								
Turn Bay Length (ft)	150	750	145	248	381	228	1099	222	1101
Base Capacity (vph)	586	750	145	248	381	228	1099	222	1101
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.19	0.26	0.41	0.59	0.12	0.63	0.44	0.62

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 103 (86%). Referenced to phase 2:SBTL and 6:NBTL. Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 26.6
Intersection Capacity Utilization 81.9%
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
15: Bells Ferry Road & Marietta Highway

Future SAT - Improved
12/28/2006

Movement	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.98	1.00	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1825	1770	1863	1583	1770	1859	1770	1863
Flt Permitted	0.59	1.00	0.52	1.00	0.26	1.00	0.25	1.00	1.00
Satd. Flow (perm)	1102	1825	974	1863	1583	1770	1859	1770	1863
Volume (vph)	438	113	18	35	95	210	27	647	9
Peak-hour factor, PHF	0.93	0.93	0.93	0.94	0.94	0.95	0.95	0.94	0.94
Adj. Flow (vph)	471	122	19	37	101	223	28	681	9
RTOR Reduction (vph)	0	5	0	0	0	176	0	0	0
Lane Group Flow (vph)	471	136	0	37	101	47	28	690	0
Turn Type	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	3	8	4	4	6	6	2	2	2
Permitted Phases	8	4	4	4	6	6	2	2	2
Actuated Green, G (s)	41.1	41.1	12.5	12.5	12.5	70.9	70.9	70.9	70.9
Effective Green, g (s)	41.1	41.1	12.5	12.5	12.5	70.9	70.9	70.9	70.9
Actuated g/C Ratio	0.34	0.34	0.10	0.10	0.10	0.59	0.59	0.59	0.59
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	514	625	101	194	165	282	1098	277	1101
v/s Ratio Prot	c0.19	0.07	0.04	0.05	0.03	0.06	0.37	0.21	0.13
v/s Ratio Perm	c0.13	0.04	0.04	0.05	0.03	0.06	0.37	0.21	0.13
Uniform Delay, d1	37.2	28.0	50.1	50.9	49.6	10.7	16.0	12.7	15.9
Progression Factor	1.00	1.00	0.68	0.70	1.32	1.00	1.00	1.00	1.00
Incremental Delay, d2	21.1	0.2	2.0	2.2	0.8	0.7	2.7	3.5	2.6
Delay (s)	58.3	28.2	35.8	37.7	66.5	11.4	18.7	16.2	18.5
Level of Service	E	C	D	D	E	B	B	B	B
Approach Delay (s)	51.4								
Approach LOS	D								
Intersection Summary									
HCM Average Control Delay	29.4								
HCM Volume to Capacity ratio	0.73								
Actuated Cycle Length (s)	120.0								
Intersection Capacity Utilization	81.9%								
Analysis Period (min)	15								
c Critical Lane Group									

Future Site Access Analysis

Future 2020 AM Site Access Analysis

Lanes, Volumes, Timings
13: N Etowah Drive & Riverstone Parkway

Future AM - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	650	204	737	15	47	10	298	1361	32	9	1729	395
v/c Ratio	0.77	0.33	0.47	0.29	0.36	0.08	1.04	0.64	0.03	0.10	1.01	0.25
Control Delay	46.4	28.0	1.1	65.6	59.8	26.2	93.9	7.1	0.7	19.8	49.1	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.4	28.0	1.1	65.6	59.8	26.2	93.9	7.1	0.7	19.8	49.1	0.2
Queue Length 50th (ft)	245	102	0	11	35	0	~130	121	0	4	~772	0
Queue Length 95th (ft)	#341	m154	5	23	50	10	m#166	m127	m0	m6	m#904	m0
Internal Link Dist (ft)	145				385			423			436	
Turn Bay Length (ft)	150		150		150		150	150	175	150		165
Base Capacity (vph)	842	652	1583	98	248	220	286	2123	960	87	1711	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.31	0.47	0.15	0.19	0.05	1.04	0.64	0.03	0.10	1.01	0.25

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
13: N Etowah Drive & Riverstone Parkway

Future AM - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Flt	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)	3433	1863	1583	1770	1863	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.54	1.00	1.00	0.95	1.00	1.00	0.10	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1007	1863	1583	3433	3539	1583	188	3539	1583
Volume (vph)	585	184	663	9	29	6	280	1279	30	8	1573	359
Peak-hour factor, PHF	0.90	0.90	0.90	0.62	0.62	0.62	0.94	0.94	0.94	0.91	0.91	0.91
Adj. Flow (vph)	650	204	737	15	47	10	298	1361	32	9	1729	395
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	11	0	0
Lane Group Flow (vph)	650	204	737	15	47	1	298	1361	21	9	1729	395
Turn Type	Prot	Free	Free	Perm	Perm	Perm	Prot	Perm	Perm	Perm	Free	Free
Protected Phases	3	8		4			1	6			2	
Permitted Phases			Free	4		4			6		2	
Actuated Green, G (s)	29.4	40.8	120.0	7.4	7.4	7.4	10.0	71.2	71.2	57.2	57.2	120.0
Effective Green, g (s)	29.4	40.8	120.0	7.4	7.4	7.4	10.0	71.2	71.2	57.2	57.2	120.0
Actuated g/C Ratio	0.24	0.34	1.00	0.06	0.06	0.06	0.08	0.59	0.59	0.48	0.48	1.00
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	841	633	1583	62	115	98	286	2100	939	90	1687	1583
v/s Ratio Prot	c0.19	0.11		0.03			c0.09	0.38			c0.49	
v/s Ratio Perm	0.77	0.32	0.47	0.01	0.41	0.01	1.04	0.65	0.02	0.10	1.02	0.25
Uniform Delay, d1	42.2	29.4	0.0	53.6	54.2	52.8	55.0	16.1	10.1	17.3	31.4	0.0
Progression Factor	0.92	0.90	1.00	1.00	1.00	1.00	0.82	0.39	0.13	0.94	0.97	1.00
Incremental Delay, d2	4.4	0.3	1.0	2.0	2.4	0.0	48.7	0.8	0.0	1.1	22.4	0.2
Delay (s)	43.2	26.6	1.0	55.7	56.6	52.9	94.1	7.0	1.4	17.4	52.9	0.2
Level of Service	D	C	A	E	E	D	F	A	A	B	D	A
Approach Delay (s)		21.5			55.9		22.2				43.0	
Approach LOS		C			E		C				D	
Intersection Summary												
HCM Average Control Delay												C
HCM Volume to Capacity ratio												
Actuated Cycle Length (s)												12.0
Intersection Capacity Utilization												E
Analysis Period (min)												15
c Critical Lane Group												

Baseline
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Future PM
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Lanes, Volumes, Timings
14: Broad Water Bay Road & Finch Road

Future AM - Improved
12/28/2006

	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	84	195	11	111	10	120	110	77	148	17
Lane Group Flow (vph)	0.18	0.56	0.02	0.22	0.01	0.11	0.11	0.10	0.13	0.02
v/c Ratio	8.4	17.7	8.4	3.6	6.6	6.7	2.6	7.0	6.9	4.1
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.4	17.7	8.4	3.6	6.6	6.7	2.6	7.0	6.9	4.1
Queue Length 50th (ft)	11	37	2	0	1	11	0	7	14	0
Queue Length 95th (ft)	25	62	7	18	6	35	15	28	45	7
Internal Link Dist (ft)	496	982			5995				3061	
Turn Bay Length (ft)	150	150	150	150	150	150	150	150	150	150
Base Capacity (vph)	698	528	752	705	744	1122	997	763	1122	960
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.37	0.01	0.16	0.01	0.11	0.11	0.10	0.13	0.02
Intersection Summary										

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
14: Broad Water Bay Road & Finch Road

Future AM - Improved
12/28/2006

	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.97	0.97	1.00	1.00	0.85	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.99	0.99	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)	1777	1777	1770	1863	1583	1770	1863	1583	1770	1863
Flt Permitted	0.93	0.70	1.00	1.00	0.66	1.00	0.66	1.00	1.00	0.68
Satd. Flow (perm)	1671	1308	1863	1583	1235	1863	1583	1266	1863	1583
Volume (vph)	21	36	18	179	10	102	8	96	88	67
Peak-hour factor, PHF	0.89	0.89	0.92	0.92	0.92	0.80	0.80	0.80	0.87	0.87
Adj. Flow (vph)	24	40	20	195	11	111	10	120	110	77
RTOR Reduction (vph)	0	15	0	0	0	84	0	0	48	0
Lane Group Flow (vph)	0	69	0	195	11	27	10	120	62	77
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	8	8	4	4	4	6	6	2	2	2
Permitted Phases	8	8	4	4	4	6	6	2	2	2
Actuated Green, G (s)	9.6	9.6	9.6	9.6	9.6	22.4	22.4	22.4	22.4	22.4
Effective Green, g (s)	9.6	9.6	9.6	9.6	9.6	22.4	22.4	22.4	22.4	22.4
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.56	0.56	0.56	0.56	0.56
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	401	314	447	380	692	1043	886	709	1043	886
v/s Ratio Prot	0.04	c0.15	0.01	0.02	0.01	0.06	0.06	c0.08	0.01	0.01
v/s Ratio Perm	0.17	0.62	0.02	0.07	0.01	0.12	0.07	0.11	0.14	0.01
Uniform Delay, d1	12.0	13.6	11.6	11.7	3.9	4.1	4.0	4.1	4.2	3.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	3.8	0.0	0.1	0.0	0.2	0.2	0.3	0.3	0.0
Delay (s)	12.3	17.4	11.6	11.8	3.9	4.4	4.2	4.4	4.5	3.9
Level of Service	B	B	B	B	A	A	A	A	A	A
Approach Delay (s)	12.3	15.2	15.2	15.2	4.3	4.3	4.3	4.4	4.4	4.4
Approach LOS	B	B	B	B	A	A	A	A	A	A
Intersection Summary										
HCM Average Control Delay	9.0									
HCM Volume to Capacity ratio	0.29									
Actuated Cycle Length (s)	40.0									
Intersection Capacity Utilization	33.6%									
Analysis Period (min)	15									
c Critical Lane Group										

Baseline
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Future PM
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Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	203	23	26	180	95
Intersection Summary					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕	↕	↕	↕	↕	↕
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%			0%	0%	
Volume (veh/h)	187	21	24	166	45	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	203	23	26	180	49	46
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			226		436	203
vC1, stage 1 conf vol						
vC2, stage 2 conf vol			226		436	203
vCu, unblocked vol			4.1		6.4	6.2
IC, single (s)						
IC, 2 stage (s)			2.2		3.5	3.3
IF (s)			98		91	95
p0 queue free %			1342		566	837
cM capacity (veh/h)						
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	203	23	26	180	95	
Volume Left	0	0	26	0	49	
Volume Right	0	23	0	0	46	
cSH	1700	1700	1342	1700	671	
Volume to Capacity	0.12	0.01	0.02	0.11	0.14	
Queue Length 95th (ft)	0	0	1	0	12	
Control Delay (s)	0.0	0.0	7.7	0.0	11.2	
Lane LOS			A		B	
Approach Delay (s)	0.0		1.0		11.2	
Approach LOS					B	
Intersection Summary						
Average Delay	2.4			A		
Intersection Capacity Utilization	28.2%			ICU Level of Service		
Analysis Period (min)	15					

Lanes, Volumes, Timings
17: SR 5 - SR 108 Connector & Town Center Main Access

HCM Signalized Intersection Capacity Analysis
17: SR 5 - SR 108 Connector & Town Center Main Access

Future AM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	39	542	55	18	537	35	64	158	111	115		
v/c Ratio	0.07	0.19	0.04	0.03	0.19	0.03	0.41	0.52	0.77	0.43		
Control Delay	3.4	3.1	1.0	1.4	1.3	0.1	54.8	23.4	81.4	27.1		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	3.4	3.1	1.0	1.4	1.3	0.1	54.8	23.4	81.4	27.1		
Queue Length 50th (ft)	5	38	0	1	12	0	47	36	85	36		
Queue Length 95th (ft)	16	72	9	m3	m28	m0	87	98	141	89		
Internal Link Dist (ft)	7608			7293			490		569			
Turn Bay Length (ft)	150	150	150	150	150	150	150	150	150	150		
Base Capacity (vph)	590	2866	1292	585	2866	1288	579	825	538	818		
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0		
Reduced v/c Ratio	0.07	0.19	0.04	0.03	0.19	0.03	0.11	0.19	0.21	0.14		

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

Baseline
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Future PM
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.90	1.00	0.95	1.00	1.00
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1674	1770	1707	1770	1707
Fit Permitted	0.45	1.00	1.00	0.45	1.00	1.00	0.54	1.00	0.54	1.00	0.39	1.00
Satd. Flow (perm)	840	3539	1583	835	3539	1583	999	1674	717	1707		
Volume (vph)	36	499	51	17	494	32	59	47	98	102	47	59
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	542	55	18	537	35	64	51	107	111	51	64
RTOR Reduction (vph)	0	0	10	0	0	0	7	0	94	0	0	56
Lane Group Flow (vph)	39	542	45	18	537	28	64	64	0	111	59	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	6	2	2	2	4	4	8	8		
Permitted Phases	6	6	6	2	2	2	4	4	8	8		
Actuated Green, G (s)	97.2	97.2	97.2	97.2	97.2	97.2	14.8	14.8	14.8	14.8		
Effective Green, g (s)	97.2	97.2	97.2	97.2	97.2	97.2	14.8	14.8	14.8	14.8		
Actuated g/C Ratio	0.81	0.81	0.81	0.81	0.81	0.81	0.12	0.12	0.12	0.12		
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	680	2867	1282	676	2867	1282	123	206	88	211		
v/s Ratio Prot	0.05	0.03	0.02	0.02	0.02	0.06			0.15	0.03		
v/s Ratio Perm	0.06	0.19	0.03	0.03	0.19	0.02	0.52	0.31	0.15	0.28		
Uniform Delay, d1	2.3	2.6	2.2	2.2	2.6	2.2	49.3	48.0	52.6	47.8		
Progression Factor	1.00	1.00	1.00	0.43	0.39	0.05	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.2	0.1	0.1	0.1	0.1	0.0	3.9	0.9	181.6	0.7		
Delay (s)	2.4	2.7	2.3	1.0	1.1	0.1	53.2	48.8	234.2	48.5		
Level of Service	A	A	A	A	A	A	D	D	F	D		
Approach Delay (s)	2.7			1.1			50.1		139.7			
Approach LOS	A			A			D		F			
Intersection Summary												
HCM Average Control Delay												
HCM Volume to Capacity ratio												
Actuated Cycle Length (s)												
Intersection Capacity Utilization												
Analysis Period (min)												
c Critical Lane Group												

Baseline
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Future PM
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Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Group	316	78	5	180	49	
Lane Group Flow (vph)						
Intersection Summary						

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑	↑	↑	↑	↑	↑
Sign Control	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	291	72	5	166	42	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	316	78	5	180	46	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
VC, conflicting volume			395		508	316
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
vCu, unblocked vol			395		508	316
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		91	100
cM capacity (veh/h)			1164		523	724
Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SW 1	SW 2
Volume Total	316	78	5	180	49	
Volume Left	0	0	5	0	46	
Volume Right	0	78	0	0	3	
cSH	1700	1700	1164	1700	532	
Volume to Capacity	0.19	0.05	0.00	0.11	0.09	
Queue Length 95th (ft)	0	0	0	0	8	
Control Delay (s)	0.0	0.0	8.1	0.0	12.4	
Lane LOS			A		B	
Approach Delay (s)	0.0	0.2	12.4			
Approach LOS			B			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			25.3%		ICU Level of Service	A
Analysis Period (min)			15			

Future 2020 PM Site Access Analysis

Lanes, Volumes, Timings
13: N Etowah Drive & Riverstone Parkway

Future PM - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	576	141	473	9	126	39	759	1557	18	23	1582	975
Lane Group Flow (vph)	0.95	0.24	0.30	0.08	0.63	0.20	1.21	0.71	0.02	0.37	1.12	0.62
v/c Ratio	71.8	27.5	0.5	48.2	65.3	23.0	139.7	8.4	1.4	34.5	89.0	1.4
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	71.8	27.5	0.5	48.2	65.3	23.0	139.7	8.4	1.4	34.5	89.0	1.4
Total Delay	233	78	0	6	95	6	~377	148	0	13	~746	0
Queue Length 50th (ft)	#382	m108	1	17	111	23	m#488	m166	m0	m17	m#772	m0
Queue Length 95th (ft)	145				385			423			436	
Internal Link Dist (ft)	150				150			150			150	
Turn Bay Length (ft)	606	590	1583	135	248	237	629	2182	982	62	1416	1583
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.24	0.30	0.07	0.51	0.16	1.21	0.71	0.02	0.37	1.12	0.62

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

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Baseline
A & R Engineering Inc.

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HCM Signalized Intersection Capacity Analysis
13: N Etowah Drive & Riverstone Parkway

Future PM - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Flt	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	0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.51	1.00	1.00	0.95	1.00	1.00	0.08	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	954	1863	1583	3433	3539	1583	155	3539	1583
Volume (vph)	518	127	426	6	83	26	698	1432	17	20	1382	858
Peak-hour factor, PHF	0.90	0.90	0.90	0.66	0.66	0.66	0.92	0.92	0.92	0.88	0.88	0.88
Adj. Flow (vph)	576	141	473	9	126	39	759	1557	18	23	1582	975
RTOR Reduction (vph)	0	0	0	0	0	0	27	0	0	5	0	0
Lane Group Flow (vph)	576	141	473	9	126	39	759	1557	18	23	1582	975
Turn Type	Prot	Free	Perm	Perm	Perm	Prot	Perm	Perm	Perm	Perm	Free	Free
Protected Phases	3	8		4		4	1	6		6	2	
Permitted Phases		Free		4		4				6	2	
Actuated Green, G (s)	21.2	38.0	120.0	12.8	12.8	12.8	22.0	74.0	74.0	48.0	48.0	120.0
Effective Green, g (s)	21.2	38.0	120.0	12.8	12.8	12.8	22.0	74.0	74.0	48.0	48.0	120.0
Actuated g/C Ratio	0.18	0.32	1.00	0.11	0.11	0.11	0.18	0.62	0.62	0.40	0.40	1.00
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	606	590	1583	102	199	169	629	2182	976	62	1416	1583
v/s Ratio Prot	c0.17	0.08		0.07		0.07	c0.22	0.44		c0.45		
v/s Ratio Perm	0.95	0.24	0.30	0.09	0.63	0.07	1.21	0.71	0.01	0.37	1.12	0.62
Uniform Delay, d1	48.9	30.3	0.0	48.3	51.4	48.3	49.0	15.7	8.9	25.4	36.0	0.0
Progression Factor	0.92	0.86	1.00	1.00	1.00	1.00	0.86	0.45	0.29	0.87	0.87	1.00
Incremental Delay, d2	24.5	0.2	0.5	0.4	6.4	0.2	102.1	1.2	0.0	8.2	58.2	0.9
Delay (s)	69.3	26.4	0.5	48.7	57.8	48.4	144.4	8.2	2.6	30.4	89.5	0.9
Level of Service	E	C	A	D	E	D	F	A	A	C	F	A
Approach Delay (s)		36.9			55.2			52.5			55.5	
Approach LOS		D			E			D			E	

Intersection Summary

- HCM Average Control Delay
- HCM Volume to Capacity ratio
- Actuated Cycle Length (s)
- Intersection Capacity Utilization
- Analysis Period (min)
- c Critical Lane Group

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
14: Broad Water Bay Road & Fincher Road
Future PM - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frft	0.98	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected	0.99	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1804	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863
Flt Permitted	0.95	0.86	1.00	1.00	1.00	0.67	1.00	1.00	0.66	1.00	1.00	1.00
Satd. Flow (perm)	1735	1598	1863	1583	1255	1863	1583	1223	1863	1583	1223	1863
Volume (vph)	15	66	18	171	54	125	36	136	180	108	120	33
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.86	0.86	0.86	0.92	0.92	0.92
Adj. Flow (vph)	17	74	20	186	59	136	42	158	209	117	130	38
RTOR Reduction (vph)	0	15	0	0	0	0	104	0	0	91	0	17
Lane Group Flow (vph)	0	96	0	186	59	32	42	158	118	117	130	21
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	8	8	4	4	4	4	6	6	6	2	2	2
Permitted Phases	8	8	4	4	4	4	6	6	6	2	2	2
Actuated Green, G (s)	9.5	9.5	9.5	9.5	9.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Effective Green, g (s)	9.5	9.5	9.5	9.5	9.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.24	0.56	0.56	0.56	0.56	0.56	0.56
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Expansion (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	412	379	442	376	706	1048	890	688	1048	890	688	1048
v/s Ratio Prot	0.06	c0.12	0.02	0.03	0.03	0.03	0.07	c0.10	0.07	c0.10	0.07	c0.10
v/s Ratio Perm	0.23	0.49	0.13	0.09	0.06	0.15	0.13	0.17	0.12	0.12	0.02	0.02
Uniform Delay, d1	12.3	13.2	12.0	11.9	4.0	4.2	4.1	4.2	4.1	4.2	4.1	3.9
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	0.3	1.0	0.1	0.1	0.2	0.3	0.3	0.5	0.2	0.0	0.2	0.0
Delay (s)	12.6	14.2	12.1	12.0	4.1	4.5	4.4	4.8	4.4	4.8	4.4	3.9
Level of Service	B	B	B	B	A	A	A	A	A	A	A	A
Approach Delay (s)	12.6	13.1	13.1	13.1	4.4	4.4	4.4	4.4	4.4	4.4	4.5	4.5
Approach LOS	B	B	B	B	A	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	8.0 HCM Level of Service											
HCM Volume to Capacity ratio	0.27											
Actuated Cycle Length (s)	40.0											
Intersection Capacity Utilization	39.3% ICU Level of Service											
Analysis Period (min)	15											
Critical Lane Group												

Baseline
A & R Engineering Inc.

