

PARKWAY 400
Development of Regional Impact # 1307

ALPHARETTA, GA

TRAFFIC IMPACT STUDY

Prepared for:

Greenstone Properties
3330 Cumberland Boulevard
Suite 475
Atlanta, Georgia 30339

Prepared by:



A&R Engineering Inc.

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February 16, 2007
A&R Project No: 07-004

EXECUTIVE SUMMARY

The purpose of this study is to determine the traffic impact that will result from the proposed Parkway 400 development located to the southeast of Old Milton Parkway and Westside Parkway in the city limits of Alpharetta, Georgia. The development is proposed to consist of 630,000 s.f. of office space and a 10,000 s.f. restaurant. The traffic analysis includes the evaluation of the following scenarios: existing conditions, the year 2010 without additional traffic generated by the site, and the year 2010 with the traffic generated by the development. The future traffic conditions were evaluated in two scenarios. Scenario 1 assumes that Amberpark Drive will be the only full access point on Old Milton Parkway for the development and Northwinds Parkway will not be extended from Kimball Bridge Road to Old Milton Parkway. Scenario 2 assumes that Northwinds Parkway will be extended from Kimball Bridge Road to Old Milton Parkway. When Northwinds Parkway is extended to Old Milton Parkway it will align with Alpha Court and will create a second full access point on Old Milton Parkway for the Parkway 400 development. For the purpose of this analysis, the traffic that will be generated by the Prospect Park and the Offices at Prospect Park developments were also included in the analysis. These developments are proposed across Old Milton Parkway from the Parkway 400 site.

From the existing conditions analysis it was found that all study intersections within the study area are operating at the required LOS standard of D. Analysis of the Base Year 2010 revealed five study intersections will not be at the LOS standard if no roadway improvements are implemented. Improvements were recommended to restore these intersections back to the LOS standard.

The Future 2010 traffic including the site-generated traffic was then evaluated using existing lane geometry for the two scenarios. Six study network intersections in Scenario 1 and five study intersections Scenario 2 will not meet the required LOS standard after the project is completed if no roadway improvements are implemented. 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 for the two scenarios.

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1. PROJECT DESCRIPTION

The purpose of this study is to determine the traffic impact that will result from the proposed Parkway 400 development located to the southeast of Old Milton Parkway and Westside Parkway in the city limits of Alpharetta, Georgia. The development is proposed to consist of 630,000 s.f. of office space and a 10,000 s.f. restaurant. A location map for the site is shown in Figure 1.

1.1 Site Plan

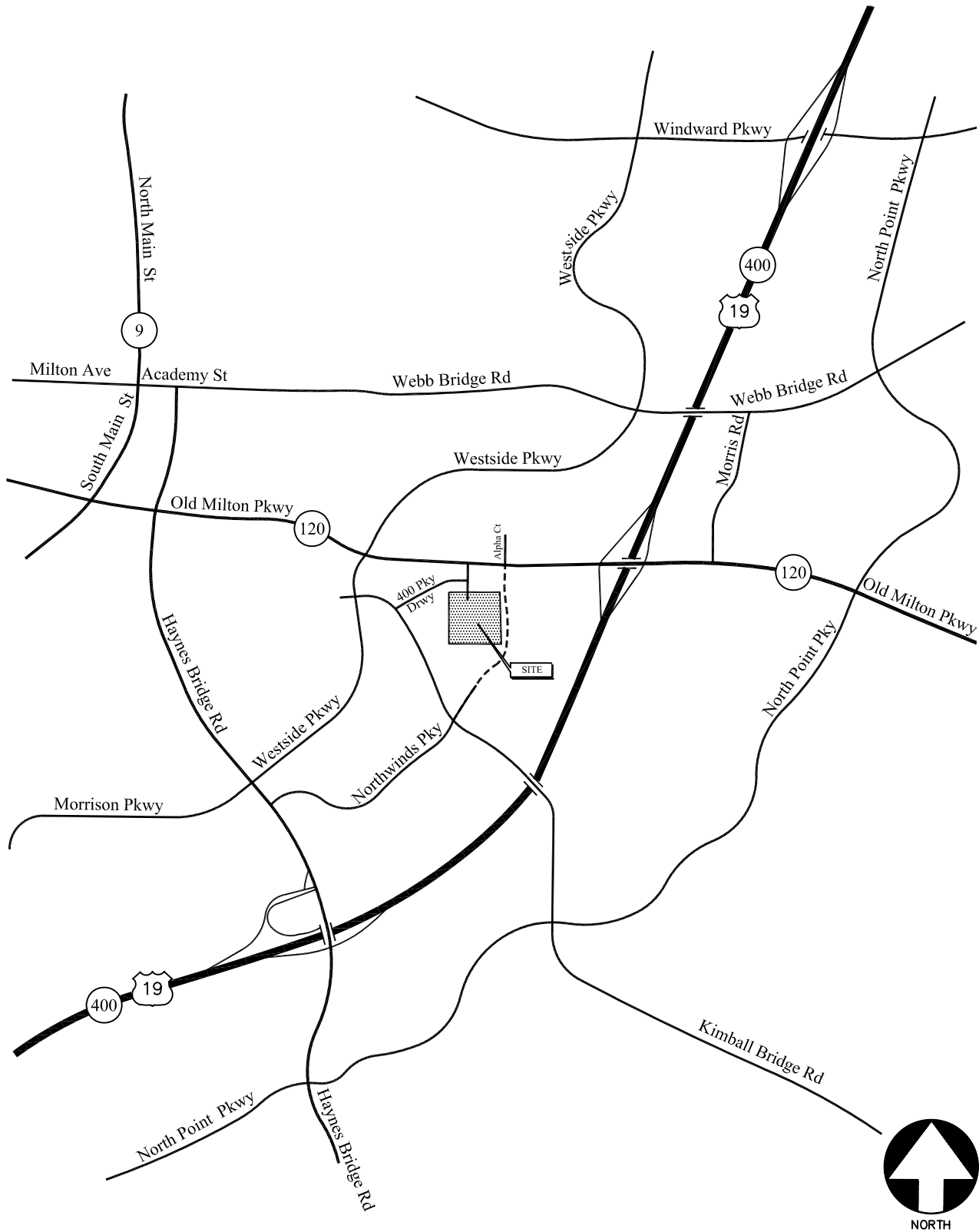
Two site plans were developed for the project. The Scenario 1 site plan, shown in Figure 2, illustrates the site layout assuming Northwinds Parkway will not be extended from Kimball Bridge Road to Old Milton Parkway. Under this scenario, Amberpark Drive will provide access to the site. The Scenario 2 site plan, shown in Figure 3, illustrates the site layout assuming Northwinds Parkway will be extended from Kimball Bridge Road to Old Milton Parkway. Under this scenario, the site will have access to both Amberpark Drive and Northwinds Parkway extension. A larger size drawing and a digital copy of both site plans are also provided with this report.

1.2 Consistency with Adopted Comprehensive Plan

The proposed site is consistent with the City of Alpharetta's future land use map, which designates the site for office uses. The project will require a master plan amendment to accommodate the proposed office density and restaurant use.

1.3 Project Phasing

The project's impact will be evaluated in one phase, estimated for completion in the year 2010. This study includes the evaluation of traffic operations in the vicinity of the site for existing conditions (year 2007), the year 2010 without additional traffic generated by the site and the year 2010 with the additional traffic generated by the development. The future traffic conditions were evaluated in two scenarios. Scenario 1 assumes that Amberpark Drive will be the only full access point on Old Milton Parkway for the development and Northwinds Parkway will not be extended from Kimball Bridge Road to Old Milton Parkway. Scenario 2 assumes that Northwinds Parkway will be extended from Kimball Bridge Road to Old Milton Parkway. When Northwinds Parkway is extended to Old Milton Parkway it will align with Alpha Court and will create a second full access point on Old Milton Parkway for the Parkway 400 development. For the purpose of this analysis, the traffic that will be generated by the Prospect Park and the Offices at Prospect Park developments were also included in the analysis.

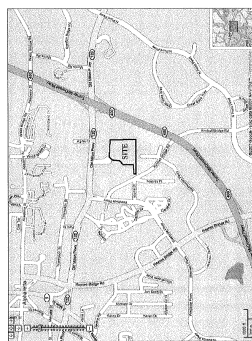


LOCATION MAP

FIGURE 1
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DATA

TOTAL ACREAGE:	11.55 ACRES: 781,402 SF ²
LOCATION:	LAND LOT 204 1ST DISTRICT 204 SECTION CITY OF ALPHARETTA FULTON COUNTY, GEORGIA
EXISTING ZONING:	O41 CONDITIONAL
PROPOSED USE:	OFFICE DEVELOPMENT
TOTAL SQUARE FEET:	630,000 SF (18 STORY MAXIMUM)
SITE DENSITY FLOOR AREA RATIO (FAR):	20 FAR
OPEN SPACE:	11.3 ACRES (40%)
REQUIRED PARKING:	119 SPACE/ 200 FT ² (9.50 SPACES)
PROPOSED PARKING:	126 SPACE/ 200 FT ² (9.346 SPACES)



NOTES:

2. BASE INFORMATION BASED UPON BOUNDARY SURVEY FOR ASSOCIATED ENGINEERING CONSULTANTS, INC. BY SURVEY SERVICES, DATED 04-22-99, REVISED 11-01-99. THERE ARE NO JURISDICTIONAL WATERS LOCATED ON THIS SITE.