Lanes, Volumes, Timings
16: Fincher Road & North Site Driveway

HCM Unsignalized Intersection Capacity Analysis
16: Fincher Road & North Site Driveway

Future PM - Improved
12/28/2006

Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	212	65	75	238	110
Intersection Summary					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	195	60	69	219	44	57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	212	65	75	238	48	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume						
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol						
tC, single (s)						
tC, 2 stage (s)						
tF (s)						
p0 queue free %						
cM capacity (veh/h)						

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	212	65	75	238	110	
Volume Left	0	0	75	0	48	
Volume Right	0	65	0	0	62	
cSH	1700	1700	1286	1700	596	
Volume to Capacity	0.12	0.04	0.06	0.14	0.18	
Queue Length 95th (ft)	0	0	5	0	17	
Control Delay (s)	0.0	0.0	8.0	0.0	12.4	
Lane LOS			A		B	
Approach Delay (s)	0.0		1.9		12.4	
Approach LOS			B		B	

Intersection Summary					
Average Delay			2.8		
Intersection Capacity Utilization			30.0%		A
Analysis Period (min)			15		

Lanes, Volumes, Timings
17: SR 5 - SR 108 Connector & Town Center Main Access

Future PM - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	54	637	110	57	661	115	59	195	95	175
Lane Group Flow (vph)	0.11	0.22	0.08	0.11	0.23	0.09	0.44	0.76	0.74	0.71
v/c Ratio	3.5	3.1	0.8	1.8	1.4	0.1	57.9	54.4	81.0	51.9
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.5	3.1	0.8	1.8	1.4	0.1	57.9	54.4	81.0	51.9
Queue Length 50th (ft)	7	45	0	4	26	0	43	105	72	97
Queue Length 95th (ft)	21	83	12	m7	m35	m0	83	177	126	164
Internal Link Dist (ft)	7608			7293			490		569	
Turn Bay Length (ft)	150		150	150	150	150	150		150	
Base Capacity (vph)	503	2883	1310	520	2883	1311	488	777	471	777
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.22	0.08	0.11	0.23	0.09	0.12	0.25	0.20	0.23
Intersection Summary										
m	Volume for 95th percentile queue is metered by upstream signal.									

HCM Signalized Intersection Capacity Analysis
17: SR 5 - SR 108 Connector & Town Center Main Access

Future PM - Improved
12/28/2006

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.93
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1717	1770	1732	1732
Flt Permitted	0.40	1.00	1.00	0.41	1.00	1.00	0.31	1.00	0.28	1.00	0.28
Satd. Flow (perm)	736	3539	1583	755	3539	1583	577	1717	525	1732	525
Volume (vph)	50	586	101	52	608	106	54	86	94	87	86
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	637	110	57	661	115	59	93	102	95	93
RTOR Reduction (vph)	0	0	20	0	0	21	0	51	0	0	41
Lane Group Flow (vph)	54	637	90	57	661	94	59	144	0	95	134
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	6	2	2	4	4	4	8	8	8
Permitted Phases	6	6	6	2	2	4	4	4	8	8	8
Actuated Green, G (s)	97.8	97.8	97.8	97.8	97.8	97.8	14.2	14.2	14.2	14.2	14.2
Effective Green, g (s)	97.8	97.8	97.8	97.8	97.8	97.8	14.2	14.2	14.2	14.2	14.2
Actuated g/C Ratio	0.82	0.82	0.82	0.82	0.82	0.82	0.12	0.12	0.12	0.12	0.12
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	600	2884	1290	615	2884	1290	68	203	62	205	0.08
v/s Ratio Prot	0.07	0.18	0.06	0.08	0.06	0.10	0.06	0.08	0.18	0.08	0.08
v/s Ratio Perm	0.09	0.22	0.07	0.09	0.23	0.07	0.87	0.71	1.53	0.65	0.65
Uniform Delay, d1	2.2	2.5	2.2	2.2	2.5	2.2	52.0	50.9	52.9	50.5	50.5
Progression Factor	1.00	1.00	1.00	0.51	0.46	0.04	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.2	0.1	0.1	0.1	0.1	64.6	10.8	305.1	7.2	7.2
Delay (s)	2.5	2.7	2.3	1.3	1.3	1.3	116.6	61.7	358.0	57.8	57.8
Level of Service	A	A	A	A	A	A	F	E	F	E	E
Approach Delay (s)	2.6				1.1		74.4		163.4		F
Approach LOS	A				A		E				F
Intersection Summary											
HCM Average Control Delay	30.6										C
HCM Volume to Capacity ratio	0.39										
Actuated Cycle Length (s)	120.0										8.0
Intersection Capacity Utilization	48.6%										A
Analysis Period (min)	15										
c	Critical Lane Group										

	↑	↖	↗	↓	↘
Lane Group	NBT	NBR	SBL	SBT	SWL
Lane Group Flow (vph)	380	102	13	322	141
Intersection Summary					

	↑	↖	↗	↓	↘
Movement	NBT	NBR	SBL	SBT	SWL
Lane Configurations	↑	↖	↗	↓	↘
Sign Control	Free	Free	Free	Free	Stop
Grade	0%	0%	0%	0%	0%
Volume (veh/h)	350	94	12	296	122
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	380	102	13	322	133
Pedestrians					8
Lane Width (ft)					
Walking Speed (ft/s)					
Percent Blockage					
Right turn flare (veh)					
Median type					None
Median storage (veh)					
Upstream signal (ft)					
pX, platoon unblocked					
VC, conflicting volume			483		728
VC1, stage 1 conf vol					380
VC2, stage 2 conf vol					
vCu, unblocked vol			483		728
tC, single (s)			4.1		6.4
tC, 2 stage (s)					6.2
tF (s)			2.2		3.5
p0 queue free %			99		66
cM capacity (veh/h)			1080		386
					667
Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SW 1
Volume Total	380	102	13	322	140
Volume Left	0	0	13	0	133
Volume Right	0	102	0	0	8
cSH	1700	1700	1080	1700	395
Volume to Capacity	0.22	0.06	0.01	0.19	0.36
Queue Length 95th (ft)	0	0	1	0	39
Control Delay (s)	0.0	0.0	8.4	0.0	19.1
Lane LOS			A		C
Approach Delay (s)	0.0		0.3		19.1
Approach LOS			C		C
Intersection Summary					
Average Delay			2.9		
Intersection Capacity Utilization			32.3%		ICU Level of Service
Analysis Period (min)			15		A

Future 2020 Saturday Site Access Analysis

Lanes, Volumes, Timings
13: N Etowah Drive & Riverstone Parkway

Future SAT - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	3433	3539	1583	1770	3539	1583
Fit Permitted	0.95	1.00	1.00	0.45	1.00	0.45	1.00	0.95	1.00	1.00	0.08	1.00
Satd. Flow (perm)	3433	1863	1583	847	1863	1583	3433	3539	1583	151	3539	1583
Volume (vph)	527	140	463	9	52	8	533	1401	11	9	1382	717
Peak-hour factor, PHF	0.90	0.90	0.90	0.69	0.69	0.69	0.90	0.90	0.90	0.90	0.97	0.97
Adj. Flow (vph)	586	156	514	13	75	12	592	1557	12	9	1394	739
RTOR Reduction (vph)	0	0	0	0	0	0	11	0	0	3	0	0
Lane Group Flow (vph)	586	156	514	13	75	12	592	1557	9	9	1394	739
Turn Type	Prot	Free	Free	Perm	Perm	Perm	Prot	Perm	Perm	Perm	Free	Free
Protected Phases	3	8		4			1	6			2	
Permitted Phases			Free	4			4		6		2	
Actuated Green, G (s)	25.7	38.5	120.0	8.8	8.8	8.8	20.0	73.5	73.5	49.5	49.5	120.0
Effective Green, g (s)	25.7	38.5	120.0	8.8	8.8	8.8	20.0	73.5	73.5	49.5	49.5	120.0
Actuated g/C Ratio	0.21	0.32	1.00	0.07	0.07	0.07	0.17	0.61	0.61	0.41	0.41	1.00
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	735	598	1583	62	137	116	572	2168	970	62	1480	1583
v/s Ratio Prot	c0.17	0.08		0.04			c0.17	0.44			c0.39	
v/s Ratio Perm	0.80	0.26	0.32	0.21	0.55	0.01	1.03	0.72	0.01	0.15	0.95	0.47
Uniform Delay, d1	44.7	30.2	0.0	52.3	53.7	51.6	50.0	16.1	9.1	22.0	34.2	0.0
Progression Factor	0.89	0.85	1.00	1.00	1.00	1.00	0.84	0.47	0.30	0.77	0.89	1.00
Incremental Delay, d2	5.9	0.2	0.5	1.7	4.4	0.0	43.1	1.7	0.0	2.3	8.7	0.5
Delay (s)	45.7	26.0	0.5	54.0	58.1	51.6	84.9	9.3	2.7	19.3	39.0	0.5
Level of Service	D	C	A	D	E	D	F	A	A	B	D	A
Approach Delay (s)		24.8			56.8			30.0			25.6	
Approach LOS		C			E			C			C	

Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 57' (48%), Referenced to phase 2:SRTL and 6:NBT, Start of Green												
Control Type: Actuated-Coordinated												
Maximum v/c Ratio: 1.03												
Intersection Signal Delay: 27.9												
Intersection Capacity Utilization 84.3%												
Analysis Period (min) 15												
~ Volume exceeds capacity, queue is theoretically infinite.												
Queue shown is maximum after two cycles.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												

Baseline
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HCM Signalized Intersection Capacity Analysis
13: N Etowah Drive & Riverstone Parkway

Future SAT - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	3433	3539	1583	1770	3539	1583
Fit Permitted	0.95	1.00	1.00	0.45	1.00	0.45	1.00	0.95	1.00	1.00	0.08	1.00
Satd. Flow (perm)	3433	1863	1583	847	1863	1583	3433	3539	1583	151	3539	1583
Volume (vph)	527	140	463	9	52	8	533	1401	11	9	1382	717
Peak-hour factor, PHF	0.90	0.90	0.90	0.69	0.69	0.69	0.90	0.90	0.90	0.90	0.97	0.97
Adj. Flow (vph)	586	156	514	13	75	12	592	1557	12	9	1394	739
RTOR Reduction (vph)	0	0	0	0	0	0	11	0	0	3	0	0
Lane Group Flow (vph)	586	156	514	13	75	12	592	1557	9	9	1394	739
Turn Type	Prot	Free	Free	Perm	Perm	Perm	Prot	Perm	Perm	Perm	Free	Free
Protected Phases	3	8		4			1	6			2	
Permitted Phases			Free	4			4		6		2	
Actuated Green, G (s)	25.7	38.5	120.0	8.8	8.8	8.8	20.0	73.5	73.5	49.5	49.5	120.0
Effective Green, g (s)	25.7	38.5	120.0	8.8	8.8	8.8	20.0	73.5	73.5	49.5	49.5	120.0
Actuated g/C Ratio	0.21	0.32	1.00	0.07	0.07	0.07	0.17	0.61	0.61	0.41	0.41	1.00
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	735	598	1583	62	137	116	572	2168	970	62	1480	1583
v/s Ratio Prot	c0.17	0.08		0.04			c0.17	0.44			c0.39	
v/s Ratio Perm	0.80	0.26	0.32	0.21	0.55	0.01	1.03	0.72	0.01	0.15	0.95	0.47
Uniform Delay, d1	44.7	30.2	0.0	52.3	53.7	51.6	50.0	16.1	9.1	22.0	34.2	0.0
Progression Factor	0.89	0.85	1.00	1.00	1.00	1.00	0.84	0.47	0.30	0.77	0.89	1.00
Incremental Delay, d2	5.9	0.2	0.5	1.7	4.4	0.0	43.1	1.7	0.0	2.3	8.7	0.5
Delay (s)	45.7	26.0	0.5	54.0	58.1	51.6	84.9	9.3	2.7	19.3	39.0	0.5
Level of Service	D	C	A	D	E	D	F	A	A	B	D	A
Approach Delay (s)		24.8			56.8			30.0			25.6	
Approach LOS		C			E			C			C	

Intersection Summary												
HCM Average Control Delay												
HCM Volume to Capacity ratio												
Actuated Cycle Length (s)												
Intersection Capacity Utilization												
Analysis Period (min)												
c Critical Lane Group												

Baseline
A & R Engineering Inc.

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Lanes, Volumes, Timings
14: Broad Water Bay Road & Finch Road

Future SAT - Improved
12/28/2006

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	171	201	73	147	51	111	175	111	110	48
Act Effct Green (s)	10.6	10.6	10.6	10.6	24.1	24.1	24.1	24.1	24.1	24.1
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.60	0.60	0.60	0.60	0.60	0.60
v/c Ratio	0.35	0.55	0.15	0.28	0.07	0.10	0.17	0.14	0.10	0.05
Control Delay	10.2	17.5	10.2	3.7	6.6	6.5	2.3	7.1	6.5	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.2	17.5	10.2	3.7	6.6	6.5	2.3	7.1	6.5	3.1
LOS	B	B	B	A	A	A	A	A	A	A
Approach Delay	10.2	11.4				4.3			6.1	
Approach LOS	B	B				A			A	
Queue Length 50th (ft)	24	38	12	0	5	10	0	11	10	0
Queue Length 95th (ft)	45	65	25	21	21	35	23	37	35	12
Internal Link Dist (ft)	496		982			5995			3061	
Turn Bay Length (ft)	150	150	150	150	150	150	150	150	150	150
Base Capacity (vph)	725	554	748	723	773	1126	1026	771	1126	976
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.36	0.10	0.20	0.07	0.10	0.17	0.14	0.10	0.05
Intersection Summary										
Cycle Length: 40										
Actuated Cycle Length: 40										
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of Green										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 0.55										
Intersection Signal Delay: 8.1	Intersection LOS: A									
Intersection Capacity Utilization 40.7%	ICU Level of Service A									
Analysis Period (min) 15										

Baseline
A & R Engineering Inc.

Future PM
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HCM Signalized Intersection Capacity Analysis
14: Broad Water Bay Road & Finch Road

Future SAT - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.97	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.99	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1795	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863
Flt Permitted	0.96	0.72	1.00	1.00	0.69	1.00	1.00	0.69	1.00	0.69	1.00	1.00
Satd. Flow (perm)	1730	1341	1863	1583	1278	1863	1583	1277	1863	1583	1277	1863
Volume (vph)	20	100	34	185	67	135	45	98	154	97	96	42
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.88	0.88	0.88	0.87	0.87	0.87
Adj. Flow (vph)	22	111	38	201	73	147	51	111	175	111	110	48
RTOR Reduction (vph)	0	29	0	0	0	112	0	0	77	0	0	21
Lane Group Flow (vph)	0	142	0	201	73	35	51	111	98	111	110	27
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	8	8	4	4	4	4	6	6	6	2	2	2
Permitted Phases	8	8	4	4	4	4	6	6	6	2	2	2
Actuated Green, G (s)	9.5	9.5	9.5	9.5	9.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Effective Green, g (s)	9.5	9.5	9.5	9.5	9.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.24	0.56	0.56	0.56	0.56	0.56	0.56
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	411	318	442	376	719	1048	890	718	1048	890	718	890
v/s Ratio Prot	0.08	c0.15	0.04	0.04	0.04	0.04	0.06	0.06	0.06	0.09	0.06	0.02
v/s Ratio Perm	0.35	0.63	0.17	0.09	0.07	0.11	0.11	0.11	0.11	0.15	0.10	0.03
Uniform Delay, d1	12.7	12.1	11.9	4.0	4.1	4.1	4.1	4.1	4.1	4.2	4.1	3.9
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	0.5	4.1	0.2	0.1	0.2	0.2	0.2	0.2	0.3	0.5	0.2	0.1
Delay (s)	13.2	17.7	12.3	12.0	4.2	4.3	4.3	4.3	4.3	4.7	4.3	4.0
Level of Service	B	B	B	B	B	B	A	A	A	A	A	A
Approach Delay (s)	13.2	14.8					4.3			4.4		
Approach LOS	B	B					A			A		
Intersection Summary												
HCM Average Control Delay	9.3										A	
HCM Volume to Capacity ratio	0.30										A	
Actuated Cycle Length (s)	40.0										8.0	
Intersection Capacity Utilization	40.7%										A	
Analysis Period (min)	15										A	
c Critical Lane Group												

Baseline
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Lanes, Volumes, Timings
16: Fincher Road & North Site Driveway

HCM Unsignalized Intersection Capacity Analysis
16: Fincher Road & North Site Driveway

Future SAT - Improved
12/28/2006

Future SAT - Improved
12/28/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	174	62	80	200	130	130
Sign Control	Free	Free	Free	Free	Stop	Stop
Intersection Summary						
Control Type: Unsignalized	ICU Level of Service A					
Intersection Capacity Utilization	29.6%					
Analysis Period (min)	15					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	160	57	74	184	51	69
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	174	62	80	200	55	75
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			236		535	174
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			236		535	174
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		88	91
cM capacity (veh/h)			1331		476	870
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	174	62	80	200	130	130
Volume Left	0	0	80	0	55	55
Volume Right	0	62	0	0	75	75
cSH	1700	1700	1331	1700	643	643
Volume to Capacity	0.10	0.04	0.06	0.12	0.20	0.20
Queue Length 95th (ft)	0	0	5	0	19	19
Control Delay (s)	0.0	0.0	7.9	0.0	12.0	12.0
Lane LOS			A		B	B
Approach Delay (s)	0.0		2.3		12.0	
Approach LOS					B	
Intersection Summary						
Average Delay	3.4					
Intersection Capacity Utilization	29.6%					
Analysis Period (min)	15					
			ICU Level of Service		A	

Lanes, Volumes, Timings

17: SR 5 - SR 108 Connector & Town Center Main Access

Future SAT - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	54	663	111	55	677	111	65	213	98	196
Act Effct Green (s)	97.1	97.1	97.1	97.1	97.1	97.1	14.9	14.9	14.9	14.9
Actuated g/C Ratio	0.81	0.81	0.81	0.81	0.81	0.81	0.12	0.12	0.12	0.12
v/c Ratio	0.11	0.23	0.09	0.11	0.24	0.09	0.48	0.80	0.75	0.76
Control Delay	3.8	3.3	0.8	1.8	1.5	0.1	59.3	57.8	82.0	55.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.8	3.3	0.8	1.8	1.5	0.1	59.3	57.8	82.0	55.1
LOS	A	A	A	A	A	A	E	E	F	E
Approach Delay	3.0			1.3			58.2			
Approach LOS	A			A			E			
Queue Length 50th (ft)	7	49	0	3	22	0	48	118	75	110
Queue Length 95th (ft)	22	91	13	m7	m33	m0	90	192	128	181
Internal Link Dist (ft)	7608			7293			490			
Turn Bay Length (ft)	150	150	150	150	150	150	150	150	150	150
Base Capacity (vph)	482	2864	1302	493	2864	1302	481	791	466	791
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.23	0.09	0.11	0.24	0.09	0.14	0.27	0.21	0.25

Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 9 (8%), Referenced to phase 2:WBT and 6:EBTL, Start of Green										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 0.80										
Intersection Signal Delay: 17.2	Intersection LOS: B									
Intersection Capacity Utilization 50.1%	ICU Level of Service A									
Analysis Period (min) 15										
m Volume for 95th percentile queue is metered by upstream signal.										