00 0474-40 CERTA C. de 0001/1997 de 01.01.97



**ENVIRONMENTAL ENGINEERING • LANDSCAPE ARCHITECTURE
PLANNING • ENVIRONMENTAL DIGITIZATION**

February 15, 2007

Parkway 400

GREENSTONE PROPERTIES

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Insert Site Plan 2 Figure # 3

2. TRIP GENERATION

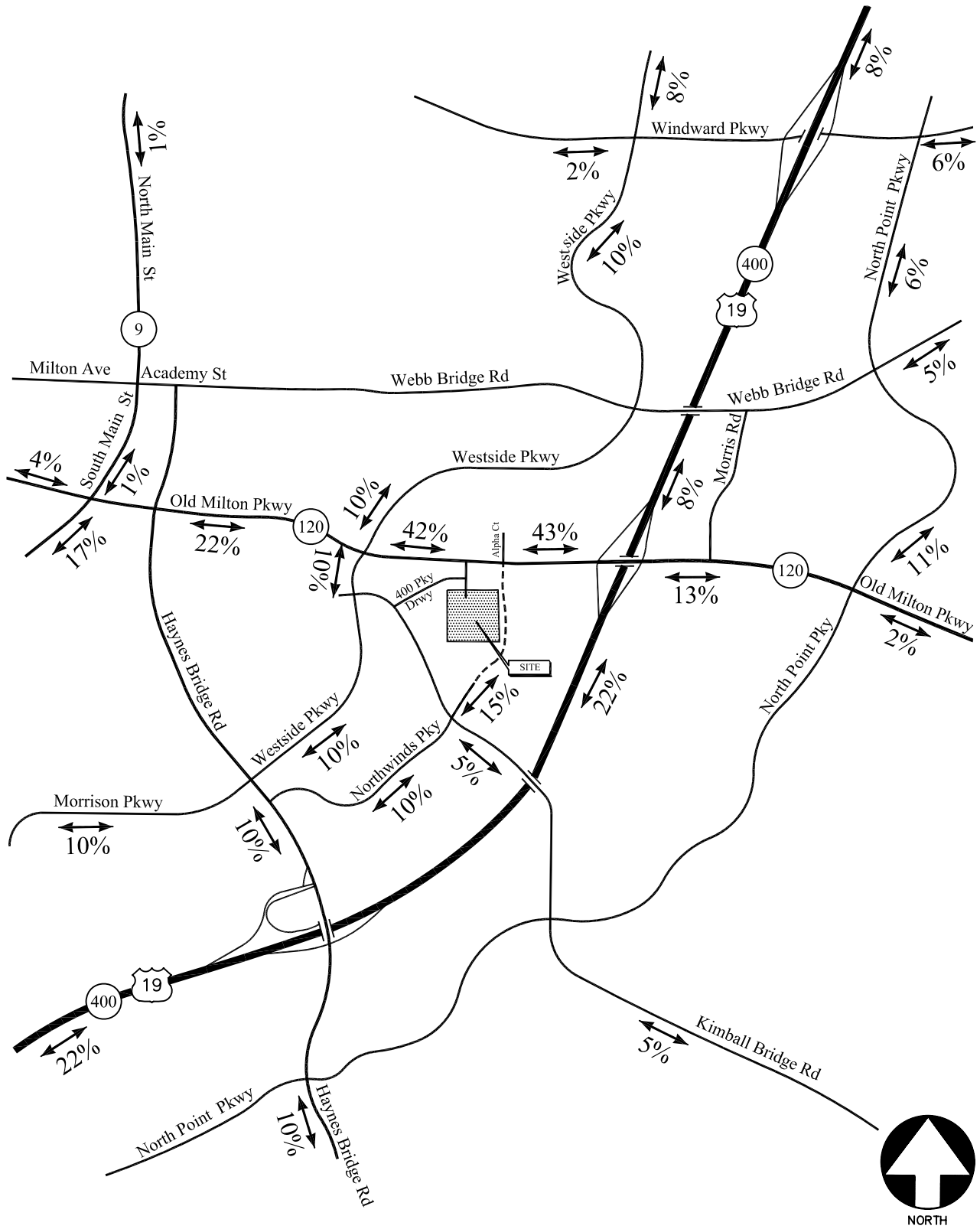
Trip generation estimates for the project were based on the rates and equations published in the 7th edition of the Institute of Transportation Engineers (ITE) Trip Generation report. The ITE Trip Generation report contains traffic volume count data collected at similar facilities nationwide. The proposed development will consist of 630,000 s.f. office space and 10,000 s.f. restaurant. Trip generation calculations for the Parkway 400 development are shown in Table 1.

TABLE 1 TRIP GENERATION								
Land Use	Total Size	A.M. Peak Hour			P.M. Peak Hour			24-Hour
		Enter	Exit	Totals	Enter	Exit	Totals	2-way
710 – General Office	630,000 s.f.	720	98	818	133	651	784	5,504
931 - Quality Restaurant	10,000 s.f.	4	4	8	50	25	75	900
Totals:		724	102	826	183	676	859	6,404

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. The distribution was based on the location of major roadways, highways, employment centers and residential concentrations in the vicinity of the site. The distributions were discussed and agreed upon in the methodology meeting. The trip distribution is shown in Figure 4.

The site-generated volumes were then distributed to the surrounding roadway network based on the driver's destination, and the most easily accessible route.



TRIP DISTRIBUTION

FIGURE 4
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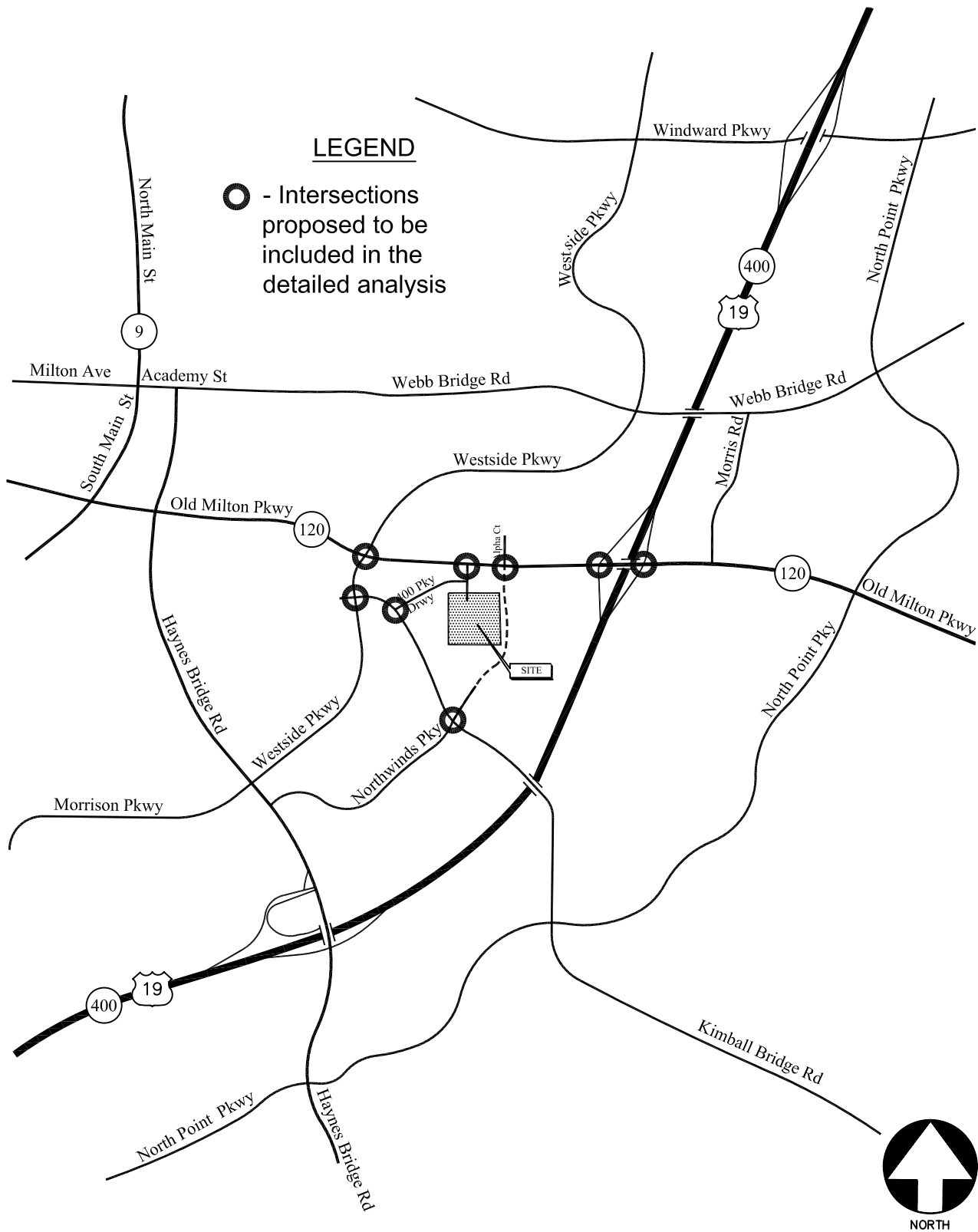
4. STUDY NETWORK DETERMINATION

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. The following intersections fell within the 7% rule and have been included in the traffic study:

1. Old Milton Parkway at GA 400 Northbound Ramp
2. Old Milton Parkway at GA 400 Southbound Ramp
3. Old Milton Parkway at Alpha Court
4. Old Milton parkway at Amberpark Drive
5. Old Milton Parkway at Westside Parkway
6. Kimball Bridge Road at Northwinds Parkway / Bailey Johnson Road
7. Kimball Bridge Road at Parkway 400 Driveway
8. Westside Parkway at Kimball Bridge 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, the site driveways along Northwinds Parkway extension have been included in the analysis during the A.M. peak hour and P.M. peak hour as agreed upon in the methodology meeting.



PROPOSED STUDY INTERSECTIONS

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). These improvements are within the vicinity of the proposed development. Additional improvements for Fulton County are planned; however, they are not relevant to this project. Details of the planned programs can be found in the Appendix.

- AR-H-400: SR 400 from I-285 to McFarland Road
 - Includes the addition of HOV lanes on SR 400.
- FN-AR-189: SR 400 at SR 120 (Old Milton Parkway)
 - Includes the improvement of the interchange of SR 400 and SR 120 (Old Milton Parkway).
- FN-224: Westside Parkway from SR 120 (Old Milton Parkway) to south of Cumming Street
 - Includes new roadway provides gap closer along the Westside Parkway corridor and provide a local alternative to SR 400 for short trips in the immediate area.

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

GA 400

GA 400 is a four lane north-south divided roadway to the east of the proposed development.

Old Milton Parkway (State Route 120)

Old Milton Parkway is an east-west six-lane divided roadway with a posted speed limit of 45 mph in the vicinity of the site. It extends between Kimball Bridge Road / State Bridge Road in the east and Maddox Street in the west.

Kimball Bridge Road

Kimball Bridge Road is a north-south two-lane undivided roadway with a posted speed limit of 30 mph in the vicinity of the site. It extends between Jones Bridge Road / Abbotts Bridge Road in the west and Old Milton Parkway in the east.

Westside Parkway

Westside Parkway is a north-south two-lane undivided roadway with a posted speed limit of 30 mph in the vicinity of the site. It extends between Haynes Bridge Road in the south and Webb Bridge Road in the north.

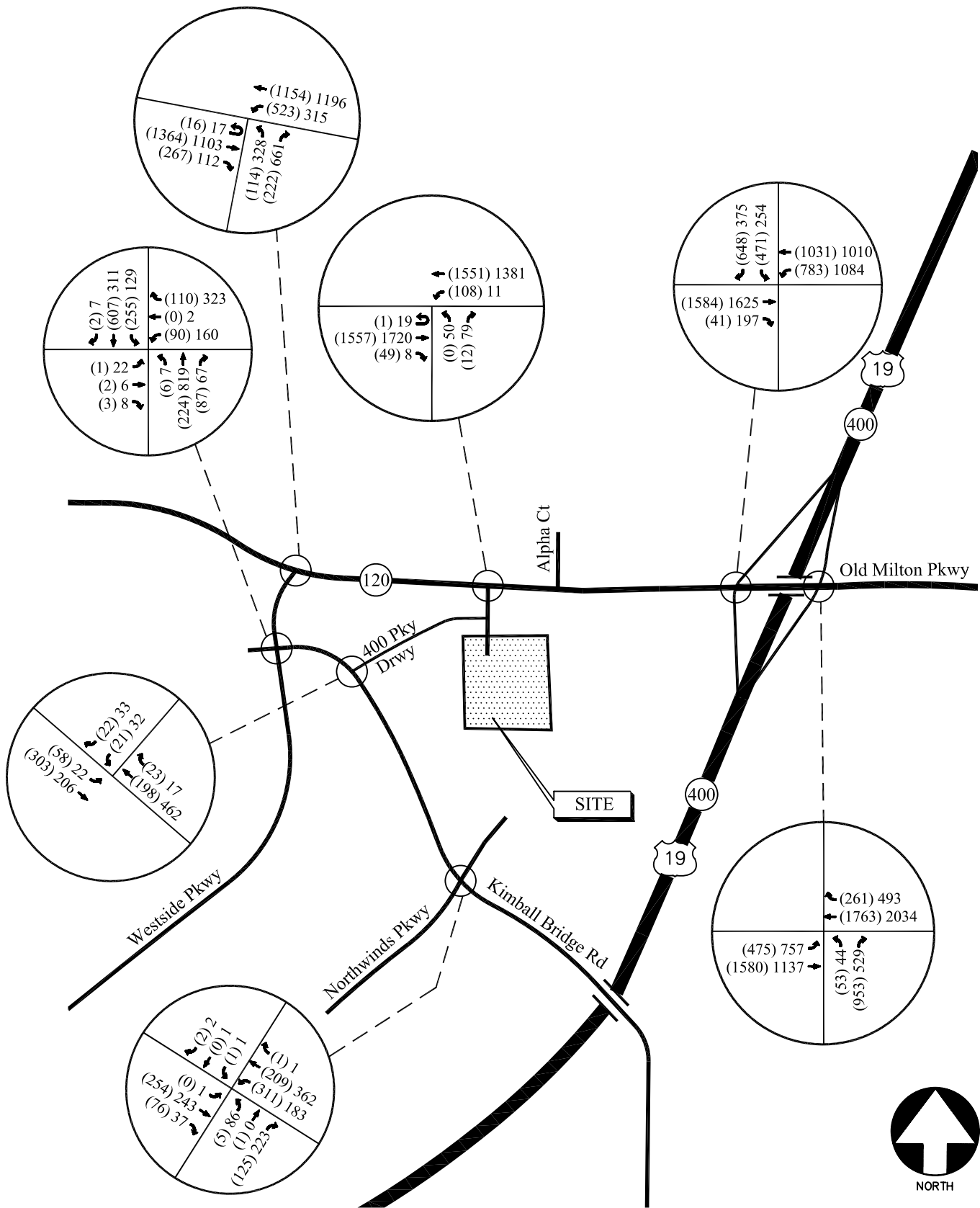
Northwinds Parkway

Northwinds Parkway is a two-lane roadway with a posted speed limit of 35 mph. It extends between Kimball Bridge Road and Lakeview Parkway.

6.2 Analysis Summary

Existing traffic counts were collected at the intersections listed in Section 4 - Study Area Network. In addition to traffic counts, intersection geometry data was also obtained. 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. 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. and P.M. peak hour traffic volumes for the intersections counted. The existing traffic volumes are shown in Figure 6. Additionally, the existing intersection traffic control and lane geometry for the study area network is shown in Figure 7.

The site-generated volumes shown in Table 1 were distributed to the surrounding roadway network in accordance with the trip distribution. The site-generated volumes for the study intersections are shown in Figures 8 and 9 for the two analyzed scenarios. Scenario 1 assumes that Amberpark Drive will be the only full access point on Old Milton Parkway for the development and Northwinds Parkway will not be extended from Kimball Bridge Road to Old Milton Parkway. Scenario 2 assumes that Northwinds Parkway will be extended from Kimball Bridge Road to Old Milton Parkway. When Northwinds Parkway is extended to Old Milton Parkway it will align with Alpha Court and will create a second full access point on Old Milton Parkway for the Parkway 400 development. 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 2.