HCM Signalized Intersection Capacity Analysis

17: SR 5 - SR 108 Connector & Town Center Main Access

Future SAT - Improved
12/28/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1716	1770	1727	1770	1727
Flt Permitted	0.39	1.00	1.00	0.39	1.00	1.00	0.27	1.00	0.27	1.00	0.27	1.00
Satd. Flow (perm)	722	3539	1583	733	3539	1583	500	1716	500	1727	1727	1727
Volume (vph)	50	610	102	51	623	102	60	93	103	90	93	87
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	663	111	55	677	111	65	101	112	98	101	95
RTOR Reduction (vph)	0	0	21	0	0	21	0	53	0	0	45	0
Lane Group Flow (vph)	54	663	90	55	677	90	65	160	0	98	151	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	6	2	2	2	4	4	8	8	8	8
Permitted Phases	6	6	6	2	2	2	4	4	8	8	8	8
Actuated Green, G (s)	97.1	97.1	97.1	97.1	97.1	97.1	14.9	14.9	14.9	14.9	14.9	14.9
Effective Green, g (s)	97.1	97.1	97.1	97.1	97.1	97.1	14.9	14.9	14.9	14.9	14.9	14.9
Actuated g/C Ratio	0.81	0.81	0.81	0.81	0.81	0.81	0.12	0.12	0.12	0.12	0.12	0.12
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	584	2864	1281	593	2864	1281	62	213	62	214	214	214
v/s Ratio Prot	0.19	0.06	0.08	0.19	0.06	0.13	0.09	0.09	0.09	0.09	0.09	0.09
v/s Ratio Perm	0.07	0.23	0.07	0.09	0.24	0.07	1.05	0.75	1.58	0.71	1.58	0.71
v/c Ratio	0.09	0.23	0.07	0.09	0.24	0.07	1.05	0.75	1.58	0.71	1.58	0.71
Uniform Delay, d1	2.4	2.7	2.3	2.4	2.7	2.3	52.6	50.8	52.6	50.5	52.6	50.5
Progression Factor	1.00	1.00	1.00	0.44	0.43	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.2	0.1	0.2	0.1	0.1	128.4	14.0	324.9	10.2	324.9	10.2
Delay (s)	2.7	2.9	2.4	1.2	1.3	0.1	181.0	64.8	377.4	60.6	377.4	60.6
Level of Service	A	A	A	A	A	A	F	E	F	E	F	E
Approach Delay (s)	2.8			1.1			91.9				166.2	
Approach LOS	A			A			F				F	
Intersection Summary												
HCM Average Control Delay	34.6			HCM Level of Service			C				C	
HCM Volume to Capacity ratio	0.41											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			8.0				8.0	
Intersection Capacity Utilization	50.1%			ICU Level of Service			A				A	
Analysis Period (min)	15											
Critical Lane Group												

Lanes, Volumes, Timings
77: SR 5 - SR 108 Connector &

HCM Unsignalized Intersection Capacity Analysis
77: SR 5 - SR 108 Connector &

Future SAT - Improved
12/28/2006

Future SAT - Improved
12/28/2006



Lane Group	NBT	NBR	SBL	SBT	SWL
Lane Group Flow (vph)	421	122	9	343	142
Sign Control	Free			Free	Stop
Intersection Summary					
Control Type: Unsignalized					
Intersection Capacity Utilization 34.3%					
Analysis Period (min) 15					
ICU Level of Service A					

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑	↑	↑	↑	↑	↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%			0%	0%	0%
Volume (veh/h)	387	112	8	316	127	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	421	122	9	343	138	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
VC, conflicting volume		542			782	421
VC1, stage 1 conf vol						
VC2, stage 2 conf vol		542			782	421
VCu, unblocked vol						
tC, single (s)		4.1			6.4	6.2
tC, 2 stage (s)						
tF (s)		2.2			3.5	3.3
p0 queue free %		99			62	99
cM capacity (veh/h)		1026			360	633
Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SW 1	SW 2
Volume Total	421	122	9	343	142	
Volume Left	0	0	9	0	138	
Volume Right	0	122	0	0	4	
cSH	1700	1700	1026	1700	365	
Volume to Capacity	0.25	0.07	0.01	0.20	0.39	
Queue Length 95th (ft)	0	0	1	0	45	
Control Delay (s)	0.0	0.0	8.5	0.0	21.0	
Lane LOS			A		C	
Approach Delay (s)	0.0	0.0	0.2	0.2	21.0	
Approach LOS			C	C		
Intersection Summary						
Average Delay	3.0					
Intersection Capacity Utilization	34.3%					
Analysis Period (min)	15					
			ICU Level of Service		A	

Traffic Volume Worksheets

05-141 Canton West DRI
Traffic Volumes
Future Conditions

A&R Engineering
December-06

Cumming Highway at I - 575 Northbound Off Ramp

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	0	0	0	0	539	0	246	785	130	264	0	394
Existing Traffic Redistribution	0	0	539	539	0	0	246	246	130	264	0	394
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	0	0	815	815	0	0	372	372	197	399	0	596
Retail Trips	0	0	0	0	0	0	0	0	0	5	0	5
Residential & Office Trips	0	0	0	0	0	0	14	14	27	40	0	67
Total New Trips:	0	0	0	0	0	0	14	14	27	45	0	72
Future Traffic Volumes:	0	0	815	815	0	0	386	386	224	444	0	668

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	0	0	0	0	673	0	96	769	250	616	0	866
Existing Traffic Redistribution	0	0	673	673	0	0	96	96	250	616	0	866
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	0	0	1018	1018	0	0	145	145	378	932	0	1310
Retail Trips	0	0	0	0	0	0	0	0	0	27	0	27
Residential & Office Trips	0	0	0	0	0	0	38	38	14	20	0	34
Total New Trips:	0	0	0	0	0	0	38	38	14	47	0	61
Future Traffic Volumes:	0	0	1018	1018	0	0	183	183	392	979	0	1371

SAT Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	0	0	0	0	428	0	79	507	79	466	0	545
Existing Traffic Redistribution	0	0	428	428	0	0	79	79	79	466	0	545
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	0	0	647	647	0	0	119	119	119	705	0	824
Retail Trips	0	0	0	0	0	0	0	0	0	34	0	34
Residential & Office Trips	0	0	0	0	0	0	24	24	14	21	0	35
Total New Trips:	0	0	0	0	0	0	24	24	14	55	0	69
Future Traffic Volumes:	0	0	647	647	0	0	143	143	133	760	0	893

05-141 Canton West DRI
Traffic Volumes
Future Conditions

A&R Engineering
December-06

Cumming Highway at I - 575 Southbound Off Ramp

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	0	0	0	0	192	0	181	373	81	181	0	262
Existing Traffic Redistribution	0	0	0	0	192	0	181	373	0	181	81	262
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	0	0	0	0	290	0	274	564	0	274	123	396
Retail Trips	0	0	0	0	0	0	0	0	0	5	0	5
Residential & Office Trips	0	0	0	0	0	0	9	9	0	67	40	107
Total New Trips:	0	0	0	0	0	0	9	9	0	72	40	112
Future Traffic Volumes:	0	0	0	0	290	0	283	573	0	346	163	508

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	0	0	0	0	434	0	107	541	330	422	0	752
Existing Traffic Redistribution	0	0	0	0	434	0	107	541	0	422	330	752
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	0	0	0	0	656	0	162	818	0	638	499	1137
Retail Trips	0	0	0	0	0	0	0	0	0	27	0	27
Residential & Office Trips	0	0	0	0	0	0	25	25	0	34	20	54
Total New Trips:	0	0	0	0	0	0	25	25	0	61	20	81
Future Traffic Volumes:	0	0	0	0	656	0	187	843	0	699	519	1218

SAT Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	0	0	0	0	293	0	74	367	61	241	0	302
Existing Traffic Redistribution	0	0	0	0	293	0	74	367	0	241	61	302
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	0	0	0	0	443	0	112	555	0	365	92	457
Retail Trips	0	0	0	0	0	0	0	0	0	34	0	34
Residential & Office Trips	0	0	0	0	0	0	16	16	0	35	21	56
Total New Trips:	0	0	0	0	0	0	16	16	0	69	21	90
Future Traffic Volumes:	0	0	0	0	443	0	128	571	0	434	113	547

05-141 Canton West DRI
Traffic Volumes
Future Conditions

A&R Engineering
December-06

Marietta Street @ Hickory Flat Highway / Bobo Grinding Company Driveway

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	2	327	120	449	213	267	3	483	2	6	2	10
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	3	495	182	679	322	404	5	731	3	9	3	15
Retail Trips	0	0	0	0	5	0	0	5	0	0	0	0
Residential & Office Trips	0	0	0	0	94	0	0	94	0	0	0	0
Total New Trips	0	0	0	0	99	0	0	99	0	0	0	0
Future Traffic Volumes:	3	495	182	679	421	404	5	830	3	9	3	15

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	3	293	142	438	385	379	5	769	3	6	2	11
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	5	443	215	663	582	573	8	1163	5	9	3	17
Retail Trips	0	0	0	0	27	0	0	27	0	0	0	0
Residential & Office Trips	0	0	0	0	48	0	0	48	0	0	0	0
Total New Trips	0	0	0	0	75	0	0	75	0	0	0	0
Future Traffic Volumes:	5	443	215	663	657	573	8	1238	5	9	3	17

SAT Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	1	249	128	378	144	271	1	416	2	1	2	5
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	2	377	194	572	218	410	2	629	3	2	3	8
Retail Trips	0	0	0	0	34	0	0	34	0	0	0	0
Residential & Office Trips	0	0	0	0	50	0	0	50	0	0	0	0
Total New Trips	0	0	0	0	84	0	0	84	0	0	0	0
Future Traffic Volumes:	2	377	194	572	302	410	2	713	3	2	3	8

05-141 Canton West DRI
Traffic Volumes
Future Conditions

A&R Engineering
December-06

Marietta Highway @ West South Street (SR 140)/Big K - Mart Driveway

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	5	852	358	1215	387	745	14	1146	40	48	5	93
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	8	1289	542	1838	585	1127	21	1733	61	73	8	141
Retail Trips	0	32	0	32	0	20	0	20	0	0	0	0
Residential & Office Trips	0	70	0	70	270	202	0	472	0	0	0	0
Total New Trips	0	102	0	102	270	222	0	492	0	0	0	0
Future Traffic Volumes:	8	1391	542	1940	855	1349	21	2225	61	73	8	141

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	13	747	446	1206	291	848	22	1161	70	46	19	135
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	20	1130	675	1824	440	1283	33	1756	106	70	29	204
Retail Trips	0	100	0	100	0	108	0	108	0	0	0	0
Residential & Office Trips	0	191	0	191	136	102	0	238	0	0	0	0
Total New Trips	0	291	0	291	136	210	0	346	0	0	0	0
Future Traffic Volumes:	20	1421	675	2115	576	1493	33	2102	106	70	29	204

SAT Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	22	676	315	1013	229	651	47	927	85	46	17	148
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	33	1023	476	1532	346	985	71	1402	129	70	26	224
Retail Trips	0	145	0	145	0	135	0	135	0	0	0	0
Residential & Office Trips	0	122	0	122	142	107	0	249	0	0	0	0
Total New Trips	0	267	0	267	142	242	0	384	0	0	0	0
Future Traffic Volumes:	33	1290	476	1799	488	1227	71	1786	129	70	26	224

05-141 Canton West DRI
Traffic Volumes
Future Conditions

A&R Engineering
December-06

Riverstone Parkway at I - 575 Northbound Off Ramp

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	496	0	329	825	0	0	0	0	156	347	0	503
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	750	0	498	1248	0	0	0	0	236	525	0	761
Retail Trips	0	0	0	0	0	0	0	0	5	5	0	10
Residential & Office Trips	33	0	0	33	0	0	0	0	243	27	0	270
Total New Trips	33	0	0	33	0	0	0	0	248	32	0	280
Future Traffic Volumes:	783	0	498	1281	0	0	0	0	484	557	0	1041

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	682	0	513	1195	0	0	0	0	379	593	0	972
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	1032	0	776	1808	0	0	0	0	573	897	0	1470
Retail Trips	0	0	0	0	0	0	0	0	27	27	0	54
Residential & Office Trips	89	0	0	89	0	0	0	0	123	14	0	137
Total New Trips	89	0	0	89	0	0	0	0	150	41	0	191
Future Traffic Volumes:	1121	0	776	1897	0	0	0	0	723	938	0	1661

SAT Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	608	0	543	1151	0	0	0	0	212	805	0	1017
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	920	0	821	1741	0	0	0	0	321	1218	0	1538
Retail Trips	0	0	0	0	0	0	0	0	34	34	0	68
Residential & Office Trips	57	0	0	57	0	0	0	0	128	14	0	142
Total New Trips	57	0	0	57	0	0	0	0	162	48	0	210
Future Traffic Volumes:	977	0	821	1798	0	0	0	0	483	1266	0	1748

05-141 Canton West DRI
Traffic Volumes
Future Conditions

A&R Engineering
December-06

Riverstone Parkway at I-575 Southbound Off Ramp

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	L	T	R	L	T	R
Existing:	0	0	0	0	117	0	381	498	0	415	503	918
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	0	0	0	0	177	0	576	753	0	628	761	1389
Retail Trips	0	0	0	0	0	0	8	8	0	10	0	10
Residential & Office Trips	0	0	0	0	0	0	84	84	0	270	94	364
Total New Trips	0	0	0	0	0	0	92	92	0	280	94	374
Future Traffic Volumes:	0	0	0	0	177	0	668	845	0	908	855	1763

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	L	T	R	L	T	R
Existing:	0	0	0	0	74	0	293	367	0	931	467	1398
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	0	0	0	0	112	0	443	555	0	1408	706	2115
Retail Trips	0	0	0	0	0	0	25	25	0	54	0	54
Residential & Office Trips	0	0	0	0	0	0	229	229	0	137	48	185
Total New Trips	0	0	0	0	0	0	254	254	0	191	48	239
Future Traffic Volumes:	0	0	0	0	112	0	697	809	0	1599	754	2354

SAT Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	L	T	R	L	T	R
Existing:	0	0	0	0	155	0	266	421	0	832	531	1363
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	0	0	0	0	234	0	402	637	0	1258	803	2062
Retail Trips	0	0	0	0	0	0	36	36	0	68	0	68
Residential & Office Trips	0	0	0	0	0	0	146	146	0	142	50	192
Total New Trips	0	0	0	0	0	0	182	182	0	210	50	260
Future Traffic Volumes:	0	0	0	0	234	0	584	819	0	1468	853	2322

A&R Engineering
December-06

A.M. Peak Hour

P.M. Peak Hour

SAT Peak HourA - 237

05-141 Canton West DRI
Traffic Volumes
Future Conditions

A&R Engineering
December-06

Riverstone Parkway (SR 5) at Reinhardt College Parkway

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	0	0	0	0	220	0	69	289	156	526	0	682
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	0	0	0	0	333	0	104	437	236	796	0	1032
Retail Trips	0	0	0	0	0	0	0	0	0	15	0	15
Residential & Office Trips	14	0	0	14	0	0	0	0	0	364	40	404
Total New Trips	14	0	0	14	0	0	0	0	0	379	40	419
Future Traffic Volumes:	14	0	0	14	333	0	104	437	236	1175	40	1451

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	0	0	0	0	242	0	134	376	251	852	0	1103
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	0	0	0	0	366	0	203	569	380	1289	0	1668
Retail Trips	0	0	0	0	0	0	0	0	0	81	0	81
Residential & Office Trips	38	0	0	38	0	0	0	0	0	185	21	206
Total New Trips	38	0	0	38	0	0	0	0	0	266	21	287
Future Traffic Volumes:	38	0	0	38	366	0	203	569	380	1555	21	1955

SAT Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	0	0	0	0	224	0	96	320	236	782	0	1018
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	0	0	0	0	339	0	145	484	357	1183	0	1540
Retail Trips	0	0	0	0	0	0	0	0	0	102	0	102
Residential & Office Trips	24	0	0	24	0	0	0	0	0	192	21	213
Total New Trips	24	0	0	24	0	0	0	0	0	294	21	315
Future Traffic Volumes:	24	0	0	24	339	0	145	484	357	1477	21	1855

05-141 Canton West DRI
Traffic Volumes
Future Conditions

A&R Engineering
December-06

Riverstone Parkway (SR 5) at Waleska Road/Waleska Street

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	155	198	122	475	130	262	458	850	422	410	148	980
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	234	299	185	718	197	396	693	1286	638	620	224	1482
Retail Trips	16	0	0	16	0	0	24	24	15	15	10	40
Residential & Office Trips	61	0	0	61	0	1	13	14	40	405	175	620
Total New Trips	77	0	0	77	0	1	37	38	55	420	55	530
Future Traffic Volumes:	311	299	185	795	197	397	730	1324	693	1040	279	2012

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	185	269	333	787	184	170	264	618	338	548	80	966
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	280	407	504	1190	278	257	399	935	511	829	121	1461
Retail Trips	50	0	0	50	0	0	74	74	80	81	54	215
Residential & Office Trips	165	0	0	165	0	4	34	38	20	204	88	312
Total New Trips	215	0	0	215	0	4	108	112	100	285	41	426
Future Traffic Volumes:	495	407	504	1405	278	261	507	1047	611	1114	162	1887

SAT Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	112	112	313	537	148	136	243	527	267	589	100	956
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	169	169	473	812	224	206	368	797	404	891	151	1446
Retail Trips	72	0	0	72	0	0	109	109	101	102	68	271
Residential & Office Trips	107	0	0	107	0	2	22	24	21	213	92	326
Total New Trips	179	0	0	179	0	2	131	133	122	315	48	485
Future Traffic Volumes:	348	169	473	991	224	208	499	930	526	1206	199	1931

05-141 Canton West DRI
Traffic Volumes
Future Conditions

A&R Engineering
December-06

Waleska Road at Reinhardt College Parkway

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	0	430	39	469	321	769	0	1090	0	0	0	0
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	0	650	59	709	486	1163	0	1649	0	0	0	0
Retail Trips	0	12	0	12	0	19	0	19	0	0	0	0
Residential & Office Trips	0	40	0	40	0	14	0	14	0	0	0	0
Total New Trips	0	52	0	52	0	33	0	33	0	0	0	0
Future Traffic Volumes:	0	702	59	761	486	1196	0	1682	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
Existing:	0	639	127	766	213	380	0	593	0	0	0	0
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	0	967	192	1159	322	575	0	897	0	0	0	0
Retail Trips	0	64	0	64	0	59	0	59	0	0	0	0
Residential & Office Trips	0	20	0	20	0	38	0	38	0	0	0	0
Total New Trips	0	84	0	84	0	97	0	97	0	0	0	0
Future Traffic Volumes:	0	1051	192	1243	322	672	0	994	0	0	0	0

SAT Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	0	334	73	407	258	416	0	674	0	0	0	0
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	0	505	110	616	390	629	0	1019	0	0	0	0
Retail Trips	0	81	0	81	0	87	0	87	0	0	0	0
Residential & Office Trips	0	21	0	21	0	24	0	24	0	0	0	0
Total New Trips	0	102	0	102	0	111	0	111	0	0	0	0
Future Traffic Volumes:	0	607	110	718	390	740	0	1130	0	0	0	0

05-141 Canton West DRI
Traffic Volumes
Future Conditions

A&R Engineering
December-06

College Street (SR 108) at Reinhardt College Parkway (SR 140)

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	12	113	86	211	166	71	54	291	55	315	9	379
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	18	171	130	319	251	107	82	440	83	476	14	573
Retail Trips	10	5	0	15	0	8	0	8	0	0	16	16
Residential & Office Trips	67	0	0	67	14	0	0	14	0	0	23	23
Total New Trips	77	5	0	82	14	8	0	22	0	0	39	39
Future Traffic Volumes:	95	176	130	401	265	115	82	462	83	476	53	612

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	14	59	27	100	76	48	53	177	52	211	10	273
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	21	89	41	151	115	73	80	268	79	319	15	413
Retail Trips	54	27	0	81	0	25	0	25	0	0	50	50
Residential & Office Trips	34	0	0	34	38	0	0	38	0	0	64	64
Total New Trips	88	27	0	115	38	25	0	63	0	0	114	114
Future Traffic Volumes:	109	116	41	266	153	98	80	331	79	319	129	527

SAT Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	15	50	29	94	49	36	46	131	26	205	12	243
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	23	76	44	142	74	54	70	198	39	310	18	368
Retail Trips	67	34	0	101	0	36	0	36	0	0	73	73
Residential & Office Trips	36	0	0	36	24	0	0	24	0	0	41	41
Total New Trips	103	34	0	137	24	36	0	60	0	0	114	114
Future Traffic Volumes:	126	110	44	279	98	90	70	258	39	310	132	482

05-141 Canton West DRI
Traffic Volumes
Future Conditions

A&R Engineering
December-06

Knox Bridge Highway (SR 20) at Fincher Road (SR 108)/ Upper Sweetwater Trail

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	2	1	23	26	73	9	70	152	61	397	4	462
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	3	2	35	39	110	14	106	230	92	600	6	699
Retail Trips	0	0	0	0	5	0	10	15	16	0	0	16
Residential & Office Trips	0	0	0	0	0	0	135	135	47	0	0	47
Total New Trips	0	0	0	0	5	0	145	150	63	0	0	63
Future Traffic Volumes:	3	2	35	39	115	14	251	380	155	600	6	762