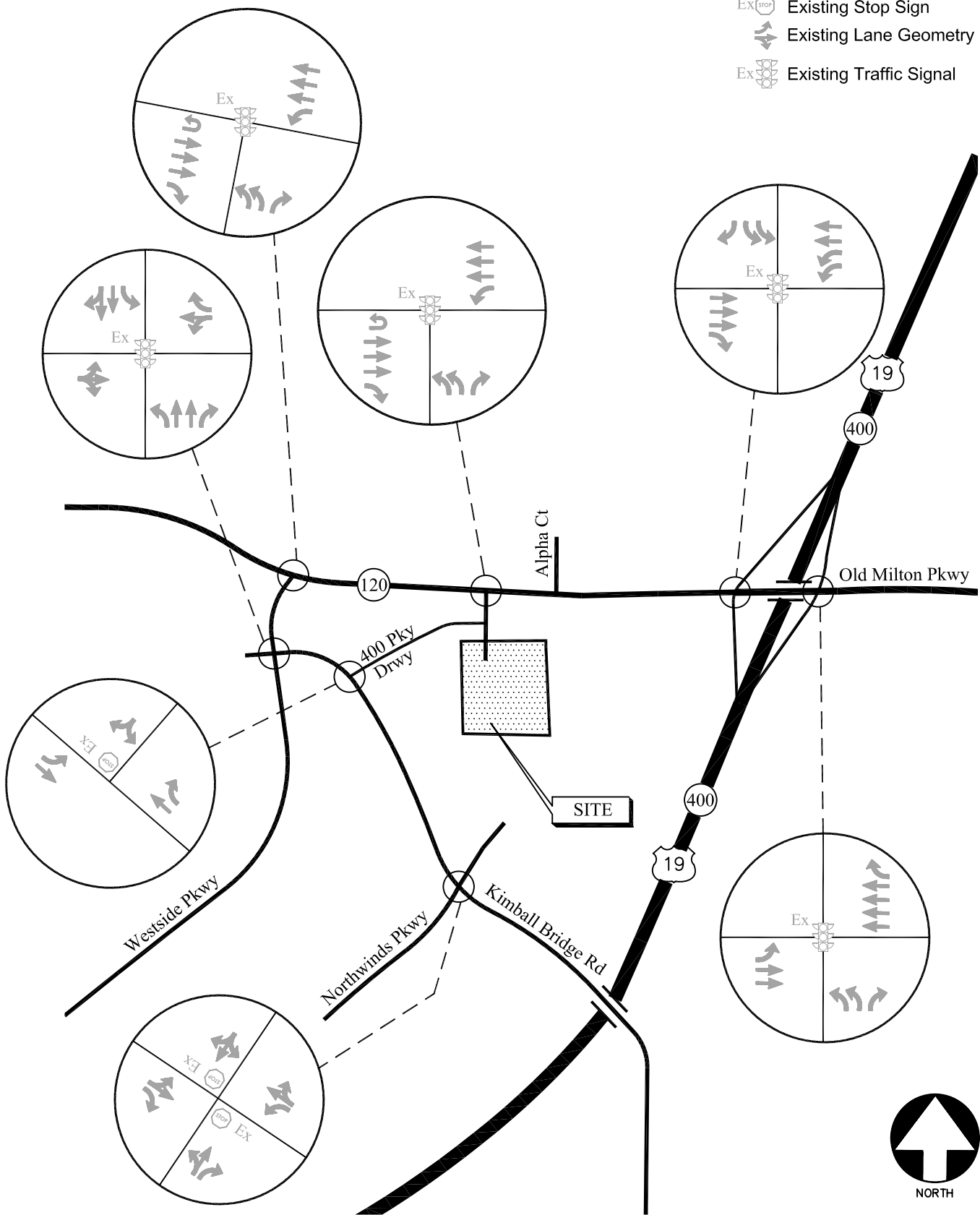
EXISTING WEEKDAY PEAK-HOUR VOLUMES

FIGURE 6

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LEGEND

- Ex  Existing Stop Sign
-  Existing Lane Geometry
- Ex  Existing Traffic Signal



EXISTING TRAFFIC CONTROL AND LANE GEOMETRY

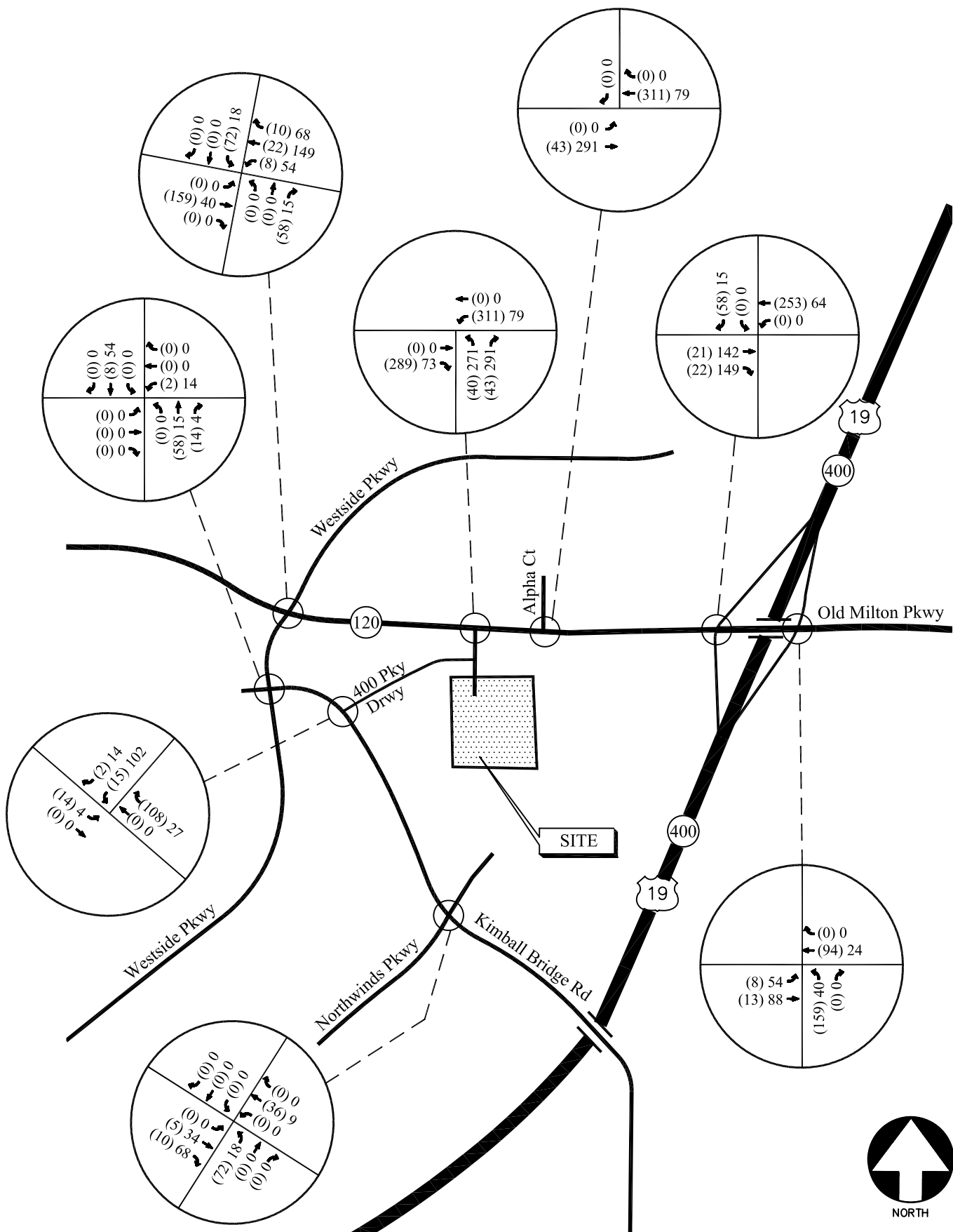
FIGURE 7

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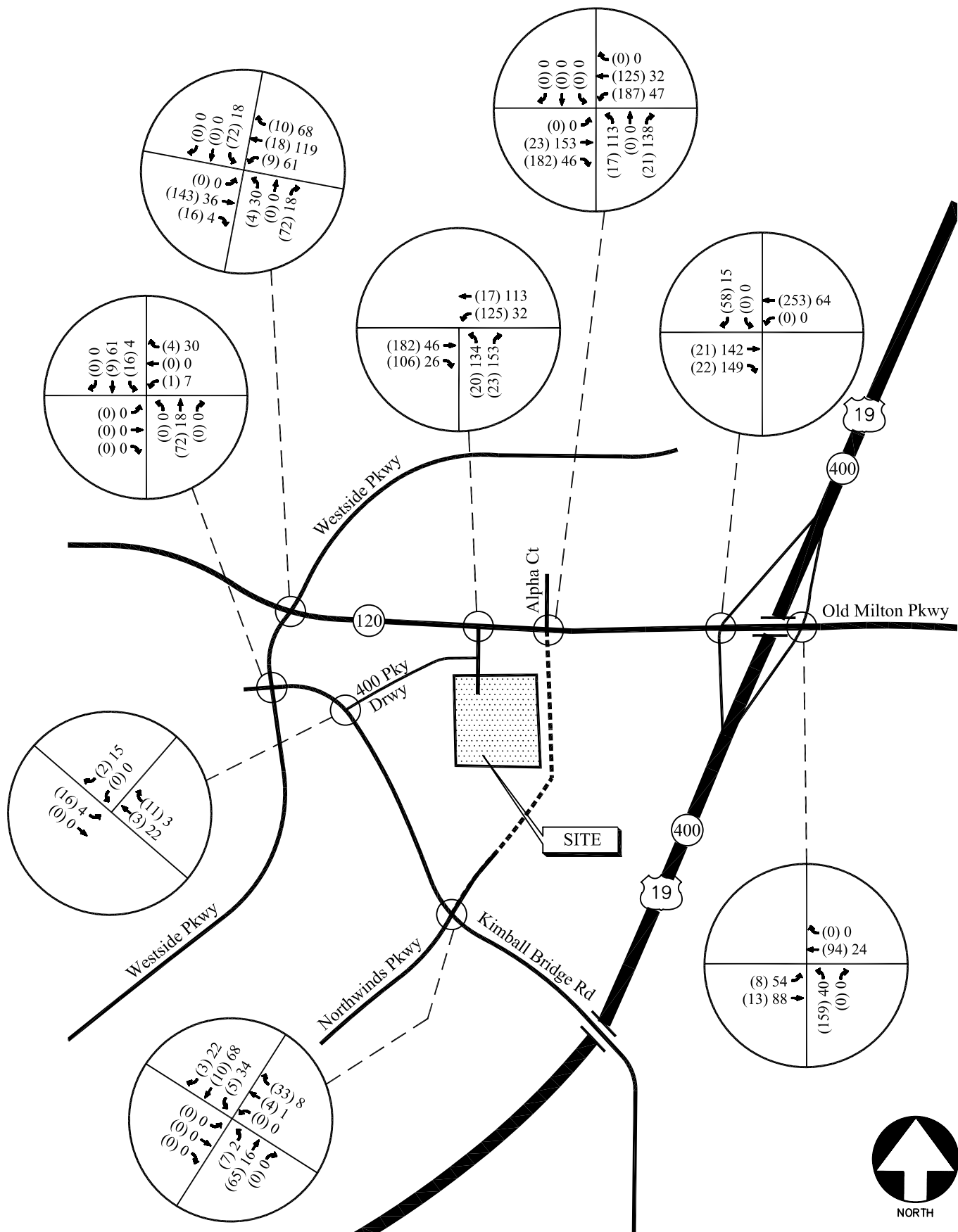
TABLE 2						
EXISTING INTERSECTION OPERATIONS						
Intersection	AM/PM LOS Standard	Traffic Control	A.M. Peak Hour		P.M. Peak Hour	
			LOS (Delay)	v/c*	LOS (Delay)	v/c*
Old Milton Parkway at GA 400 Northbound Ramp	D/D	Signalized	B (13.5)	0.65	C (22.9)	0.85
Old Milton Parkway at GA 400 Southbound Ramp	D/D	Signalized	B (13.7)	0.84	B (14.1)	0.88
Old Milton Parkway at Amberpark Drive	D/D	Signalized	A (3.4)	0.43	A (2.8)	0.41
Old Milton Parkway at Westside Parkway	D/D	Signalized	B (18.2)	0.67	B (13.5)	0.54
Kimball Bridge Road at Northwinds Parkway / Bailey Johnson Road		Stop Controlled				
-Eastbound Left (Kimball Bridge Road)	D/D	on Northwinds	A (0.0)	-	A (0.2)	-
-Westbound Left (Kimball Bridge Road)	D/D	Parkway / Bailey	A (8.9)	-	A (8.3)	-
-Northbound Approach (Northwinds Parkway)	D/D	Johnson Road	B (13.0)	-	D (25.3)	-
-Southbound Approach (Bailey Johnson Road)	D/D		C (22.4)	-	D (26.0)	-
Kimball Bridge Road at Parkway 400 Driveway		Stop Controlled				
-Eastbound Left (Kimball Bridge Road)	D/D	on Parkway 400	A (7.9)	-	A (8.5)	-
-Southbound Approach (Parkway 400 Driveway)	D/D	Driveway	B (12.7)	-	B (15.0)	-
Westside Parkway at Kimball Bridge Road	D/D	Signalized	B (10.2)	0.34	B (19.2)	0.55

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

As shown in Table 2, all study intersection is operating at acceptable LOS.



SITE GENERATED WEEKDAY PEAK HOUR
VOLUMES (Scenario - 1)



SITE GENERATED WEEKDAY PEAK HOUR
VOLUMES (Scenario - 2)

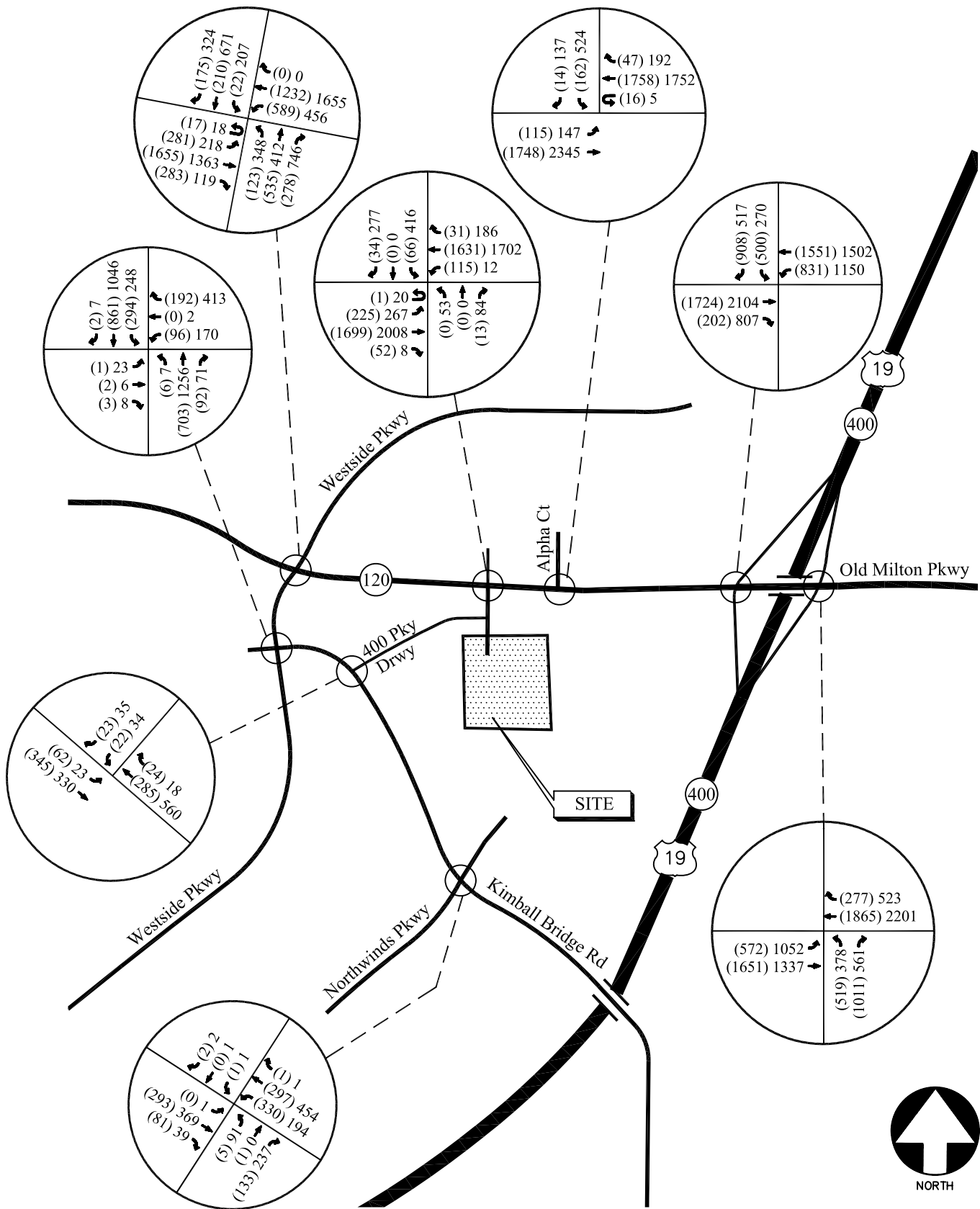
7. FUTURE YEAR BACKGROUND TRAFFIC

In order to evaluate future traffic operations in this area a projection was made of future base year traffic volumes. It was agreed upon in the GRTA letter of understanding to use a growth factor of 2%. This growth factor was applied to the existing traffic volumes on the roadways to estimate the future year 2010 traffic volumes prior to the addition of the site-generated volumes. Westside Parkway is proposed to be extended for Old Milton Parkway to Webb Bridge Road. The existing volumes from all the study intersections except those along Kimball Bridge Road have been diverted to access the Webb Bridge Road via the proposed Westside Parkway extension. The traffic volumes that will be generated by the proposed Prospect Park and Offices at Prospect Park developments located along the north side of Old Milton Parkway have also been included in the base condition volumes. The future year (base) traffic volumes for 2010 at all the study intersections are shown in Figure 10.

Traffic operation analyses for the following Base Scenarios were performed:

- Base Year 2010 traffic with existing lane geometry.
- Base Year 2010 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 3 and 4. Recommendations to bring the intersections back to the LOS standard are discussed after Table 3.



BASE 2010 WEEKDAY PEAK HOUR VOLUMES

FIGURE 10

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TABLE 3						
BASE INTERSECTION OPERATIONS						
Intersection	AM/PM LOS Standard	Traffic Control	A.M. Peak Hour		P.M. Peak Hour	
			LOS (Delay)	v/c*	LOS (Delay)	v/c*
Old Milton Parkway at GA 400 Northbound Ramp	D/D	Signalized	C (27.5)	0.92	F (97.9)	1.27
Old Milton Parkway at GA 400 Southbound Ramp	D/D	Signalized	C (21.3)	0.88	D (39.3)	1.00
Old Milton Parkway at Alpha Court	D/D	Stopped	D (26.1)	-	E (40.6)	-
-Eastbound Left (Old Milton Parkway	D/D	Controlled on	F (999)	-	F (999)	-
-Southbound Approach (Alpha Court)	D/D	Alpha Court				
Old Milton Parkway at Amberpark Drive	D/D	Signalized	D (44.0)	1.68	F (81.6)	2.32
Old Milton Parkway at Westside Parkway	D/D	Signalized	E (75.8)	1.46	F (141.1)	3.12
Kimball Bridge Road at Northwinds Parkway / Bailey Johnson Road		Stop Controlled				
-Eastbound Left (Kimball Bridge Road)	D/D	on Northwinds	A (0.0)	-	A (0.0)	-
-Westbound Left (Kimball Bridge Road)	D/D	Parkway / Bailey	A (9.1)	-	A (8.8)	-
-Northbound Approach (Northwinds Parkway)	D/D	Johnson Road	B (12.7)	-	E (44.2)	-
-Southbound Approach (Bailey Johnson Road)	D/D		C (24.2)	-	D (28.8)	-
Kimball Bridge Road at Parkway 400 Driveway		Stop Controlled				
-Eastbound Left (Kimball Bridge Road)	D/D	on Parkway 400	A (8.1)	-	A (8.9)	-
-Southbound Approach (Parkway 400 Driveway)	D/D	Driveway	B (13.9)	-	C (18.6)	-
Westside Parkway at Kimball Bridge Road	D/D	Signalized	B (12.1)	0.60	C (22.8)	0.85

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

Analysis of the future year (Base 2010) traffic volumes indicates that five of the study intersections (Old Milton Parkway at Alpha Court) will not operate within the LOS standard. The following improvements were identified for that intersection that did not comply with the LOS standard.