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	5	12	14	31	40	3	50	93	67	313	4	384
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	8	18	21	47	61	5	76	141	101	473	6	581
Retail Trips	0	0	0	0	27	0	54	81	50	0	0	50
Residential & Office Trips	0	0	0	0	0	0	68	68	127	0	0	127
Total New Trips	0	0	0	0	27	0	122	149	177	0	0	177
Future Traffic Volumes:	8	18	21	47	88	5	198	290	278	473	6	758

SAT Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	6	4	14	24	39	7	47	93	53	245	6	304
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	9	6	21	36	59	11	71	141	80	371	9	460
Retail Trips	0	0	0	0	34	0	67	101	73	0	0	73
Residential & Office Trips	0	0	0	0	0	0	71	71	81	0	0	81
Total New Trips	0	0	0	0	34	0	138	172	154	0	0	154
Future Traffic Volumes:	9	6	21	36	93	11	209	313	234	371	9	614

05-141 Canton West DRI
Traffic Volumes
Future Conditions

A&R Engineering
December-06

Riverton Parkway (SR 140) at N Etowah Drive

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
	Tot			Tot			Tot			Tot		
Existing:	16	885	20	921	5	1089	12	1106	4	0	79	83
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	24	1339	30	1393	8	1647	18	1673	6	0	119	126
Base Diverted	60	-60	0	0	0	-74	74	0	49	0	52	101
Retail Trips	32	0	0	32	0	0	64	64	40	0	20	60
Residential & Office Trips	164	0	0	164	0	0	203	203	620	54	472	1146
Total New Trips	196	0	0	196	0	0	267	267	530	184	492	1206
Future Traffic Volumes:	280	1279	30	1589	8	1573	359	1940	585	184	663	1433

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
	Tot			Tot			Tot			Tot		
Existing:	56	992	11	1059	13	969	22	1004	29	0	22	51
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	85	1500	17	1602	20	1466	33	1519	44	0	33	77
Base Diverted	68	-68	0	0	0	-74	74	0	47	0	47	94
Retail Trips	100	0	0	100	0	0	199	199	215	0	108	323
Residential & Office Trips	445	0	0	445	0	0	552	552	313	26	238	577
Total New Trips	545	0	0	545	0	0	751	751	427	127	346	900
Future Traffic Volumes:	698	1432	17	2147	20	1392	858	2270	518	127	426	1071

SAT Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
	Tot			Tot			Tot			Tot		
Existing:	25	970	7	1002	6	936	6	948	8	0	26	34
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	38	1467	11	1516	9	1416	9	1434	12	0	39	51
Base Diverted	66	-66	0	0	0	-64	64	0	30	0	40	70
Retail Trips	145	0	0	145	0	0	289	289	271	0	135	406
Residential & Office Trips	284	0	0	284	0	0	355	355	326	28	249	603
Total New Trips	429	0	0	429	0	0	644	644	485	140	384	1009
Future Traffic Volumes:	533	1401	11	1945	9	1352	717	2078	527	140	463	1130

05-141 Canton West DRI
Traffic Volumes
Future Conditions

A&R Engineering
December-06

Fincher Road at Broad Water Bay Road

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing:	5	75	0	80	0	84	10	94	0	0	0	0
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	8	113	0	121	0	127	15	142	32	0	27	59
Base Diverted	0	-38	38	0	43	-43	0	0	-11	20	-9	0
Retail Trips	0	7	17	24	12	5	0	17	0	16	0	16
Residential & Office Trips	0	14	33	47	12	40	0	52	0	0	0	0
Total New Trips	0	21	50	71	24	45	0	69	0	16	0	16
Future Traffic Volumes:	8	96	88	192	67	129	15	211	21	36	18	75

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing:	24	76	0	100	0	76	23	99	15	0	17	32
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	36	115	0	151	0	115	35	150	23	0	26	48
Base Diverted	0	-39	39	0	39	-39	0	0	-8	16	-8	0
Retail Trips	0	22	52	74	37	24	0	61	0	50	0	50
Residential & Office Trips	0	38	89	127	32	20	0	52	0	0	0	0
Total New Trips	0	60	141	201	69	44	0	113	0	50	0	50
Future Traffic Volumes:	36	136	180	352	108	120	35	263	15	66	18	98

SAT Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing:	30	40	0	70	0	45	28	73	20	0	34	54
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	45	61	0	106	0	68	42	110	30	0	51	82
Base Diverted	0	-20	20	0	23	-23	0	0	-10	27	-17	0
Retail Trips	0	33	77	110	54	30	0	84	0	73	0	73
Residential & Office Trips	0	24	57	81	20	21	0	41	0	0	0	0
Total New Trips	0	57	134	191	74	51	0	125	0	73	0	73
Future Traffic Volumes:	45	98	154	297	97	96	42	235	20	100	34	155

05-141 Canton West DRI
Traffic Volumes
Future Conditions

A&R Engineering
December-06

Marietta Highway at Bells Ferry Road

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	17	356	9	382	63	383	132	578	196	139	13	348
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	26	538	14	578	95	579	200	874	296	210	20	526
Retail Trips	0	8	0	8	0	5	10	15	16	0	0	16
Residential & Office Trips	0	23	0	23	0	67	135	202	47	0	0	47
Total New Trips	0	31	0	31	0	72	145	217	63	0	0	63
Future Traffic Volumes:	26	569	14	609	95	651	345	1091	359	210	20	589

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	23	513	8	544	55	427	160	642	165	71	22	258
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	35	776	12	823	83	646	242	971	250	107	33	390
Retail Trips	0	25	0	25	0	27	54	81	50	0	0	50
Residential & Office Trips	0	64	0	64	0	34	68	102	127	0	0	127
Total New Trips	0	89	0	89	0	61	122	183	177	0	0	177
Future Traffic Volumes:	35	865	12	912	83	707	364	1154	427	107	33	567

SAT Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	18	377	6	401	61	378	131	570	188	75	12	275
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	27	570	9	607	92	572	198	862	284	113	18	416
Retail Trips	0	36	0	36	0	34	67	101	73	0	0	73
Residential & Office Trips	0	41	0	41	0	36	71	107	81	0	0	81
Total New Trips	0	77	0	77	0	70	138	208	154	0	0	154
Future Traffic Volumes:	27	647	9	684	92	642	336	1070	438	113	18	570

05-141 Canton West DRI
Traffic Volumes
Future Conditions

A&R Engineering
December-06

SR 108 at North Site Driveway

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing:	0	0	0	0	0	0	0	96	0	0	94	0
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	0	0	0	0	0	0	0	145	0	0	142	0
Pass-by Adjustments	0	0	0	0	0	0	0	0	0	0	0	0
Retail Trips	5	0	8	13	0	0	0	8	7	15	12	0
Residential & Office Trips	40	0	34	74	0	0	0	34	14	48	12	0
Total New Trips	45	0	42	87	0	0	0	42	21	63	24	0
Future Traffic Volumes:	45	0	42	87	0	0	0	187	21	208	166	0

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing:	0	0	0	0	0	0	0	91	0	0	99	0
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	0	0	0	0	0	0	0	138	0	0	150	0
Pass-by Adjustments	0	0	0	0	0	0	0	0	0	0	0	0
Retail Trips	24	0	40	64	0	0	0	40	22	62	37	0
Residential & Office Trips	20	0	17	37	0	0	0	17	38	55	32	0
Total New Trips	44	0	57	101	0	0	0	57	60	117	69	0
Future Traffic Volumes:	44	0	57	101	0	0	0	195	60	255	219	0

SAT Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing:	0	0	0	0	0	0	0	60	0	0	73	0
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	0	0	0	0	0	0	0	91	0	0	110	0
Pass-by Adjustments	0	0	0	0	0	0	0	0	0	0	0	0
Retail Trips	30	0	51	81	0	0	0	51	33	84	54	0
Residential & Office Trips	21	0	18	39	0	0	0	18	24	42	20	0
Total New Trips	51	0	69	120	0	0	0	69	57	126	74	0
Future Traffic Volumes:	51	0	69	120	0	0	0	160	57	217	184	0

05-141 Canton West DRI
Traffic Volumes
Future Conditions

A&R Engineering
December-06

SR 5 - SR 108 Connector at Town Center Main Access

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
	Tot			Tot			Tot			Tot		
Existing:	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	0	0	0	0	0	0	0	101	0	134	0	134
Pass-by Adjustments	0	0	0	0	0	0	0	0	0	0	0	0
School Trips	26	0	0	26	0	0	21	42	21	84	0	52
Retail Trips	7	11	7	25	6	11	7	64	14	85	6	56
Residential & Office Trips	26	36	91	153	96	36	24	156	8	292	16	316
Total New Trips	59	47	98	204	102	47	59	208	36	398	51	485
Future Traffic Volumes:	59	47	98	204	102	47	59	208	36	499	51	586

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
	Tot			Tot			Tot			Tot		
Existing:	0	0	0	0	0	0	0	56	0	56	0	98
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	0	0	0	0	0	0	0	94	0	94	0	134
Pass-by Adjustments	6	0	10	16	4	0	14	18	4	-14	10	0
School Trips	1	0	0	1	0	0	1	1	2	3	2	7
Retail Trips	29	47	38	114	24	47	48	119	22	247	45	314
Residential & Office Trips	18	39	46	103	59	39	12	110	22	256	44	322
Total New Trips	48	86	84	218	83	86	61	230	46	506	91	643
Future Traffic Volumes:	54	86	94	254	87	86	75	248	50	586	101	737

SAT Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
	Tot			Tot			Tot			Tot		
Existing:	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	0	0	0	0	0	0	0	70	0	70	0	130
Pass-by Adjustments	7	0	8	15	3	0	14	17	3	-11	8	0
School Trips	0	0	0	0	0	0	0	0	0	0	0	0
Retail Trips	37	63	47	147	31	63	61	155	33	338	66	437
Residential & Office Trips	16	30	48	94	56	30	12	98	14	213	28	255
Total New Trips	53	93	95	241	87	93	73	253	47	551	94	692
Future Traffic Volumes:	60	93	103	256	90	93	87	270	50	610	102	762

05-141 Canton West DRI
Traffic Volumes
Future Conditions

A&R Engineering
December-06

Waleska Street at N Etowah Drive

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	0	0	0	0	0	0	0	0	0	0	0	0
Retail Trips	0	0	0	0	0	0	0	0	0	0	0	0
Residential & Office Trips	18	61	0	79	0	175	11	186	0	54	0	54
Total New Trips	18	61	0	79	0	175	11	186	0	54	0	54
Future Traffic Volumes:	18	61	0	79	0	175	11	186	0	54	0	54

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	0	0	0	0	0	0	0	0	0	0	0	0
Retail Trips	0	0	0	0	0	0	0	0	0	0	0	0
Residential & Office Trips	51	165	0	216	0	88	32	120	0	26	0	26
Total New Trips	51	165	0	216	0	88	32	120	0	26	0	26
Future Traffic Volumes:	51	165	0	216	0	88	32	120	0	26	0	26

SAT Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	0	0	7	7	0	0	0	0	0	0	0	0
Growth Factor (%):	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	
Base Condition:	0	0	11	11	0	0	0	0	0	0	0	0
Retail Trips	0	0	0	0	0	0	0	0	0	0	0	0
Residential & Office Trips	32	107	0	139	0	92	20	112	0	28	0	28
Total New Trips	32	107	0	139	0	92	20	112	0	28	0	28
Future Traffic Volumes:	32	107	11	150	0	92	20	112	0	28	0	28

05-141 Canton West DRI
Traffic Volumes
Future Conditions

A&R Engineering
December-06

SR 108 - SR 5 Connector at North Site Driveway

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing:	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	0	0	0	0	0	0	0	0	0	0	0	0
Base Diverted	0	0	0	0	0	0	0	81	0	0	134	0
Retail Trips	0	0	0	19	0	0	0	45	0	29	13	42
Residential & Office Trips	0	0	0	23	0	3	26	40	0	128	59	187
Total New Trips	0	0	0	42	0	3	45	85	0	157	72	229
Future Traffic Volumes:	0	0	0	42	0	3	45	166	0	291	72	363

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing:	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	0	0	0	0	0	0	0	0	0	0	0	0
Base Diverted	0	0	0	0	0	0	0	78	0	134	0	134
Retail Trips	0	0	0	59	0	0	59	109	0	151	64	215
Residential & Office Trips	0	0	0	63	0	7	70	109	0	65	30	95
Total New Trips	0	0	0	122	0	7	129	218	0	216	94	310
Future Traffic Volumes:	0	0	0	122	0	7	129	296	0	350	94	444

SAT Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing:	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Base Condition:	0	0	0	0	0	0	0	0	0	0	0	0
Base Diverted	0	0	0	0	0	0	0	43	0	130	0	130
Retail Trips	0	0	0	87	0	0	87	204	0	189	81	270
Residential & Office Trips	0	0	0	40	0	4	44	69	0	68	31	99
Total New Trips	0	0	0	127	0	4	131	273	0	257	112	369
Future Traffic Volumes:	0	0	0	127	0	4	131	316	0	387	112	499

Planned and Programmed Improvements

Short Title

MARIETTA ROAD SIDEWALKS FROM MARIETTA HIGHWAY TO EAST MARIETTA STREET

GDOT Project No.

0004495

Federal ID No.

CM-0004-00(495)

Status

Programmed

Detailed Description and Justification

Construction of a sidewalk on Marietta Road from Marietta Highway to Hickory Flat Road. This project includes the installation of bike racks, lighting, and signage. The new sidewalk will connect to existing sidewalk on Marietta Road.

Service Type

Pedestrian Facility

Sponsor

City of Canton

Jurisdiction

Cherokee County

Existing Thru Lane

N/A (applicable for road projects only)

Planned Thru Lane

N/A (applicable for road projects only)

Corridor Length

0.8 miles (not applicable for all project types)

Network Year

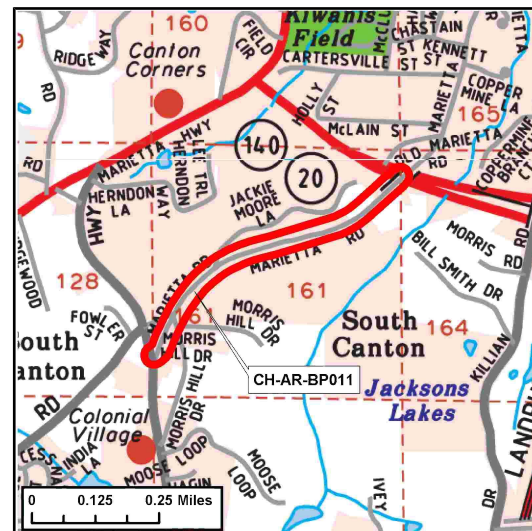
2010 (required if modeled for conformity)

Completion Date

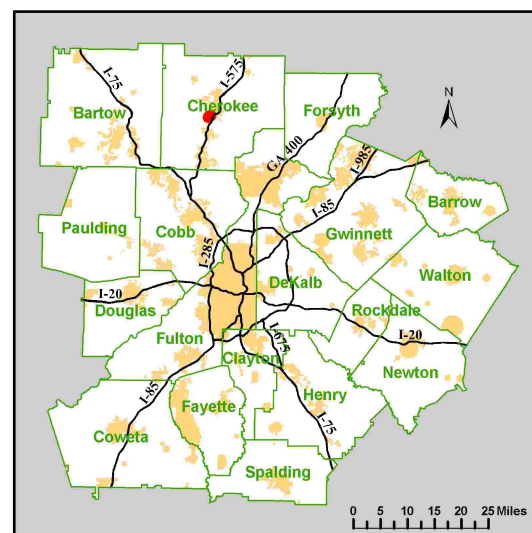
2008

Analysis Level

Exempt from Air Quality Analysis (40 CFR 93)



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Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
PE	Congestion Mitigation and Air Quality	2003	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
ROW	Congestion Mitigation and Air Quality	2003	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
CST	Congestion Mitigation and Air Quality	2007	\$1,500,000	\$1,200,000	\$0,000	\$0,000	\$300,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation



For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.



Short Title

CANTON INTERMODAL FACILITY

GDOT Project No.

0006859

Federal ID No.

CSSTP-0006-00(859)

Status

Programmed

Detailed Description and Justification

The Intermodal Transfer Station will offer a site where all bus routes of the city and those into the county can merge into the official transfer station for efficiencies of service and operation. Passengers will transfer at this central location which is in the city's central business district and was once the original train depot of Canton.

Service Type

Transit Facilities

Sponsor

City of Canton

Jurisdiction

Cherokee County

Existing Thru Lane

N/A (applicable for road projects only)

Planned Thru Lane

N/A (applicable for road projects only)

Corridor Length

N/A miles (not applicable for all project types)

Network Year

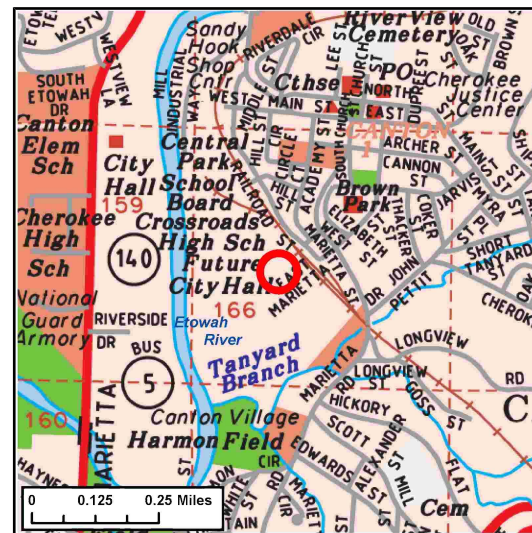
2010 (required if modeled for conformity)

Completion Date

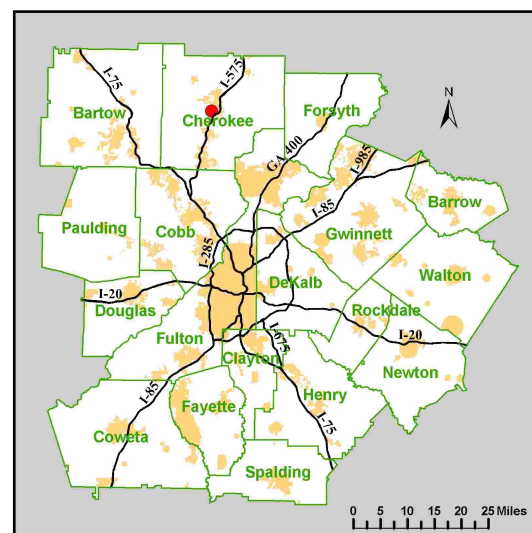
2008

Analysis Level

Exempt from Air Quality Analysis (40 CFR 93)



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Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
PE	STP - Urban (>200K) (ARC)	2005	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
ROW	STP - Urban (>200K) (ARC)	2006	\$300,000	\$240,000	\$0,000	\$0,000	\$60,000
CST	STP - Urban (>200K) (ARC)	2007	\$425,000	\$340,000	\$0,000	\$0,000	\$85,000
				\$580,000	\$0,000	\$0,000	\$145,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation



For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.



Short TitleRAILROAD STREET TRAIL/PEDESTRIAN FACILITY FROM
EAST MARIETTA STREET TO WALESKA STREET/SR 140**GDOT Project No.**

0002848

Federal ID No.

STP-0002-00(848)

Status

Programmed

Detailed Description and JustificationConstruction of bicycle lanes and sidewalks along
Railroad Street from East Marietta Street to Waleska
Street (SR 140).**Service Type**

Bicycle/Pedestrian Facility

Sponsor

City of Canton

Jurisdiction

Cherokee County

Existing Thru Lane

N/A (applicable for road projects only)

Planned Thru Lane

N/A (applicable for road projects only)

Corridor Length

N/A miles (not applicable for all project types)

Network Year

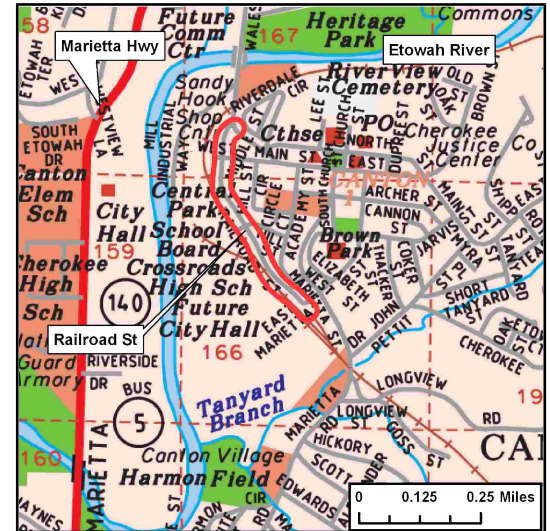
2010 (required if modeled for conformity)

Completion Date

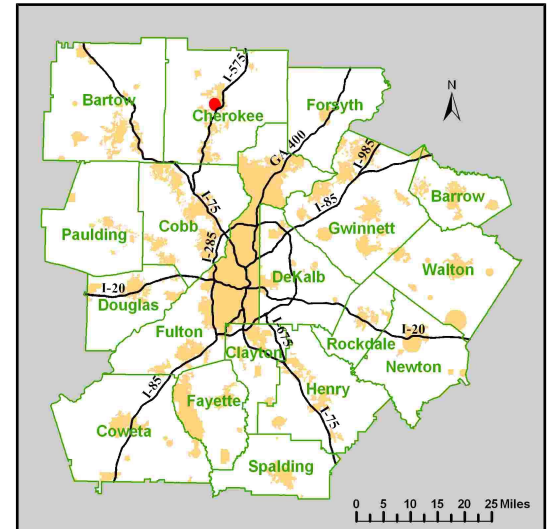
2007

Analysis Level

Exempt from Air Quality Analysis (40 CFR 93)



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Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
PE	STP - Urban (>200K) (ARC)	2003	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
CST	STP - Urban (>200K) (ARC)	2007	\$2,000,000	\$1,600,000	\$0,000	\$0,000	\$400,000
				\$1,600,000	\$0,000	\$0,000	\$400,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation



For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.