- Old Milton Parkway at GA 400 Northbound Ramp
 - Provide a second eastbound left turn lane on Old Milton Parkway creating dual left turn lanes. This improvement can be accommodated within the existing pavement by restriping.
- Old Milton Parkway at Alpha Court
 - 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 Base 2010 traffic volumes without the addition of the site generated traffic. Therefore, a signal is recommended at this intersection. However, a detailed signal warrant

analysis is recommended prior to installation of a traffic signal. In addition to the signal, a dedicated southbound left turn lane is also recommended for the traffic exiting the Prospect Park development.

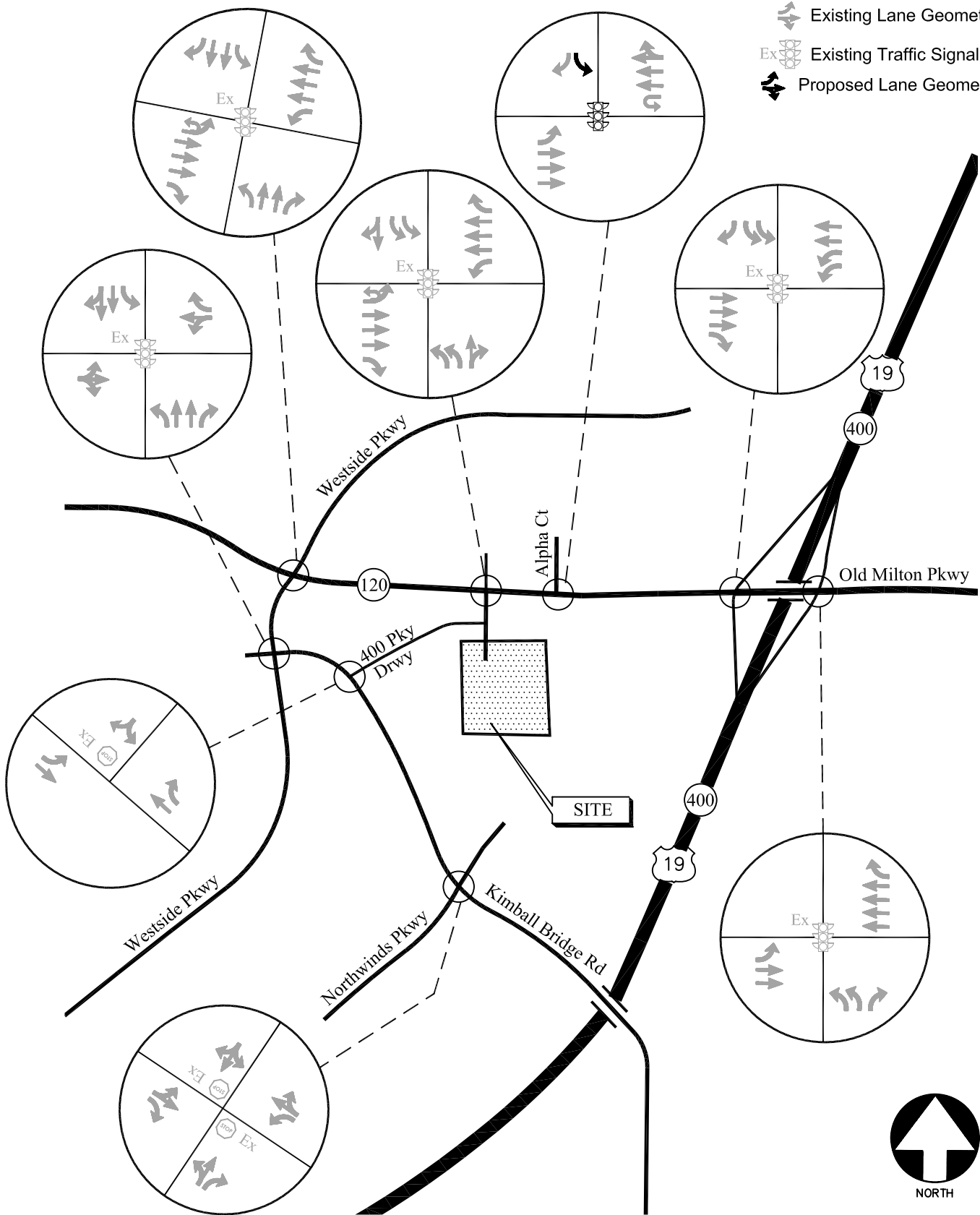
- Old Milton Parkway at Amberpark Drive
 - Change the phasing of the eastbound shared left turn and U turn movement on Old Milton Parkway from permissive to protected + permissive.
- Old Milton Parkway at Westside Parkway
 - Change the phasing of the eastbound shared left turn and U turn movement on Old Milton Parkway and northbound left turn movement on Westside Parkway from permissive to protected + permissive.
- Kimball Bridge Road at Northwinds Parkway / Bailey Johnson Road
 - The intersection will operate at LOS E with a delay of 44.2 seconds / vehicle in the AM peak hour for the northbound approach (Northwinds Parkway). No improvements other than installing a traffic signal can be recommended to improve the LOS; however, the intersection will not have the necessary traffic volumes to justify installation of a traffic signal.

The LOS at the above intersection in the year 2010 with just background traffic after the above improvements are implemented is shown in Table 4. The recommended base intersection traffic control and lane geometry is shown in Figure 11.

TABLE 4						
BASE INTERSECTION OPERATIONS — WITH IMPROVEMENTS						
Intersection	AM/PM LOS Standard	Traffic Control	A.M. Peak Hour		P.M. Peak Hour	
			LOS (Delay)	v/c*	LOS (Delay)	v/c*
Old Milton Parkway at GA 400 Northbound Ramp	D/D	Signalized	C (21.4)	0.72	C (26.5)	0.92
Old Milton Parkway at Alpha Court	D/D	Signalized	C (21.3)	0.93	D (40.9)	1.86
Old Milton Parkway at Amberpark Drive	D/D	Signalized	C (22.3)	0.56	C (29.0)	0.82
Old Milton Parkway at Westside Parkway	D/D	Signalized	D (38.6)	0.96	D (51.8)	1.10
Kimball Bridge Road at Northwinds Parkway / Bailey Johnson Road						
-Eastbound Left (Kimball Bridge Road)	D/D	Stop Controlled on Northwinds Parkway / Bailey Johnson Road	A (0.0)	-	A (0.0)	-
-Westbound Left (Kimball Bridge Road)	D/D		A (9.1)	-	A (8.8)	-
-Northbound Approach (Northwinds Parkway)	D/D		B (12.7)	-	E (44.2)	-
-Southbound Approach (Bailey Johnson Road)	D/D		C (24.2)	-	D (28.8)	-

LEGEND

- Ex  Existing Stop Sign
-  Existing Lane Geometry
- Ex  Existing Traffic Signal
-  Proposed Lane Geometry



BASE 2010 TRAFFIC CONTROL AND LANE GEOMETRY

FIGURE 11

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8. FUTURE YEAR TOTAL TRAFFIC

The traffic volumes that will be generated by the proposed development were then added to the future base year 2010 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 2010 including the site-generated volumes for the study intersections are shown in Figure 12 and 13 for the two scenarios.

9. FACILITY NEEDS ANALYSIS

9.1 Intersection Analysis

The future year total traffic volumes were used to analyze the future traffic operations. Traffic operations analyses for the following Future Scenarios were performed:

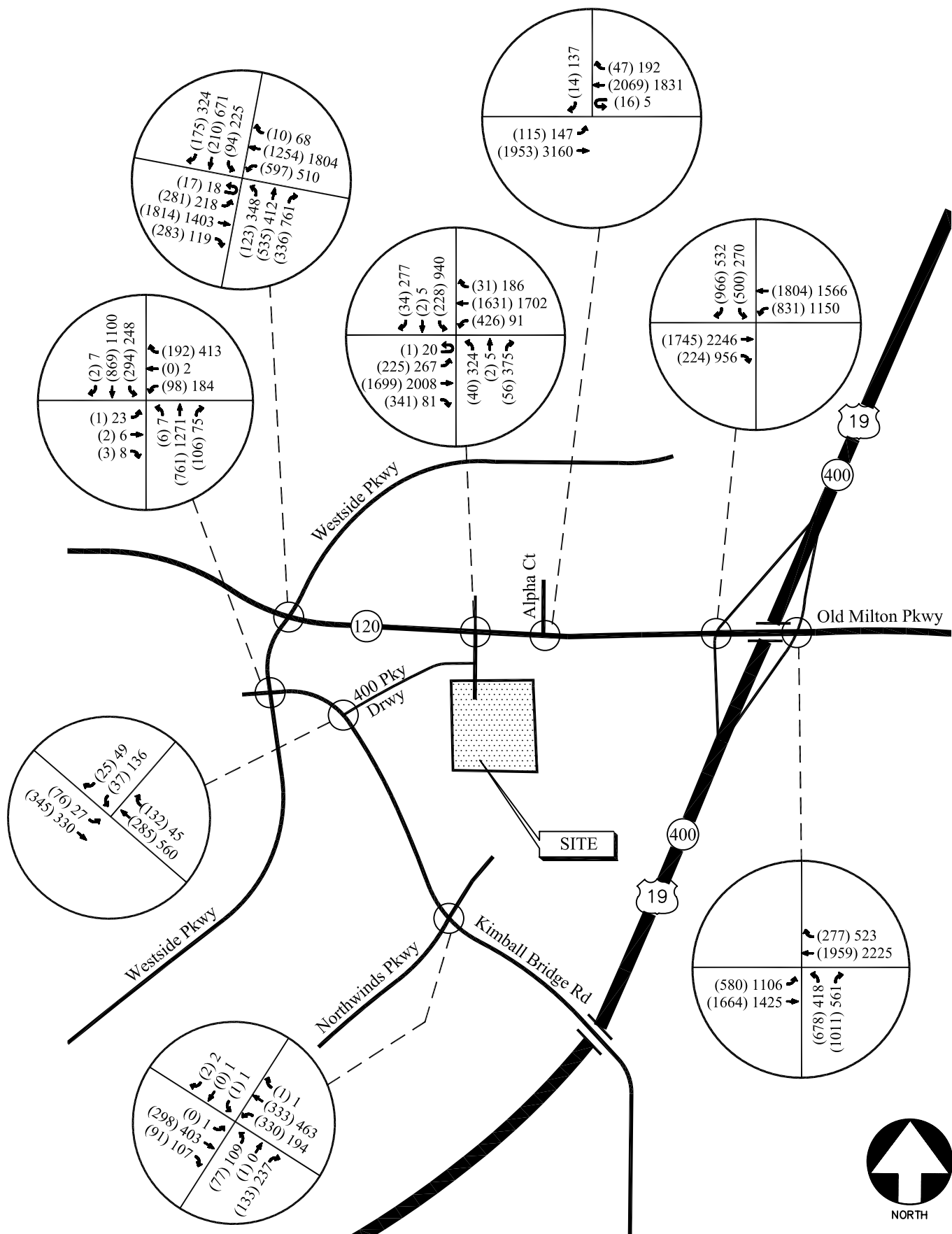
Scenario 1

- Future Year 2010 Traffic Volumes with site generated traffic and with the existing lane geometry assuming that Amberpark Drive will be the only full access point on Old Milton Parkway for the development and Northwinds Parkway will not be extended from Kimball Bridge Road to Old Milton Parkway.
- Future Year 2010 Traffic Volumes with site generated traffic and the recommended improvements to bring all intersections to LOS standard.

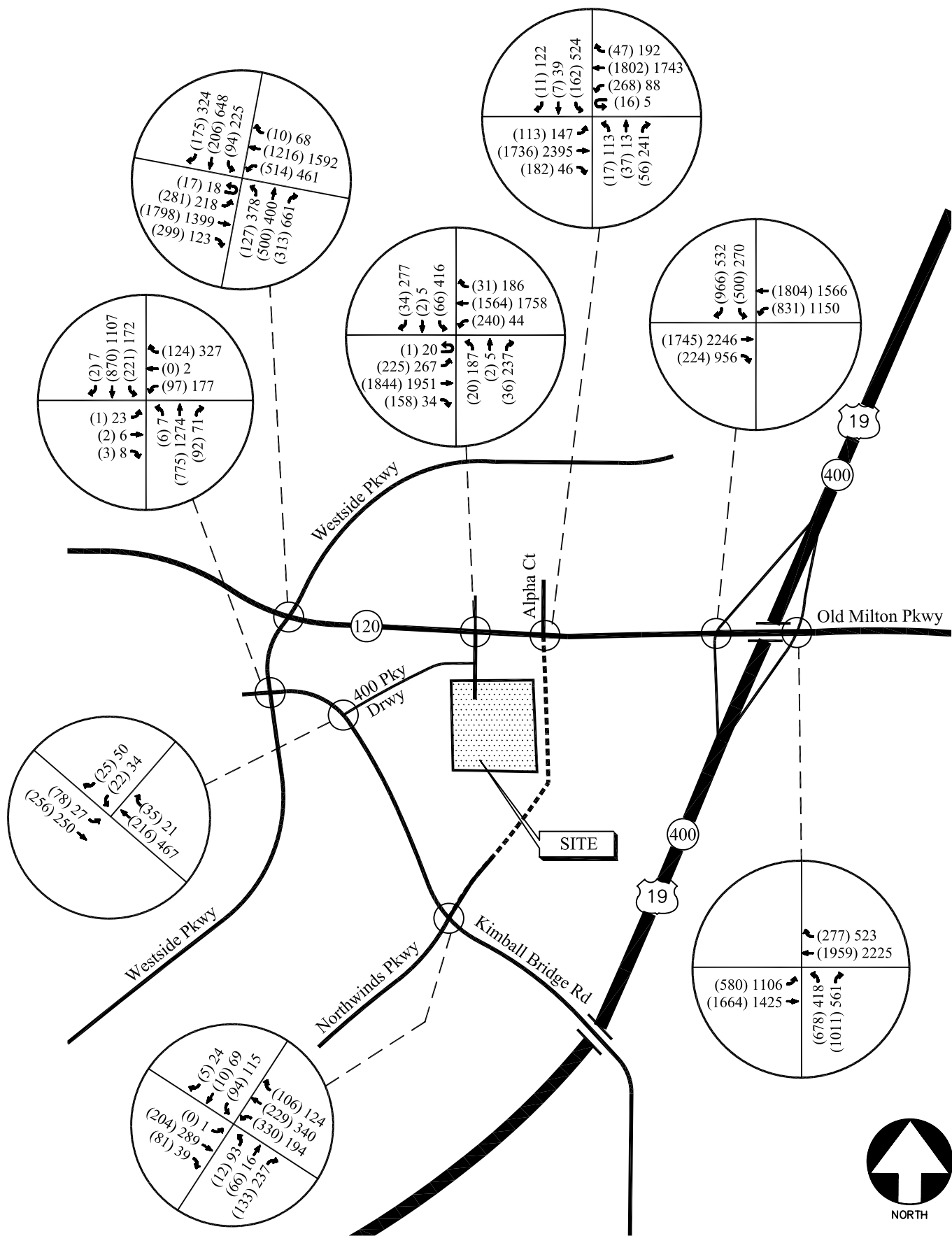
Scenario 2

- Future Year 2010 Traffic Volumes with site generated traffic and with the existing lane geometry assuming that Northwinds Parkway will be extended from Kimball Bridge Road to Old Milton Parkway. When Northwinds Parkway is extended to Old Milton Parkway it will align with Alpha Court and will create a second full access point on Old Milton Parkway for the Parkway 400 development.
- Future Year 2010 Traffic Volumes with site generated traffic and the recommended improvements to bring all intersections to LOS standard.

The results of the analyses for the above scenarios are shown in Tables 5, 6, 7 and 8. Recommendations to bring the intersections back to the LOS standard are discussed after each appropriate section.



FUTURE 2010 WEEKDAY PEAK HOUR
VOLUMES (Scenario - 1)



FUTURE 2010 WEEKDAY PEAK HOUR
VOLUMES (Scenario - 2)

FUTURE 2010 TRAFFIC OPERATIONS (SCENARIO 1)

TABLE 5						
FUTURE INTERSECTION OPERATIONS — SCENARIO - 1						
Intersection	AM/PM LOS Standard	Traffic Control	A.M. Peak Hour		P.M. Peak Hour	
			LOS (Delay)	v/c*	LOS (Delay)	v/c*
Old Milton Parkway at GA 400 Northbound Ramp	D/D	Signalized	C (29.7)	0.95	F (93.1)	1.25
Old Milton Parkway at GA 400 Southbound Ramp	D/D	Signalized	C (21.7)	0.91	E (58.9)	1.14
Old Milton Parkway at Alpha Court** -Eastbound Left (Old Milton Parkway) -Southbound Approach (Alpha Court)	D/D D/D	Stop Controlled on Alpha Court	n/a	n/a	n/a	n/a
Old Milton Parkway at Amberpark Drive	D/D	Signalized	E (68.4)	1.67	F (180.1)	3.02
Old Milton Parkway at Westside Parkway	D/D	Signalized	F (96.9)	1.83	F (141.9)	3.10
Kimball Bridge Road at Northwinds Parkway / Bailey Johnson Road		Stop Controlled on Northwinds Parkway / Bailey Johnson Road				
-Eastbound Left (Kimball Bridge Road)	D/D		A (0.0)	-	A (0.1)	-
-Westbound Left (Kimball Bridge Road)	D/D		A (9.3)	-	A (9.0)	-
-Northbound Approach (Northwinds Parkway)	D/D		F (192.8)	-	F (105.6)	-
-Southbound Approach (Bailey Johnson Road)	D/D		D (32.4)	-	E (44.7)	-
Kimball Bridge Road at Parkway 400 Driveway		Stop Controlled on Parkway 400 Driveway				
-Eastbound Left (Kimball Bridge Road)	D/D		A (8.7)	-	A (9.0)	-
-Southbound Approach (Parkway 400 Driveway)	D/D		C (17.6)	-	E (53.7)	-
Westside Parkway at Kimball Bridge Road	D/D	Signalized	B (12.4)	0.56	C (21.5)	0.92

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

** Traffic operations cannot be analyzed at an unsignalized intersection with 6 travel lanes on the main street.

Analysis of the future year 2010 traffic volumes for Scenario 2 indicates that six of the study intersections will not operate within the LOS standard. The following are the improvements needed to restore all intersections to the LOS standard for the future year 2010 traffic for the scenario one:

- Old Milton Parkway at GA 400 Northbound Ramp
 - Provide a second eastbound left turn lane on Old Milton Parkway creating dual left turn lanes. This improvement can be accommodated within the existing pavement by restriping.
- Old Milton Parkway at Amberpark Drive
 - Convert the southbound dedicated through lane to a dedicated left turn lane creating triple southbound left turn lanes. Convert the existing southbound right turn lane to a shared through / right turn lane.
 - Change the phasing of eastbound left turn movement on Old Milton Parkway from permissive to protected + permissive.