Short Title

WALESKA STREET TRAIL/PEDESTRIAN FACILITY FROM
MAIN STREET/NORTH STREET TO SR 5

GDOT Project No.

0002847

Federal ID No.

STP-0002-00(847)

Status

Programmed

Detailed Description and Justification

Bike and pedestrian improvements on Waleska Street from Main/North Street to SR Business 5. The project includes a multi-use trail, lighting, landscaping, signage, and gateway improvements. This project will cross the Etowah River via the Waleska Street bridge.

Service Type

Bicycle/Pedestrian Facility

Sponsor

City of Canton

Jurisdiction

Cherokee County

Existing Thru Lane

N/A (applicable for road projects only)

Planned Thru Lane

N/A (applicable for road projects only)

Corridor Length

0.5 miles (not applicable for all project types)

Network Year

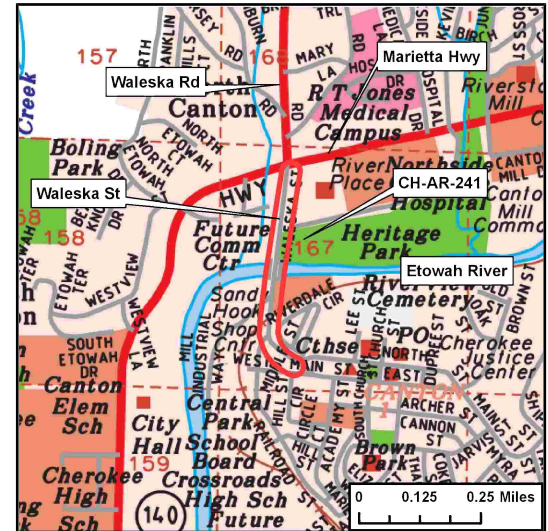
2010 (required if modeled for conformity)

Completion Date

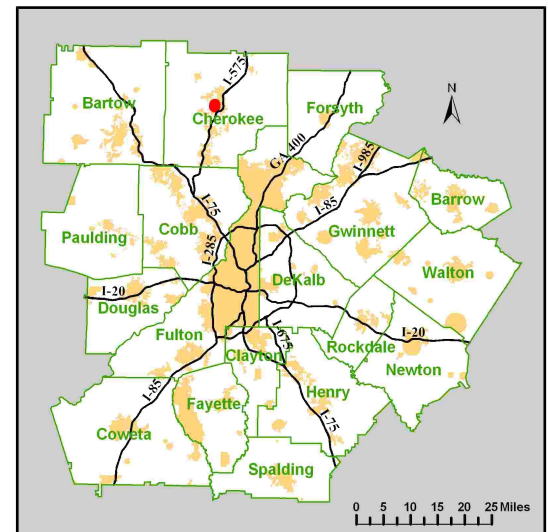
2008

Analysis Level

Exempt from Air Quality Analysis (40 CFR 93)



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Phase Status & Funding Information for 06-11 TIP	FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
			FEDERAL	STATE	BONDS	LOCAL/OTHER
PE STP - Urban (>200K) (ARC)	2003	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
CST STP - Urban (>200K) (ARC)	2007	\$1,540,000	\$1,232,000	\$0,000	\$0,000	\$308,000
			\$1,232,000	\$0,000	\$0,000	\$308,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation



For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.



Short Title

HICKORY FLAT ROAD PEDESTRIAN FACILITY FROM I-575 TO MARIETTA ROAD

GDOT Project No.

0002846

Federal ID No.

STP-0002-00(846)

Status

Programmed

Detailed Description and Justification

Funding of preliminary engineering for the design of sidewalks on Hickory Flat Road from I-575 to Marietta Road.

Service Type

Pedestrian Facility

Sponsor

City of Canton

Jurisdiction

Cherokee County

Existing Thru Lane

N/A (applicable for road projects only)

Planned Thru Lane

N/A (applicable for road projects only)

Corridor Length

0.5 miles (not applicable for all project types)

Network Year

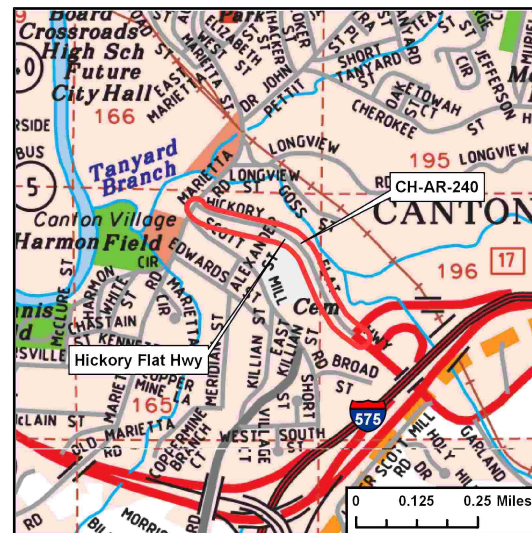
2010 (required if modeled for conformity)

Completion Date

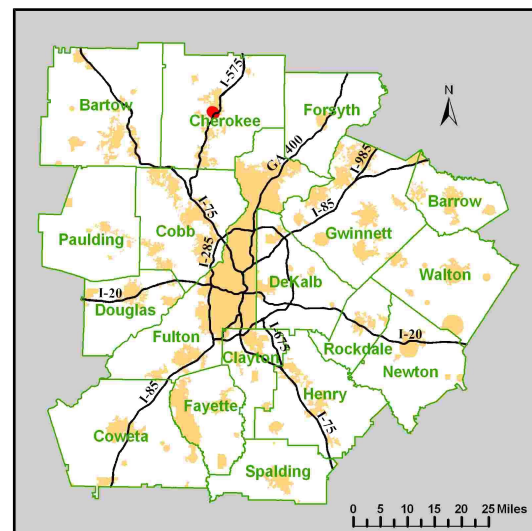
2008

Analysis Level

Exempt from Air Quality Analysis (40 CFR 93)



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Phase Status & Funding Information for 06-11 TIP	FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
			FEDERAL	STATE	BONDS	LOCAL/OTHER
PE STP - Urban (>200K) (ARC)	2003	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
CST STP - Urban (>200K) (ARC)	2007	\$1,200,000	\$960,000	\$0,000	\$0,000	\$240,000
			\$960,000	\$0,000	\$0,000	\$240,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation



For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.



Short Title

I-575 NORTH AT SR 20 (MAIN STREET / CUMMING HIGHWAY)

GDOT Project No.

611270-

Federal ID No.

NH-IM-575-1(33)

Status

Programmed

Detailed Description and Justification

Reconstruction of the interchange on I-575 at SR 20 including two new ramps: northbound off, southbound on I-575.

Service Type

Interchange Capacity

Sponsor

GDOT

Jurisdiction

Cherokee County

Existing Thru Lane

N/A (applicable for road projects only)

Planned Thru Lane

N/A (applicable for road projects only)

Corridor Length

N/A miles (not applicable for all project types)

Network Year

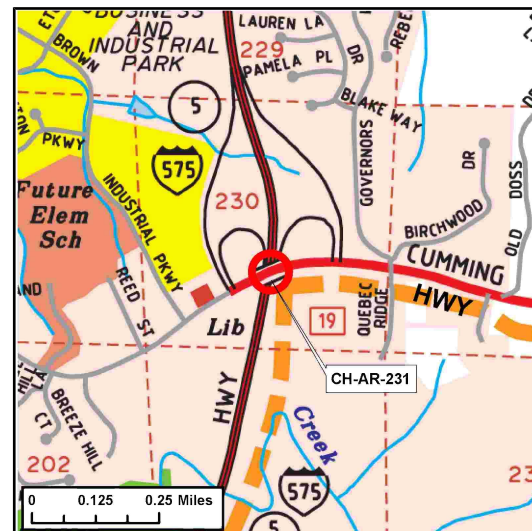
2010 (required if modeled for conformity)

Completion Date

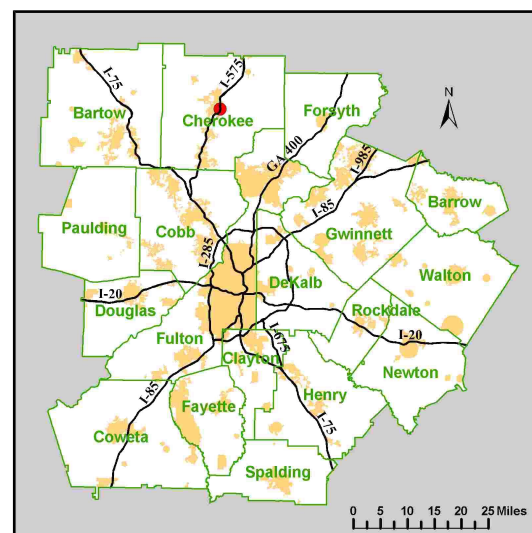
2008

Analysis Level

In the Region's Air Quality Conformity Analysis



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Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
PE	National Highway System	AUTH	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
ROW	National Highway System	2006	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
CST	National Highway System	2007	\$27,894,000	\$22,315,200	\$5,578,800	\$0,000	\$0,000
				\$22,315,200	\$5,578,800	\$0,000	\$0,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation



For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.



Short TitleEAST MAIN STREET PEDESTRIAN LIGHTING FROM
DUPREE STREET TO BROWN INDUSTRIAL AVENUE**GDOT Project No.**

0003778

Federal ID No.

CSSTP-0003-00(778)

Status

Programmed

Detailed Description and Justification

This project would add lighting on the new sidewalk from downtown Canton to the Library area. A substantial portion of this sidewalk was federally funded and recently completed. East Main Street is a well-travel pedestrian corridor and needs lighting to enhance provide pedestrian safety.

Service Type

Pedestrian Facility

Sponsor

City of Canton

Jurisdiction

Cherokee County

Existing Thru Lane

N/A (applicable for road projects only)

Planned Thru Lane

N/A (applicable for road projects only)

Corridor Length

1.2 miles (not applicable for all project types)

Network Year

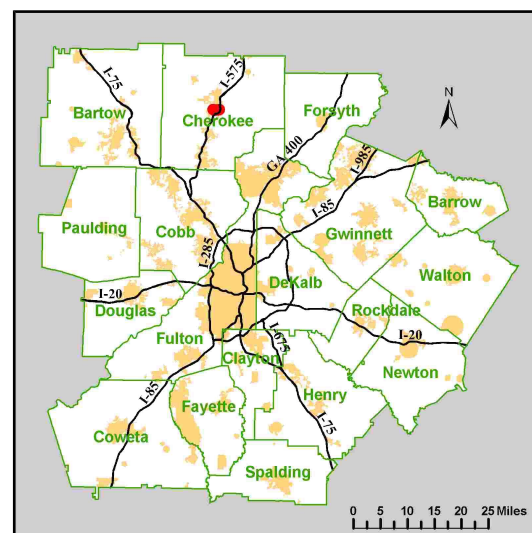
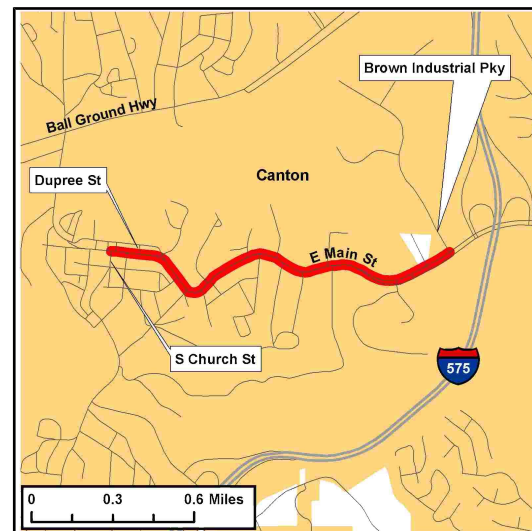
2010 (required if modeled for conformity)

Completion Date

2007

Analysis Level

Exempt from Air Quality Analysis (40 CFR 93)



Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
PE	STP - Urban (>200K) (ARC)	AUTH	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
CST	STP - Urban (>200K) (ARC)	2007	\$500,000	\$400,000	\$0,000	\$0,000	\$100,000
				\$400,000	\$0,000	\$0,000	\$100,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation

For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.

Short Title
 NORTH CANTON PARKWAY FROM LOWER BURRIS ROAD
 TO SR 140 (REINHARDT COLLEGE PARKWAY)
GDOT Project No.

N/A

Federal ID No.**Status**

Long Range

Detailed Description and Justification

None

Service Type

Roadway Capacity

Sponsor

Cherokee County

Jurisdiction

Cherokee County

Existing Thru Lane

0 (applicable for road projects only)

Planned Thru Lane

4 (applicable for road projects only)

Corridor Length

2.7 miles (not applicable for all project types)

Network Year

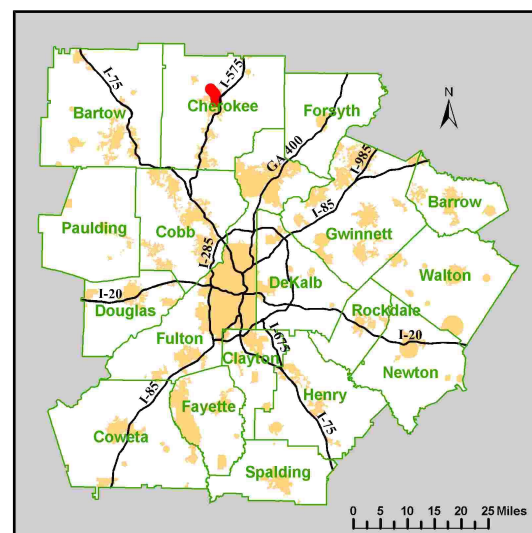
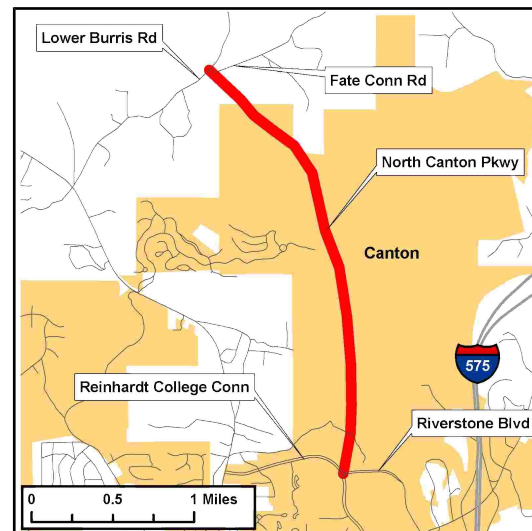
2020 (required if modeled for conformity)

Completion Date

2020

Analysis Level

In the Region's Air Quality Conformity Analysis



Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
PE	Local Jurisdiction/Municipality Funds	LR 2012-2020	\$1,000,000	\$0,000	\$0,000	\$0,000	\$1,000,000
ROW	Local Jurisdiction/Municipality Funds	LR 2012-2020	\$1,000,000	\$0,000	\$0,000	\$0,000	\$1,000,000
CST	Local Jurisdiction/Municipality Funds	LR 2012-2020	\$12,000,000	\$0,000	\$0,000	\$0,000	\$12,000,000
				\$0,000	\$0,000	\$0,000	\$14,000,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation

For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.

Short Title

SR 20 (KNOX BRIDGE ROAD) AT INTERSECTION OF SR 108 (FINCHER ROAD), WHITE ROAD AND UPPER SWEETWATER TRAIL

GDOT Project No.

662650-

Federal ID No.

STP-012-1(112)

Status

Programmed

Detailed Description and Justification

This project involves the reconstruction of the intersection of White Road @ SR 20 and SR 108. Due to the heavy traffic on SR 20, this project has been recommended to realign White Road to tie into SR 108. This project would enhance the overall operation at the intersection and reduce the risk of potential accidents.

Service Type

Roadway Operational Upgrades

Sponsor

Cherokee County

Jurisdiction

Cherokee County

Existing Thru Lane

N/A (applicable for road projects only)

Planned Thru Lane

N/A (applicable for road projects only)

Corridor Length

N/A miles (not applicable for all project types)

Network Year

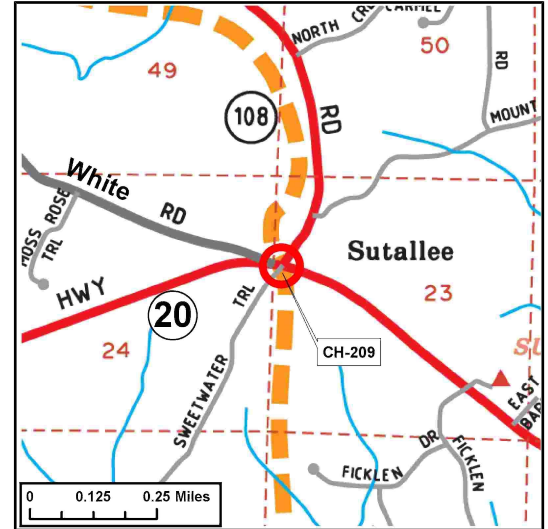
2015 (required if modeled for conformity)

Completion Date

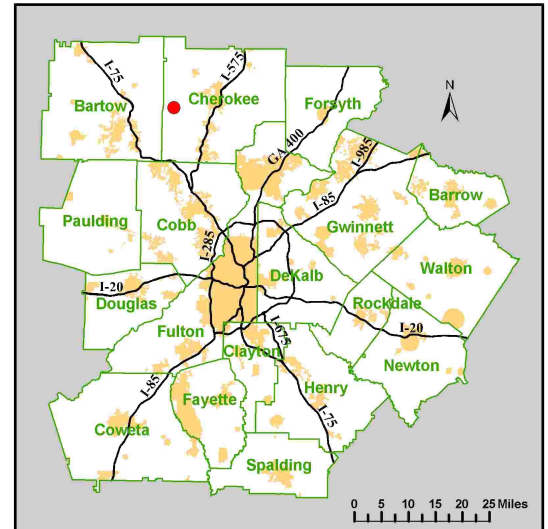
2011

Analysis Level

Exempt from Air Quality Analysis (40 CFR 93)



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Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
PE	GA Department of Transportation Funds	AUTH	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
ROW	GA Department of Transportation Funds	2008	\$69,000	\$0,000	\$69,000	\$0,000	\$0,000
CST	STP - Urban (>200K) (ARC)	2009	\$234,000	\$187,200	\$46,800	\$0,000	\$0,000
				\$187,200	\$115,800	\$0,000	\$0,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation



For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.



Short Title

SR 5 BUSINESS (MARIETTA HIGHWAY/RIVERSTONE PARKWAY) SIGNAL COORDINATION AT SR 140 CONNECTOR, CANTON MILL LANE, AND OLD BALL GROUND HIGHWAY

GDOT Project No.

0006791

Federal ID No.

CSCMQ-0006-00(791)

Status

Programmed

Detailed Description and Justification

This project will develop and implement a signal coordination system for four specific intersections along SR Business 5. In addition to the signal coordination, these same intersections will be improved by including dedicated left-hand turn lanes and left-hand turn signal heads. These intersections include: Waleska Street/SR 140, River Place, Canton Mill Drive/Juniper Street, and Old Ball Ground Highway. These intersections will enable the city to fully synchronize and coordinate the intersections along S.R. 5 Business to I-575.

Service Type

ITS-Other

Sponsor

City of Canton

Jurisdiction

Cherokee County

Existing Thru Lane

4 (applicable for road projects only)

Planned Thru Lane

4 (applicable for road projects only)

Corridor Length

N/A miles (not applicable for all project types)

Network Year

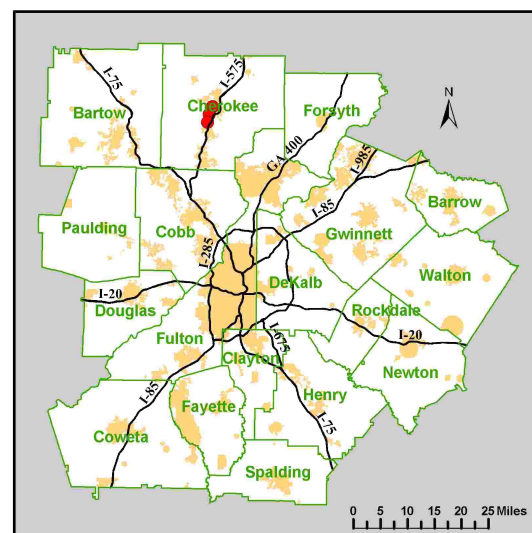
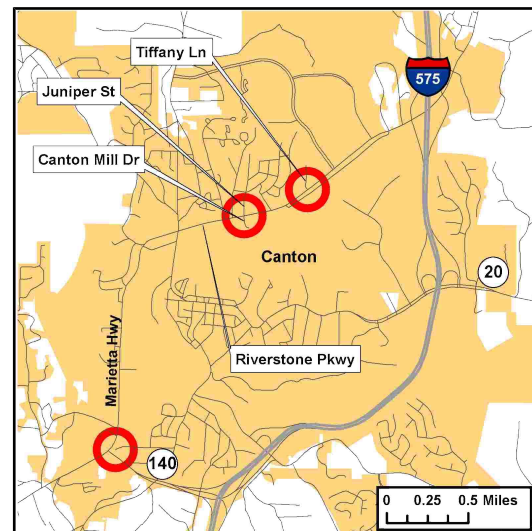
2010 (required if modeled for conformity)

Completion Date

2006

Analysis Level

Exempt from Air Quality Analysis (40 CFR 93)



Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
PE	Congestion Mitigation and Air Quality	AUTH	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
CST	Congestion Mitigation and Air Quality	2007	\$1,080,000	\$864,000	\$0,000	\$0,000	\$216,000
				\$864,000	\$0,000	\$0,000	\$216,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation



For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.



Short Title

MARIETTA ROAD AT HICKORY FLAT ROAD

GDOT Project No.

0006719

Federal ID No.

CSSTP-0006-00(719)

Status

Programmed

Detailed Description and Justification

This project will improve the operation of the intersection by providing dedicated left-hand turn lanes with left hand arrowed signalheads. Improvement to the intersection to allow synchronizing of the signal heads with a looping timing system will allow traffic a more managed and coordinated flow as traffic accesses the Canton Central Business District and the River Mill District (LCI). This project will include streetscape and pedestrian improvements such as sidewalks, street trees, signage, bus shelters, and mast arms for traffic signals.

Service Type

Roadway Operational Upgrades

Sponsor

City of Canton

Jurisdiction

Cherokee County

Existing Thru Lane

2 (applicable for road projects only)

Planned Thru Lane

2 (applicable for road projects only)

Corridor Length

N/A miles (not applicable for all project types)

Network Year

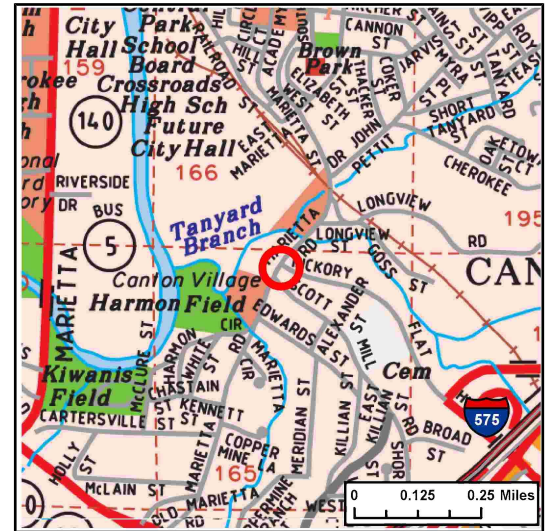
2010 (required if modeled for conformity)

Completion Date

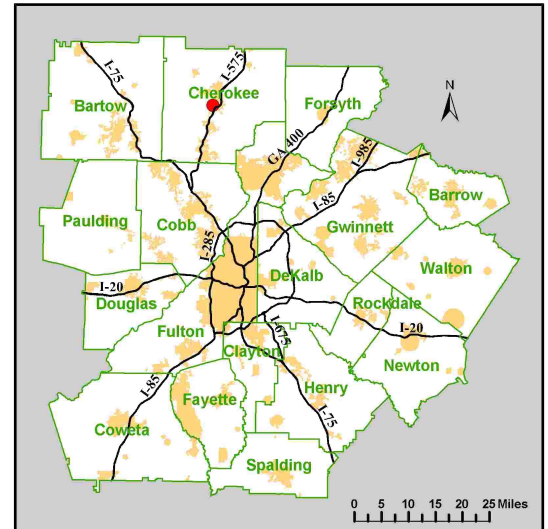
2008

Analysis Level

Exempt from Air Quality Analysis (40 CFR 93)



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Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
PE	STP - Urban (>200K) (ARC)	2005	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
CST	STP - Urban (>200K) (ARC)	2007	\$340,000	\$272,000	\$0,000	\$0,000	\$68,000
				\$272,000	\$0,000	\$0,000	\$68,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation



For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.



Short Title

SR 20 (KNOX BRIDGE HIGHWAY) AT ETOWAH RIVER

GDOT Project No.

632900-

Federal ID No.

BRST-012-1(111)

Status

Programmed

Detailed Description and Justification

Replacement of the existing bridge on SR 20 over the Etowah River. This is a safety upgrade and the bridge will remain 2 lanes.

Service Type

Bridge Upgrade

Sponsor

GDOT

Jurisdiction

Cherokee County

Existing Thru Lane

2 (applicable for road projects only)

Planned Thru Lane

2 (applicable for road projects only)

Corridor Length

N/A miles (not applicable for all project types)

Network Year

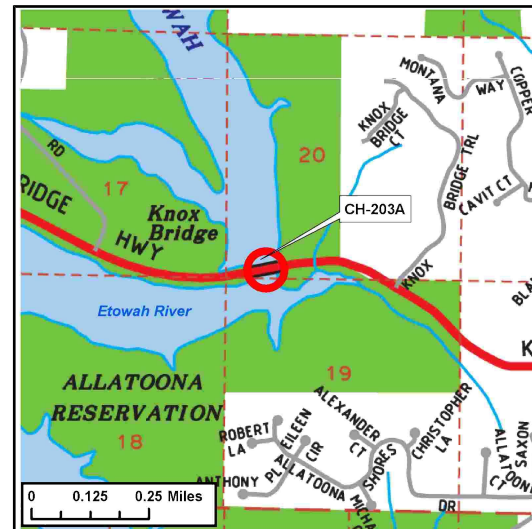
2010 (required if modeled for conformity)

Completion Date

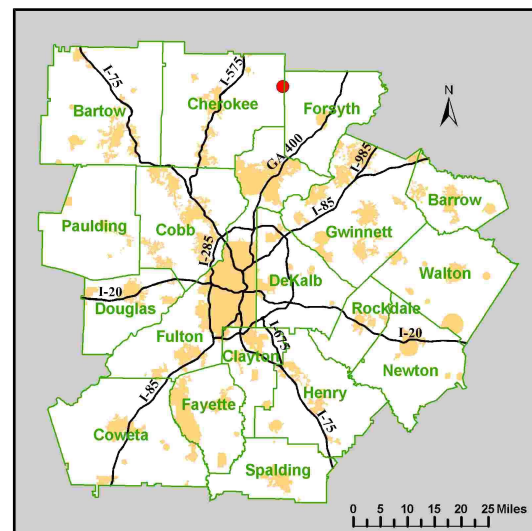
2010

Analysis Level

Exempt from Air Quality Analysis (40 CFR 93)



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Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
PE	STP - Statewide Flexible (GDOT)	AUTH	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
ROW	Bridge (On-System)	2007	\$182,000	\$145,600	\$36,400	\$0,000	\$0,000
CST	Bridge (On-System)	2008	\$2,125,000	\$1,700,000	\$425,000	\$0,000	\$0,000
CST	STP - Statewide Flexible (GDOT)	2008	\$4,434,000	\$3,547,200	\$886,800	\$0,000	\$0,000
				\$5,392,800	\$1,348,200	\$0,000	\$0,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation



For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.



Short Title

HICKORY FLAT ROAD EXTENSION FROM MARIETTA ROAD TO WALESKA STREET

GDOT Project No.

0006042

Federal ID No.

CSSTP-0006-00(042)

Status

Long Range

Detailed Description and Justification

None

Service Type

Roadway Capacity

Sponsor

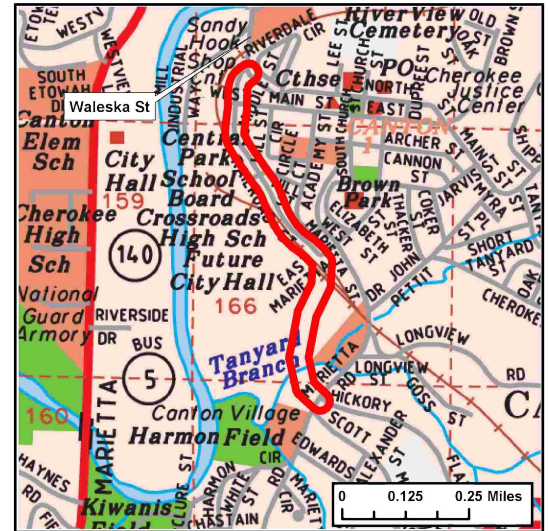
Cherokee County

Jurisdiction

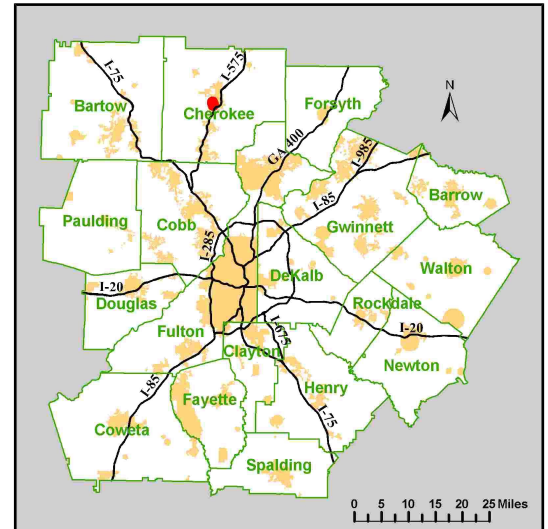
Cherokee County

Existing Thru Lane (applicable for road projects only)**Planned Thru Lane** (applicable for road projects only)**Corridor Length** miles (not applicable for all project types)**Network Year** (required if modeled for conformity)**Completion Date****Analysis Level**

In the Region's Air Quality Conformity Analysis



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Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
PE	FEDAID-2011-2030	LR 2012-2020	\$323,000	\$258,400	\$0,000	\$0,000	\$64,600
ROW	Local Jurisdiction/Municipality Funds	LR 2012-2020	\$1,398,000	\$0,000	\$0,000	\$0,000	\$1,398,000
CST	FEDAID-2011-2030	LR 2012-2020	\$2,150,000	\$1,720,000	\$0,000	\$0,000	\$430,000
				\$1,978,400	\$0,000	\$0,000	\$1,892,600

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation



For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.



Short Title

SR 140 (HICKORY FLAT ROAD): SEGMENT 4 FROM I-575 TO EAST CHEROKEE DRIVE [SEE ALSO OTHER CH-140 SERIES LINE ITEMS]

GDOT Project No.

0006040

Federal ID No.

CSSTP-0006-00(040)

Status

Long Range

Detailed Description and Justification

None

Service Type

Roadway Capacity

Sponsor

GDOT

Jurisdiction

Cherokee County

Existing Thru Lane

2 (applicable for road projects only)

Planned Thru Lane

4 (applicable for road projects only)

Corridor Length

5.57 miles (not applicable for all project types)

Network Year

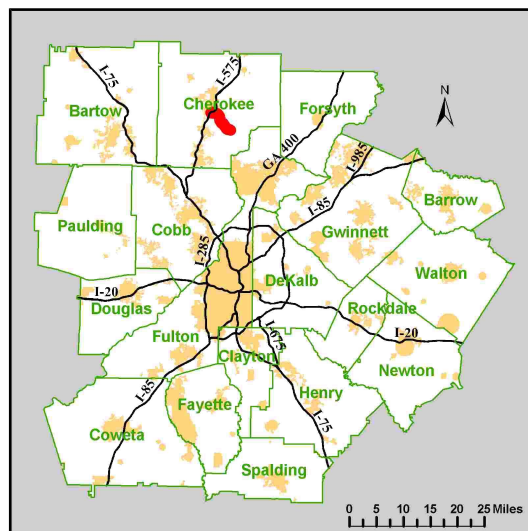
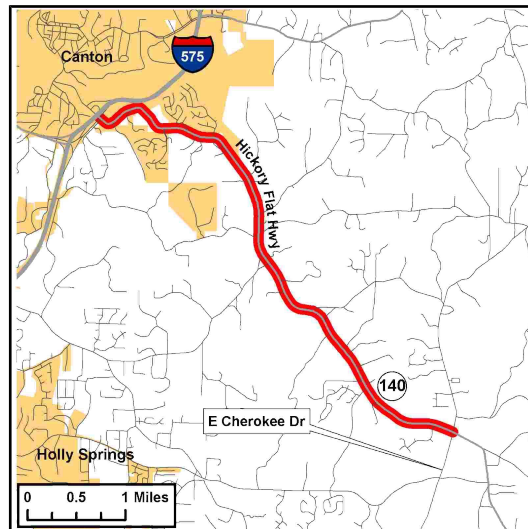
2025 (required if modeled for conformity)

Completion Date

2025

Analysis Level

In the Region's Air Quality Conformity Analysis



Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
PE	STP - Statewide Flexible (GDOT)	2006	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
ROW	FEDAID-2011-2030	LR 2021-2030	\$5,688,000	\$4,550,400	\$1,137,600	\$0,000	\$0,000
CST	FEDAID-2011-2030	LR 2021-2030	\$11,375,000	\$9,100,000	\$2,275,000	\$0,000	\$0,000
				\$13,650,400	\$3,412,600	\$0,000	\$0,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation



For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.



Short Title

SR 140 (REINHARDT COLLEGE PARKWAY): SEGMENT 3 FROM LOWER BURRIS ROAD TO SR 5 BUSINESS (RIVERSTONE PARKWAY) [SEE ALSO OTHER CH-140 SERIES LINE ITEMS]

GDOT Project No.

630942-

Federal ID No.

STP-0828(19)

Status

Long Range

Detailed Description and Justification

Widening of SR 140 from Reinhardt College Parkway/SR Business 5 to Lower Burris Rd. This corridor has heavy peak traffic near Canton. The widening of SR 140 from 2 to 4 lanes will provide a relief to congestion on SR 140, as well as on SR 20, which are both on the CMS.

Service Type

Roadway Capacity

Sponsor

GDOT

Jurisdiction

Cherokee County

Existing Thru Lane

2 (applicable for road projects only)

Planned Thru Lane

4 (applicable for road projects only)

Corridor Length

3.13 miles (not applicable for all project types)

Network Year

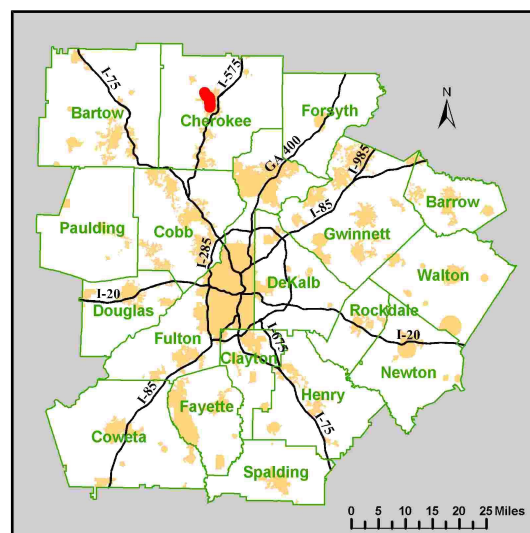
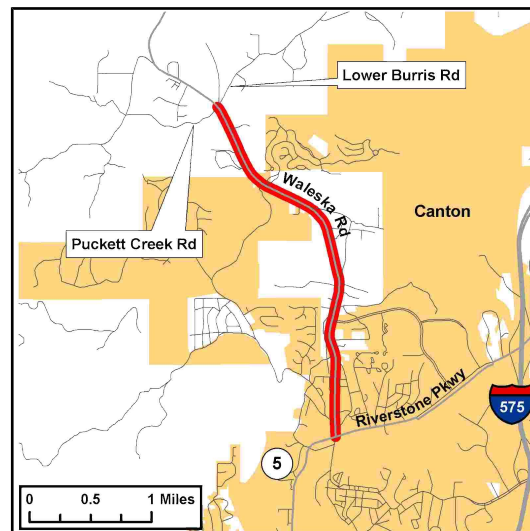
2020 (required if modeled for conformity)

Completion Date

2020

Analysis Level

In the Region's Air Quality Conformity Analysis



Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
PE	STP - Statewide Flexible (GDOT)	AUTH	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
ROW	STP - Statewide Flexible (GDOT)	LR 2012-2020	\$13,562,000	\$10,849,600	\$2,712,400	\$0,000	\$0,000
CST	STP - Statewide Flexible (GDOT)	LR 2012-2020	\$8,000,000	\$6,400,000	\$1,600,000	\$0,000	\$0,000
				\$17,249,600	\$4,312,400	\$0,000	\$0,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation



For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.



Short Title

SR 20 (CUMMING HIGHWAY): SEGMENT 2 FROM I-575 TO SR 369 (HIGHTOWER ROAD) [SEE ALSO CH-020A]

GDOT Project No.

0003681

Federal ID No.

STP-0003-00(681)

Status

Programmed

Detailed Description and Justification

This project widens this critical East-West Corridor linking Canton to Forsyth County and Cumming from 2 to 4 lanes. This corridor is forecast to be over capacity in 2030 and is part of the cross-regional grid network.

Service Type

Roadway Capacity

Sponsor

GDOT

Jurisdiction

Cherokee County

Existing Thru Lane

2 (applicable for road projects only)

Planned Thru Lane

4 (applicable for road projects only)

Corridor Length

8.6 miles (not applicable for all project types)

Network Year

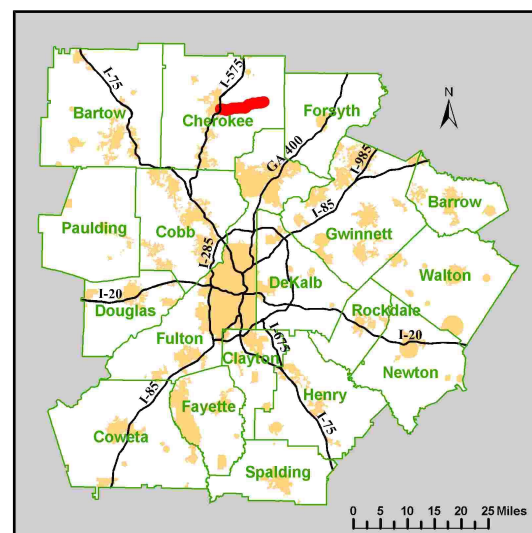
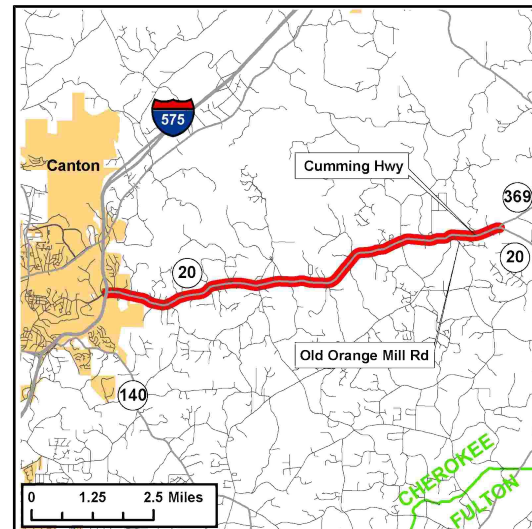
2025 (required if modeled for conformity)

Completion Date

2024

Analysis Level

In the Region's Air Quality Conformity Analysis



Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
PE	High Priority Projects from TEA-21	2006	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
ROW	High Priority Projects from TEA-21	2010	\$1,100,000	\$880,000	\$220,000	\$0,000	\$0,000
ROW	STP - Statewide Flexible (GDOT)	LR 2012-2020	\$45,000,000	\$36,000,000	\$9,000,000	\$0,000	\$0,000
CST	STP - Statewide Flexible (GDOT)	LR 2021-2030	\$25,000,000	\$20,000,000	\$5,000,000	\$0,000	\$0,000
				\$56,880,000	\$14,220,000	\$0,000	\$0,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation



For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.



Short Title

SR 20: SEGMENT 1 FROM I-75 NORTH IN BARTOW COUNTY TO I-575 IN CHEROKEE COUNTY [SEE ALSO CH-020B]

GDOT Project No.

0007836

Federal ID No.

CSSTP-0007-00(836)

Status

Long Range

Detailed Description and Justification

This project widens this critical East-West Corridor linking Cartersville and I-75 to Canton from 2 to 4 lanes. This corridor is forecast to be over capacity in 2030 and is part of the cross-regional grid network.

Service Type

Roadway Capacity

Sponsor

GDOT

Jurisdiction

Cherokee County

Existing Thru Lane

2 (applicable for road projects only)

Planned Thru Lane

4 (applicable for road projects only)

Corridor Length

15.37 miles (not applicable for all project types)

Network Year

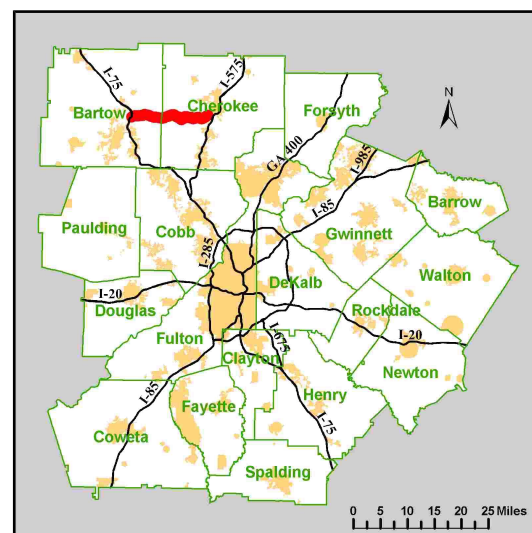
2025 (required if modeled for conformity)

Completion Date

2025

Analysis Level

In the Region's Air Quality Conformity Analysis



Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
PE	FEDAID-2011-2030	LR 2012-2020	\$4,610,000	\$3,688,000	\$922,000	\$0,000	\$0,000
ROW	FEDAID-2011-2030	LR 2021-2030	\$13,832,000	\$11,066,000	\$2,766,000	\$0,000	\$0,000
CST	FEDAID-2011-2030	LR 2021-2030	\$46,110,000	\$36,888,000	\$9,222,000	\$0,000	\$0,000
				\$51,642,000	\$12,910,000	\$0,000	\$0,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation



For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.



Short Title

SR 20 TRUCK CLIMBING LANES/INTERSECTION IMPROVEMENTS FROM I-575 TO CR 238 (OLD ORANGE MILL ROAD) [SEE ALSO OTHER CH-020 SERIES LINE ITEMS]

GDOT Project No.

632790-

Federal ID No.

STP-012-1(107)

Status

Programmed

Detailed Description and Justification

Construction of truck climbing lanes on SR 20 from I-575 to Old Orange Mill Road (CR 238) as well as intersection improvements along that corridor. This project is classified as a safety improvement.

Service Type

Roadway Operational Upgrades

Sponsor

GDOT

Jurisdiction

Cherokee County

Existing Thru Lane

2 (applicable for road projects only)

Planned Thru Lane

2 (applicable for road projects only)

Corridor Length

4.9 miles (not applicable for all project types)

Network Year

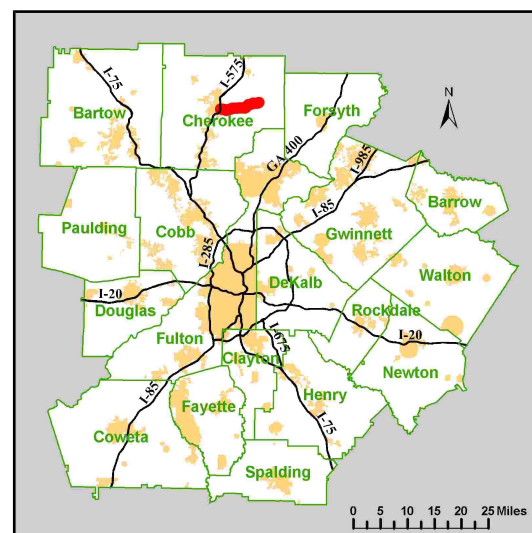
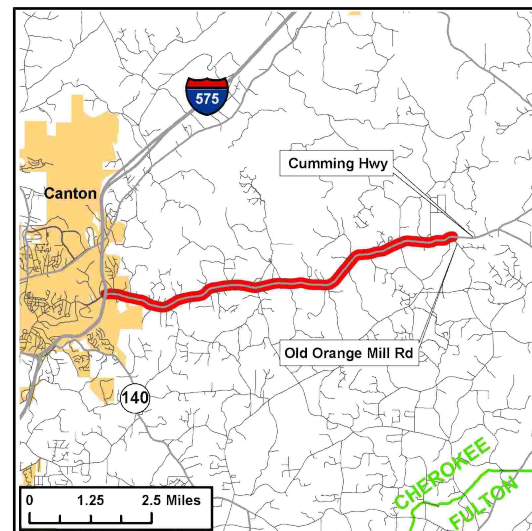
2010 (required if modeled for conformity)

Completion Date

2010

Analysis Level

Exempt from Air Quality Analysis (40 CFR 93)



Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
PE	STP - Statewide Flexible (GDOT)	AUTH	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
ROW	STP - Statewide Flexible (GDOT)	2006	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
CST	STP - Statewide Flexible (GDOT)	2008	\$10,155,000	\$8,124,000	\$2,031,000	\$0,000	\$0,000
				\$8,124,000	\$2,031,000	\$0,000	\$0,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation



For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.



Short Title

BELLS FERRY ROAD: SEGMENT 4 FROM NORTH OF SIXES ROAD TO SR 20 (KNOX BRIDGE HIGHWAY) [SEE ALSO OTHER CH-010 SERIES LINE ITEMS]

GDOT Project No.

0006039

Federal ID No.

CSSTP-0006-00(039)

Status

Long Range

Detailed Description and Justification

None

Service Type

Roadway Capacity

Sponsor

Cherokee County

Jurisdiction

Cherokee County

Existing Thru Lane

2 (applicable for road projects only)

Planned Thru Lane

4 (applicable for road projects only)

Corridor Length

3.88 miles (not applicable for all project types)

Network Year

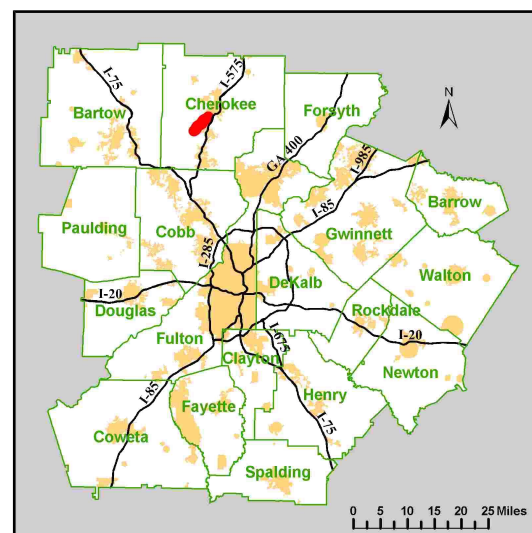
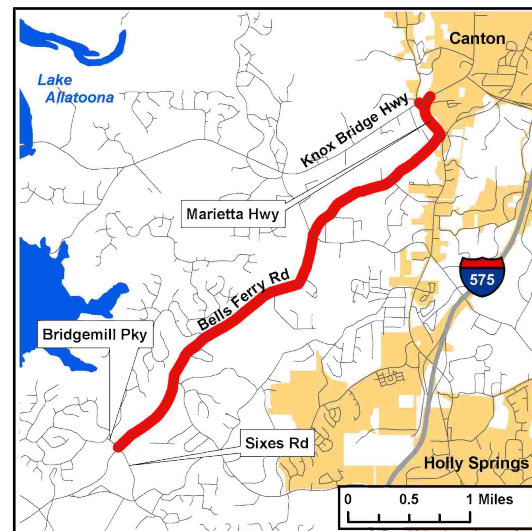
2025 (required if modeled for conformity)

Completion Date

2025

Analysis Level

In the Region's Air Quality Conformity Analysis



Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
PE	FEDAID-2011-2030	LR 2012-2020	\$853,000	\$682,400	\$0,000	\$0,000	\$170,600
ROW	Local Jurisdiction/Municipality Funds	LR 2012-2020	\$4,266,000	\$0,000	\$0,000	\$0,000	\$4,266,000
CST	FEDAID-2011-2030	LR 2021-2030	\$8,531,000	\$6,824,800	\$0,000	\$0,000	\$1,706,200
				\$7,507,200	\$0,000	\$0,000	\$6,142,800

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation



For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.



Short Title

I-575 HOV LANES FROM SR 20 TO SR 5 BUSINESS IN CHEROKEE COUNTY

GDOT Project No.

0007827

Federal ID No.

CSNHS-0007-00(827)

Status

Long Range

Detailed Description and Justification

Addition of 1 HOV lane in both directions for over 2 miles from SR 20 to SR 5 Business. Dedicated HOV-only ramps will be provided but have not been determined at this time. The HOV lanes will be barrier-separated with median breaks in certain locations to allow for ingress and egress from the HOV lanes as well as emergency vehicle access.

Service Type

HOV Lanes

Sponsor

GDOT

Jurisdiction

Cherokee County

Existing Thru Lane

0 (applicable for road projects only)

Planned Thru Lane

2 (applicable for road projects only)

Corridor Length

2.1 miles (not applicable for all project types)

Network Year

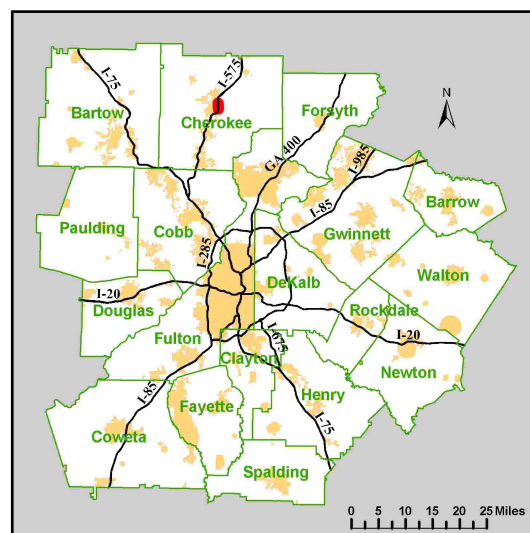
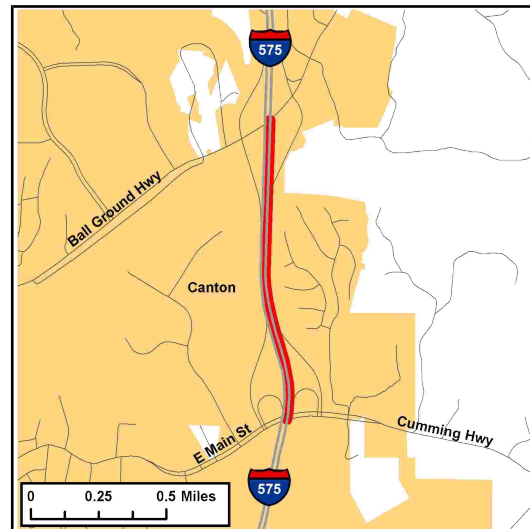
2025 (required if modeled for conformity)

Completion Date

2025

Analysis Level

In the Region's Air Quality Conformity Analysis



Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
CST	FEDAID-2011-2030	LR 2021-2030	\$25,000,000	\$20,000,000	\$5,000,000	\$0,000	\$0,000
				\$20,000,000	\$5,000,000	\$0,000	\$0,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation

For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.

Short Title

I-575 FROM I-75 NORTH TO SR 5 BUSINESS IN CHEROKEE COUNTY

GDOT Project No.

611150-

Federal ID No.

NH-575-1(29)

Status

Long Range

Detailed Description and Justification

None

Service Type

Roadway Capacity

Sponsor

GDOT

Jurisdiction

Multi-County

Existing Thru Lane

4 (applicable for road projects only)

Planned Thru Lane

6 (applicable for road projects only)

Corridor Length

19.84 miles (not applicable for all project types)

Network Year

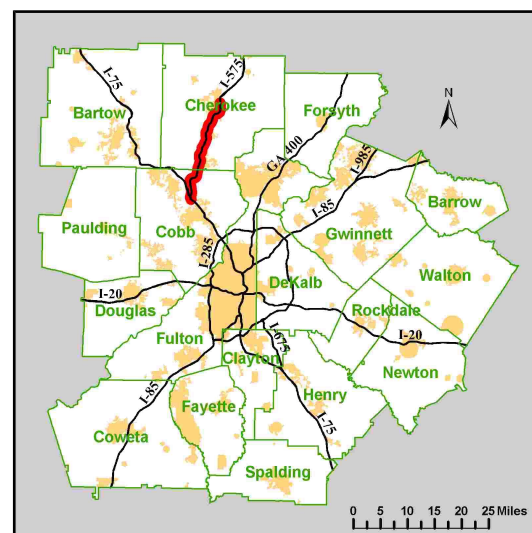
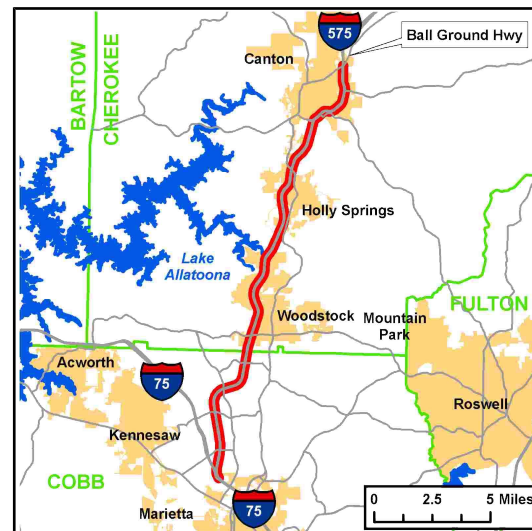
2025 (required if modeled for conformity)

Completion Date

2025

Analysis Level

In the Region's Air Quality Conformity Analysis



Phase Status & Funding Information for 06-11 TIP		FISCAL YEAR	TOTAL PHASE COST	BREAKDOWN OF TOTAL PHASE COST BY FUNDING SOURCE			
				FEDERAL	STATE	BONDS	LOCAL/OTHER
PE	National Highway System	LR 2012-2020	\$2,150,000	\$1,720,000	\$430,000	\$0,000	\$0,000
CST	National Highway System	LR 2021-2030	\$21,500,000	\$17,200,000	\$4,300,000	\$0,000	\$0,000
				\$18,920,000	\$4,730,000	\$0,000	\$0,000

PE: Preliminary Engineering / Design / Study

ROW: Right-of-way Acquisition

CST: Construction / Implementation

For additional information about this project, please visit the Atlanta Regional Commission at www.atlantaregional.com or call (404) 463-3100.

Project ID	0002846	
Project Type	Reconstruction/Rehabilitation	
STIP Code	Lump Sum	
Construction Status Code	Construction Work Program	
Corridor		
Project Manager Office	Planning	
County	Cherokee	
Project Accounting Number	STP-0002-00(846)	
Primary Work Type	Widening	
Description	HICKORY FLAT ROAD IN CANTON (LCI PROJECT)	
RCLink:	0571014000	
	Begin Mile Point	13.1
	Prop Length	3.54
	End Mile Point	16.64
Let Status	UNLET	
Priority Code		

Project ID	0002847		
Project Type	Reconstruction/Rehabilitation		
STIP Code	Lump Sum		
Construction Status Code	Construction Work Program		
Corridor			
Project Manager Office	Planning		
County	Cherokee		
Project Accounting Number	STP-0002-00(847)		
Primary Work Type	Widening		
Description	WALESKA STREET FM MAIN/NORTH ST TO SR 5BU (LCI PROJECT)		
RCLink:	0573068403		
	Begin Mile Point	0.0	
	Prop Length	0.49	
	End Mile Point	0.49	
Let Status	UNLET		
Priority Code			

Project ID	0003681	
Project Type	Reconstruction/Rehabilitation	
STIP Code	No	
Construction Status Code	Long Range Program	
Corridor		
Project Manager Office	District 6	
County	Cherokee	
Project Accounting Number	STP-0003-00(681)	
Primary Work Type	Widening	
Description	SR 20 FROM I-575 TO SR 369	
RCLink:	0571002000	
	Begin Mile Point	12.76
	Prop Length	8.64
	End Mile Point	21.4
Let Status	UNLET	
Priority Code		

Project ID	0003778		
Project Type	Enhancement		
STIP Code	Yes		
Construction Status Code	Construction Work Program		
Corridor			
Project Manager Office	District 6		
County	Cherokee		
Project Accounting Number	CSSTP-0003-00(778)		
Primary Work Type	Lighting		
Description	CS 684/EAST MAIN STREET PEDESTRIAN LIGHTING IN CANTON		
RCLink:	0573068403		
	Begin Mile Point	0.75	
	Prop Length	1.35	
	End Mile Point	2.1	
Let Status	UNLET		
Priority Code			

Project ID	0004495		
Project Type	Enhancement		
STIP Code	Yes		
Construction Status Code	Construction Work Program		
Corridor			
Project Manager Office	District 6		
County	Cherokee		
Project Accounting Number	CM-0004-00(495)		
Primary Work Type	Bicycle/Ped. Facility		
Description	CS 678/MARIETTA RD FM MARIETTA HWY TO EAST MARIETTA STREET		
RCLink:	0573067803		
	Begin Mile Point	0.0	
	Prop Length	1.60	
	End Mile Point	1.6	
Let Status	UNLET		
Priority Code			

Project ID	0006036	
Project Type	Reconstruction/Rehabilitation	
STIP Code	No	
Construction Status Code	Long Range Program	
Corridor		
Project Manager Office	District 6	
County	Cherokee,Bartow	
Project Accounting Number	CSSTP-0006-00(036)	
Primary Work Type	Passing Lanes	
Description	SR 140 FM E VALLEY RD/BARTOW TO GARLAND MTN TRAIL/CHEROKEE	
RCLink:	0571014000	
	Begin Mile Point	0.0
	Prop Length	3.18
	End Mile Point	3.18
RCLink:	0151014000	
	Begin Mile Point	21.91
	Prop Length	0.57
	End Mile Point	22.48
Let Status	UNLET	
Priority Code		

Project ID	0006037		
Project Type	Reconstruction/Rehabilitation		
STIP Code	No		
Construction Status Code	Long Range Program		
Corridor			
Project Manager Office	District 6		
County	Cherokee		
Project Accounting Number	CSSTP-0006-00(037)		
Primary Work Type	Passing Lanes		
Description	SR 140 FM LITTLE REFUGE RD TO SHOAL CREEK		
RCLink:	0571014000		
	Begin Mile Point	4.77	
	Prop Length	1.40	
	End Mile Point	6.17	
Let Status	UNLET		
Priority Code			

Project ID	0006039		
Project Type	Reconstruction/Rehabilitation		
STIP Code	No		
Construction Status Code	Long Range Program		
Corridor			
Project Manager Office	District 6		
County	Cherokee,Cherokee		
Project Accounting Number	CSSTP-0006-00(039)		
Primary Work Type	Widening		
Description	BELLS FERRY RD FM NORTH OF SIXES RD TO SR 20/KNOX HWY		
RCLink:	0572077000		
	Begin Mile Point	8.75	
	Prop Length	3.78	
	End Mile Point	12.53	
RCLink:	0572106100		
	Begin Mile Point	10.31	
	Prop Length	0.32	
	End Mile Point	10.63	
Let Status	UNLET		
Priority Code			

Project ID	0006040	
Project Type	Reconstruction/Rehabilitation	
STIP Code	No	
Construction Status Code	Long Range Program	
Corridor		
Project Manager Office	Consultant Design	
County	Cherokee	
Project Accounting Number	CSSTP-0006-00(040)	
Primary Work Type	Widening	
Description	SR 140/HICKORY FLAT RD FM CR 311/E CHEROKEE DR TO I-575	
RCLink:	0571014000	
	Begin Mile Point	16.19
	Prop Length	8.93
	End Mile Point	25.12
Let Status	UNLET	
Priority Code		

Project ID	0006042		
Project Type	New Construction		
STIP Code	No		
Construction Status Code	Long Range Program		
Corridor			
Project Manager Office	District 6		
County	Cherokee		
Project Accounting Number	CSSTP-0006-00(042)		
Primary Work Type	Roadway Project		
Description	HICKORY FLAT ROAD EXT FM MARIETTA TO WALESKA ST		
RCLink:	0571014000		
	Begin Mile Point	0.0	
	Prop Length	2.00	
	End Mile Point	2.0	
Let Status	UNLET		
Priority Code			

Project ID	0006719		
Project Type	Reconstruction/Rehabilitation		
STIP Code	Yes		
Construction Status Code	Construction Work Program		
Corridor			
Project Manager Office	District 6		
County	Cherokee		
Project Accounting Number	CSSTP-0006-00(719)		
Primary Work Type	Intersection Improvement		
Description	CS 678/MARIETTA ROAD @ CS 681/HICKORY FLAT ROAD		
RCLink:	0573067803		
	Begin Mile Point	0.99	
	Prop Length	0.40	
	End Mile Point	1.39	
Let Status	UNLET		
Priority Code			

Project ID	0006791		
Project Type	Safety		
STIP Code	Yes		
Construction Status Code	Construction Work Program		
Corridor			
Project Manager Office	Traffic Safety & Design		
County	Cherokee		
Project Accounting Number	CSCMQ-0006-00(791)		
Primary Work Type	Signals		
Description	SR 5BU FROM SR 140/WALESKA TO CS 785/RIVERSTONE BLVD		
RCLink:	05710005BU		
	Begin Mile Point	2.31	
	Prop Length	1.34	
	End Mile Point	3.65	
Let Status	UNLET		
Priority Code			

Project ID	0007836	
Project Type	Reconstruction/Rehabilitation	
STIP Code	No	
Construction Status Code	Long Range Program	
Corridor		
Project Manager Office	District 6	
County	Cherokee,Bartow	
Project Accounting Number	CSSTP-0007-00(836)	
Primary Work Type	Widening	
Description	SR 20 FROM I-75/BARTOW TO I-575/CHEROKEE	
RCLink:	0571002000	
	Begin Mile Point	0.0
	Prop Length	12.68
	End Mile Point	12.68
RCLink:	0151002000	
	Begin Mile Point	17.34
	Prop Length	6.73
	End Mile Point	24.07
Let Status	UNLET	
Priority Code		

Project ID	630942-		
Project Type	Reconstruction/Rehabilitation		
STIP Code	No		
Construction Status Code	Long Range Program		
Corridor			
Project Manager Office	Road Design		
County	Cherokee		
Project Accounting Number	STP-0828(19)		
Primary Work Type	Widening		
Description	SR 140 FM SR 5BU IN CANTON TO CR 766/LOWER BURRIS RD		
RCLink:	0571014000		
	Begin Mile Point	10.47	
	Prop Length	3.41	
	End Mile Point	13.88	
Let Status	UNLET		
Priority Code			

Project ID	632790-	
Project Type	Safety	
STIP Code	Yes	
Construction Status Code	Construction Work Program	
Corridor		
Project Manager Office	District 6	
County	Cherokee	
Project Accounting Number	STP-012-1(107)	
Primary Work Type	Passing Lanes	
Description	SR 20 FM I-575 TO CR 238 - 3 TRUCK CLIMBING LANES & INT IMP	
RCLink:	0571002000	
	Begin Mile Point	13.0
	Prop Length	7.44
	End Mile Point	20.44
Let Status	UNLET	
Priority Code		

Project ID	632900-		
Project Type	Replacement		
STIP Code	Yes		
Construction Status Code	Construction Work Program		
Corridor			
Project Manager Office	Bridge Design		
County	Cherokee		
Project Accounting Number	BRST-012-1(111)		
Primary Work Type	Bridges		
Description	SR 20 @ ETOWAH RIVER 4.5 MI WEST OF CANTON		
RCLink:	0571002000		
	Begin Mile Point	5.69	
	Prop Length	0.40	
	End Mile Point	6.089	
Let Status	UNLET		
Priority Code			

Project ID	641900-		
Project Type	Reconstruction/Rehabilitation		
STIP Code	No		
Construction Status Code	Long Range Program		
Corridor			
Project Manager Office	District 6		
County	Cherokee		
Project Accounting Number	STP-0828(21)		
Primary Work Type	Widening		
Description	SR 140 FM CR 766-MP 10.75 TO CR 52-MP 7.86		
RCLink:	0571014000		
	Begin Mile Point	7.86	
	Prop Length	2.89	
	End Mile Point	10.75	
Let Status	UNLET		
Priority Code			

Project ID	662650-		
Project Type	Safety		
STIP Code	Lump Sum		
Construction Status Code	Construction Work Program		
Corridor			
Project Manager Office	District 6		
County	Cherokee		
Project Accounting Number	STP-012-1(112)		
Primary Work Type	Intersection Improvement		
Description	SR 20 @ SR 108; CR 17/WHITE RD & CR 13/MT CARMEL LANE		
RCLink:	0571002000		
	Begin Mile Point	1.8	
	Prop Length	0.58	
	End Mile Point	2.38	
Let Status	UNLET		
Priority Code			

City of Canton Transit System

[City of Canton](#)

Transit System



[Información en Español](#) / [City of Canton Trolley](#)

[Government](#)

The City of Canton Transit System

[Business & Tourism](#)

One of the many things that make the City of Canton unique is that it offers a free bus system. This system began in 1998 with 2 used busses that the city purchased. It has grown into a system of 4 busses and a monthly ridership of over 3,500 passengers.

[Community & Culture](#)
[Churches](#)
[Libraries](#)
[Heritage & History](#)
[Education](#)
[Health Care](#)
[Parks](#)
[Public Resources](#)
[Newsletter On-Line](#)
[Transit System](#)
[Online Bill Pay](#)
[Review Status](#)
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Transit Information

City of Canton

Transit System

2525 Ridge Road

Canton , Georgia 30114

Phone: (678)-493-4560

Transit Guidelines and Schedules

The City of Canton Transit System is a fixed route bus system with bus stops throughout the Canton city limits. Bus stops are located near the local shopping, medical, educational and recreational facilities and are easily accessible to all residents.

There is no cost to ride the bus at any time.

The bus routes operate Monday thru Friday from 9:00 am until 5:00 pm and Saturdays from 9:00 am until 4:00 pm.

The transit system is closed for the following holidays:

New Years Day
 Martin Luther King Day
 Memorial Day
 July 4th
 Labor Day
 Veterans Day
 Thanksgiving Day
 Day after Thanksgiving Day
 Christmas Eve
 Christmas Day

Due to traffic or weather the bus may run a few minutes early or late. Please allow for this when using the transit system

The following guidelines have been established to ensure all passengers have a safe and convenient ride. Please follow these guidelines as you use the transit busses.

- Passengers under 16 years of age must be accompanied by an adult.
- Handicapped passengers that need the wheelchair lift should notify office when they would like to use the transit buses. This is to ensure a wheelchair lift is on the bus they will be riding.
- Passengers are not allowed to eat or drink on the busses.
- The use of tobacco products is not allowed on the busses.
- Carry on items must be limited to small sizes that can be carried onto the bus by the passenger in one trip.
- All items must be kept secured and out of the bus aisles.
- No vandalism of bus property. Please report all incidents of vandalism to the transit office.
- All passengers must be seated, and remain seated, while the bus is in motion.
- No pets except for handicapped assistance allowed on the busses.
- For the convenience of all passengers please use good hygiene prior to riding the bus. Problems will be handled properly to ensure that all transitpassengers have a pleasant ride.

City of Canton Trolley Schedule City of Canton Trolley Leasing

Route One	Route Two
North Canton	South Canton
City Hall	City Hall
9:00, 10:00, 11:00, 12:00, 1:00, 2:00, 3:00, 4:00	9:00, 10:00, 11:00, 12:00, 1:00, 2:00, 3:00, 4:00
East Marietta & Main Street	Must Ministries
9:11, 10:11, 11:11, 12:11, 1:11, 2:11, 3:11, 4:11	9:10, 10:10, 11:10, 12:10, 1:10, 2:10, 3:10, 4:10
North Cherokee Apartments on North Street	Lower Dr. John T. Petit
9:12, 10:12, 11:12, 12:12, 1:12, 2:12, 3:12, 4:12	9:1, 10:11, 11:11, 12:11, 1:11, 2:11, 3:11, 4:11
North Street (at courthouse benches)	Hearthstone Landing Apartments
9:13, 10:13, 11:13, 12:13, 1:13, 2:13, 3:13, 4:13	9:12, 10:12, 11:12, 12:12, 1:12, 2:12, 3:12, 4:12

**G. Cecil Pruett Community
Center YMCA**

9:14, 10:14, 11:14, 12:14,
1:14, 2:14, 3:14, 4:14

Ingles

9:16, 10:16, 11:16, 12:16,
1:16, 2:16, 3:16, 4:16

**Juniper Street & Canton
Mill Loft Apartments**

9:17, 10:17, 11:17, 12:17,
1:17, 2:17, 3:17, 4:17

**Lakeview Drive & Birch
Street**

(Lower end of Lakeview
Drive)

9:18, 10:18, 11:18, 12:18,
1:18, 2:18, 3:18, 4:18

**Brookside Court
Apartments (On Lakeview
Drive)**

9:20, 10:20, 11:20, 12:20,
1:20, 2:20, 3:20, 4:20

Lakeview Apartments

9:21, 10:21, 11:21, 12:21,
1:21, 2:21, 3:21, 4:21

Hickory Knoll Apartments

9:24, 10:24, 11:24, 12:24,
1:24, 2:24, 3:24, 4:24

Oakside Apartments

9:25, 10:25, 11:25, 12:25,
1:25, 2:25, 3:25, 4:25

**Oakside Road &
Mashburn Road**

9:26, 10:26, 11:26, 12:26,
1:26, 2:26, 3:26, 4:26

Brian Center

9:13, 10:13, 11:13, 12:13,
1:13, 2:13, 3:13, 4:13

Upper Dr. John T. Pettit

9:14, 10:14, 11:14, 12:14,
1:14, 2:14, 3:14, 4:14

Shipp Street

9:15, 10:15, 11:15, 12:15,
1:15, 2:15, 3:15, 4:15

Crisler Street

9:16, 10:16, 11:16, 12:16,
1:16, 2:16, 3:16, 4:16

Jefferson Circle

9:17, 10:17, 11:17, 12:17,
1:17, 2:17, 3:17, 4:17

**Main Street & Muriel
Street**

9:18, 10:18, 11:18, 12:18,
1:18, 2:18, 3:18, 4:18

**Library and Hasty
Elementary**

9:21, 10:21, 11:21, 12:21,
1:21, 2:21, 3:21, 4:21

**Department of Family and
Children Services**

9:22, 10:22, 11:22, 12:22,
1:22, 2:22, 3:22, 4:22

Georgia Highlands

9:23, 10:23, 11:23, 12:23,
1:23, 2:23, 3:23, 4:23

Child Support Enforcement

9:24, 10:24, 11:24, 12:24,
1:24, 2:24, 3:24, 4:24

Northside Hospital	Walmart
9:28, 10:28, 11:28, 12:28, 1:28, 2:28, 3:28, 4:28	9:28, 10:28, 11:28, 12:28, 1:28, 2:28, 3:28, 4:28
Hospital Road & Mashburn Road	Blue Ridge Hills Apartments
9:30, 10:30, 11:30, 12:30, 1:30, 2:30, 3:30, 4:30	9:31, 10:31, 11:31, 12:31, 1:31, 2:31, 3:31, 4:31
Hospital Road & Highway 140	Juniper Street
9:31, 10:31, 11:31, 12:31, 1:31, 2:31, 3:31, 4:31	(across from Canton Mill Loft Apartments) 9:32, 10:32, 11:32, 12:32, 1:32, 2:32, 3:32, 4:32
Highway 140 & Reinhardt College Parkway	Pizza Hut
9:32, 10:32, 11:32, 12:32, 1:32, 2:32, 3:32, 4:32	9:33, 10:33, 11:33, 12:33, 1:33, 2:33, 3:33, 4:33
River Ridge Apartments & Heritage Apartments	Cherokee High School
9:33, 10:33, 11:33, 12:33, 1:33, 2:33, 3:33, 4:33	9:34, 10:34, 11:34, 12:34, 1:34, 2:34, 3:34, 4:34
Cherokee Pediatrics & Cherokee Women's	Kmart
9:34, 10:34, 11:34, 12:34, 1:34, 2:34, 3:34, 4:34	9:35, 10:35, 11:35, 12:35, 1:35, 2:35, 3:35, 4:35
Goody's, Belk	Colonial Village
9:36, 10:36, 11:36, 12:36, 1:36, 2:36, 3:36, 4:36	9:37, 10:37, 11:37, 12:37, 1:37, 2:37, 3:37, 4:37
Publix	Ridge Road & Highway 5
9:36, 10:36, 11:36, 12:36, 1:36, 2:36, 3:36, 4:36	9:39, 10:39, 11:39, 12:39, 1:39, 2:39, 3:39, 4:39
Walmart	Prominence Point Shopping
9:38, 10:38, 11:38, 12:38, 1:38, 2:38, 3:38, 4:38	9:41, 10:41, 11:41, 12:41, 1:41, 2:41, 3:41, 4:41
Walden Crossing Apartments	Kroger
	9:43, 10:43, 11:43, 12:43, 1:43, 2:43, 3:43, 4:43

9:49, 10:49, 11:49, 12:49,
1:49, 2:49, 3:49, 4:39

**Cherokee Overlook
Subdivision**

9:51, 10:51, 11:51, 12:51,
1:51, 2:51, 3:51, 4:51

Hillcrest Subdivision

9:53, 10:53, 11:53, 12:53,
1:53, 2:53, 3:53, 4:53

**Laurels at Greenwood
Apartments**

9:54, 10:54, 11:54, 12:54,
1:54, 2:54, 3:54, 4:54

McFarlands Grocery

9:58, 10:58, 11:58, 12:58,
1:58, 2:58, 3:58, 4:58

Lower Dr. John T. Petit

9:58, 10:58, 11:58, 12:58,
1:58, 2:58, 3:58, 4:58

Pilgrims Pride

9:46, 10:46, 11:46, 12:46,
1:46, 2:46, 3:46, 4:46

Health Department

9:47, 10:47, 11:47, 12:47,
1:47, 2:47, 3:47, 4:47

Dairy Queen

9:53, 10:53, 11:53, 12:53,
1:53, 2:53, 3:53, 4:53

**Coppermine Manor
Subdivision**

9:55, 10:55, 11:55, 12:55,
1:55, 2:55, 3:55, 4:55

**Marietta Road & Edwards
Street**

9:57, 10:57, 11:57, 12:57,
1:57, 2:57, 3:57, 4:57

Lower Dr. John T. Pettit

9:58, 10:58, 11:58, 12:58,
1:58, 2:58, 3:58, 4:58

Free Ride!

Correspondence

Brannon Sabbarese

From: Gena Wilder [GWilder@GRTA.org]
Sent: Tuesday, October 10, 2006 11:25 AM
To: 'Brannon Sabbarese'
Cc: 'Abdul K. Amer'
Subject: RE: GRTA Letter of Understanding for DRI 1212 - Canton West

Brannon,

Yes, please study the driveways you proposed and ignore "all other site driveway." If driveway locations/median breaks are finalized before the completion of your study go ahead and include them. ARC (and GRTA) have been pretty stern on access management lately so they may want to see more details on the Parkway before issuing any decisions. However, if it's still in flux do not include it at this point.

Gena

From: Brannon Sabbarese [mailto:bsabbarese@areng.com]
Sent: Monday, October 09, 2006 8:18 AM
To: 'Gena Wilder'
Cc: 'Abdul K. Amer'
Subject: RE: GRTA Letter of Understanding for DRI 1212 - Canton West

Gena,

What exactly do you mean by "All other site driveways." We spoke about the proposed parkway and I thought it was agreed to study only the Town Center Main Access median break, where the proposed parkway intersects SR 108 and SR 5 and where the north site driveway intersects SR 108. The other median breaks along the proposed parkway are still in flux and since the project will be going through GDOT, I don't think it will be necessary to study any other intersections. That being said I wanted to find out what you meant by all other site driveways.

Thanks,

Brannon M. Sabbarese, EIT
 Project Manager
 A&R Engineering, Inc.
 2160 Kingston Court, Suite O
 Marietta, GA 30067
 Tel:(770) 690-9255
 Fax:(770) 690-9210
www.areng.com.

From: Gena Wilder [mailto:GWilder@GRTA.org]
Sent: Friday, October 06, 2006 5:00 PM
To: Abdul Amer (aamer@areng.com); Bill Schmid (weschmid@rochester-assoc.com); Brannon Sabbarese (bsabbarese@areng.com); Brett Buchanan (bbuchanan@cherokeega.com); Darion Dunn (ddunn@croymse.com); Don Hicks (dhicks@croymse.com); Jeff Watkins (jwatkins@cherokeega.com); Marie Garrett (marielg@bellsouth.net); Parker Ellen (Parker.Ellen@kimley-horn.com); Russ Sims (russ.sims@cherokee.k12.ga.us); Todd Hager (toddhager@pecdevelopment.net); Annaka Woodruff (awoodruff@dca.state.ga.us); Ben Buchan (ben.buchan@dot.state.ga.us); Benecia Dennard; Brian Borden; Darby Mori; Debbie Miness (dminess@dca.state.ga.us); DRI; Gena Wilder; Hal Wilson (hal.wilson@dot.state.ga.us); Kirk Fjelstul; Laura Beall; Robin Cailoux; Scott Pendergrast (spendergrast@itsmarta.com); Shaun Green; Steve Walker

(steven.walker@dot.state.ga.us); Zhuan Loo; Jean Hee Park (jpark@atlantaregional.com); Kris Morley-Nikfar (kmorley-nikfar@atlantaregional.com); M. Haley Fleming (hfleming@atlantaregional.com); Mike Alexander (MAlexander@atlantaregional.com); Susie Dunn (sdunn@atlantaregional.com); Alania Stewart (alania.stewart@dot.state.ga.us); Alex Laffey (alex.laffey@dot.state.ga.us); Harry Graham (Harry.Graham@dot.state.ga.us); Patrick Allen (patrick.allen@dot.state.ga.us)

Subject: GRTA Letter of Understanding for DRI 1212 - Canton West

Please see the attached for the GRTA Letter of Understanding for DRI 1212 - Canton West.

Thanks,
Gena Wilder
GRTA
404-463-2431

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Version: 7.5.432 / Virus Database: 268.16.3/614 - Release Date: 1/2/2007 2:58 PM

Brannon Sabbarese

From: Gena Wilder [GWilder@GRTA.org]
Sent: Friday, October 20, 2006 2:31 PM
To: 'Brannon Sabbarese'; Gena Wilder
Cc: Shaun Green; Abdul Amer
Subject: RE: Canton West DRI Mixed-Use Reduction Justification

After discussion
 Use 35% - retail
 25% - office

From: Brannon Sabbarese [mailto:bsabbarese@areng.com]
Sent: Thursday, October 19, 2006 8:52 AM
To: 'Gena Wilder'
Cc: 'Shaun Green'; Abdul Amer
Subject: Canton West DRI Mixed-Use Reduction Justification

Gena,

Attached is a map for your reference. I overlaid the location map from my study on a census tract map. The census tract boundaries and census tract numbers can be seen on the map. The map shows several things. The small dots are the grocery stores located in the vicinity of the site. Almost all other major retail in the area is located on Riverstone Blvd (near the 3 dots just outside the circle to the east). The circle is approximately 7 miles in diameter and shows the estimated area of influence for our retail uses. The numbers with the numbers in parenthesis are census tract numbers with the population shown in parenthesis. The boxed numbers are the estimated population that would possibly use the retail in our site. The boxed numbers total 5,000. The 8,700 that is boxed and shown within the boundaries of our site is the approximate population of our site (4,369 units x 2 people per residence ~ 8,700 people). Within this 7 mile diameter you will have 8,700 people from our site and roughly 5,000 from other communities that would utilize our retail uses. The largest proposed retail use will be a grocery store and Marie Garrett confirmed that the building size for any one tenant would be limited. Since our site will have the overwhelming majority of the population (63.5%) within the area of influence for our retail uses, I think a 50% reduction in the retail trips is appropriate.

The 25% proposed office reduction is due to the fact that this office will not be large in nature. A large majority of the office will likely be service type office (insurance, small businesses, etc.) that will draw employees from a more local area. Also, Bluffs Parkway, which proposes larger type office and commercial uses, is located just east of the site. That area will be more larger type offices uses, unlike within Canton West. Therefore, I think a 25% reduction in the office trips is appropriate.

Please let me know as soon as possible your comments. We are aiming to submit the study by mid-November so we can get the NOD by the end of the year.

Thank you,

Brannon M. Sabbarese, EIT
 Project Manager
 A&R Engineering, Inc.

2160 Kingston Court, Suite O
Marietta, GA 30067
Tel:(770) 690-9255
Fax:(770) 690-9210
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Proposed Facility Site Plan