- Old Milton Parkway at Westside Parkway
 - Add an additional westbound left turn lane on Old Milton Parkway creating dual left turn lanes as per Georgia DOT standards and change the phasing from protected + permissive to protected only phasing.
 - Change the phasing of eastbound shared left turn and U turn movement on Old Milton Parkway from permissive to protected + permissive.
 - Change the phasing of northbound left turn movement and southbound left turn movement on Westside Parkway from permissive to protected + permissive.

- Kimball Bridge Road at Northwinds Parkway / Bailey Johnson Road
 - The intersection will operate at LOS F with a delay of 192.8 seconds / vehicle in the AM peak hour and 105.6 seconds / vehicle in the PM peak hour for the northbound approach (Northwinds Parkway) and LOS E with a delay of 44.7 seconds / vehicle in the PM peak hour for the southbound approach (Bailey Johnson Road). No improvements other than installing a traffic signal can be recommended to improve the LOS; however, the intersection will not have the necessary traffic volumes to justify installation of a traffic signal.

- Kimball Bridge Road at Parkway 400 Driveway
 - Is discussed in section 9.2 Site Access Analysis section of the report.

The LOS for the above listed intersections in the year 2010 with the addition of site-generated traffic after the implementation of above recommended improvements for Scenario 1 is shown in Table 6. The recommended future intersection traffic control and lane geometry for the scenario one is shown in Figure 14.

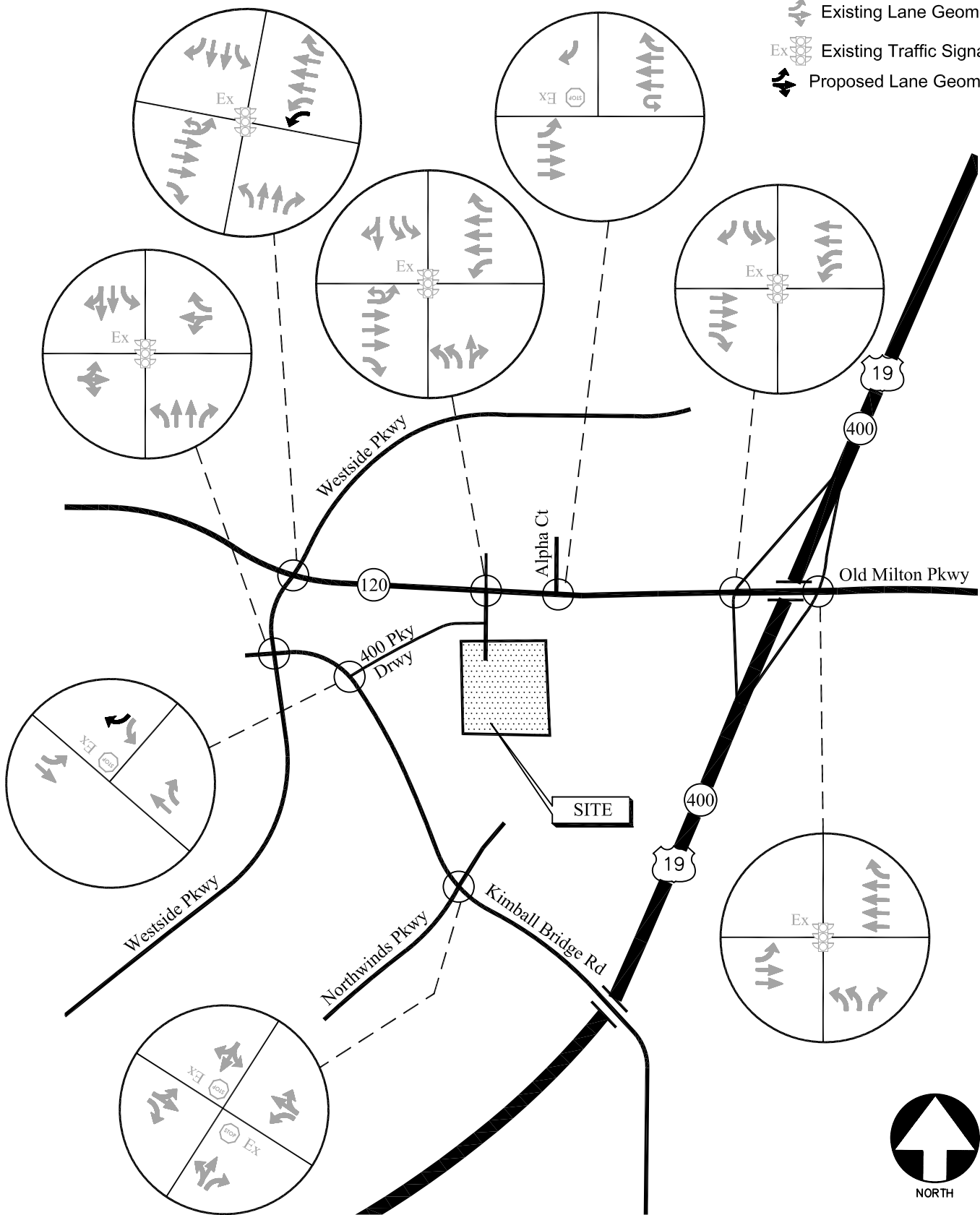
TABLE 6						
FUTURE INTERSECTION OPERATIONS WITH IMPROVEMENTS — SCENARIO -1						
Intersection	AM/PM LOS Standard	Traffic Control	A.M. Peak Hour		P.M. Peak Hour	
			LOS (Delay)	v/c*	LOS (Delay)	v/c*
Old Milton Parkway at GA 400 Northbound Ramp	D/D	Signalized	C (22.2)	0.76	C (27.8)	0.91
Old Milton Parkway at GA 400 Southbound Ramp	D/D	Signalized	B (18.0)	0.91	D (43.1)	1.05
Old Milton Parkway at Amberpark Drive	D/D	Signalized	B (18.6)	0.60	D (45.7)	1.04
Old Milton Parkway at Westside Parkway	D/D	Signalized	C (32.7)	0.87	D (44.2)	0.98

Kimball Bridge Road at Northwinds Parkway / Bailey Johnson Road						
-Eastbound Left (Kimball Bridge Road)	D/D	Stop Controlled on Northwinds	A (0.0)	-	A (0.1)	-
-Westbound Left (Kimball Bridge Road)	D/D	Parkway / Bailey Johnson Road	A (9.3)	-	A (9.0)	-
-Northbound Approach (Northwinds Parkway)	D/D		F (192.8)	-	F (105.6)	-
-Southbound Approach (Bailey Johnson Road)	D/D		D (32.4)	-	E (44.7)	-
Kimball Bridge Road at Parkway 400 Driveway						
-Eastbound Left (Kimball Bridge Road)	D/D	Stop Controlled on Parkway 400	A (8.7)	-	A (9.0)	-
-Southbound Approach (Parkway 400 Driveway)	D/D	Driveway	C (16.3)	-	E (37.3)	-

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

LEGEND

- Ex  Existing Stop Sign
-  Existing Lane Geometry
- Ex  Existing Traffic Signal
-  Proposed Lane Geometry



FUTURE 2010 TRAFFIC CONTROL AND LANE
GEOMETRY (Scenario - 1)

FUTURE 2010 TRAFFIC OPERATIONS (SCENARIO 2)

TABLE 7						
FUTURE INTERSECTION OPERATIONS – SCENARIO - 2						
Intersection	AM/PM LOS Standard	Traffic Control	A.M. Peak Hour		P.M. Peak Hour	
			LOS (Delay)	v/c*	LOS (Delay)	v/c*
Old Milton Parkway at GA 400 Northbound Ramp	D/D	Signalized	C (34.0)	1.00	F (110.5)	1.32
Old Milton Parkway at GA 400 Southbound Ramp	D/D	Signalized	B (19.5)	0.88	D (44.9)	1.10
Old Milton Parkway at Alpha Court	D/D	Signalized	B (15.8)	0.71	F (102.3)	1.32
Old Milton Parkway at Amberpark Drive	D/D	Signalized	D (44.7)	1.61	F (104.9)	2.87
Old Milton Parkway at Westside Parkway	D/D	Signalized	E (70.0)	1.58	F (147.4)	3.07
Kimball Bridge Road at Northwinds Parkway Extension		Stop Controlled on Northwinds Parkway Extension				
-Eastbound Left (Kimball Bridge Road)	D/D		A (0.0)	-	A (0.1)	-
-Westbound Left (Kimball Bridge Road)	D/D		A (8.6)	-	A (8.5)	-
-Northbound Approach (Northwinds Parkway Ext)	D/D		E (39.7)	-	F (88.3)	-
-Southbound Approach (Northwinds Parkway Ext)	D/D		F (698.5)	-	F (537.1)	-
Kimball Bridge Road at Parkway 400 Driveway		Stop Controlled on Parkway 400 Driveway				
-Eastbound Left (Kimball Bridge Road)	D/D		A (8.0)	-	A (8.6)	-
-Southbound Approach (Parkway 400 Driveway)	D/D		B (12.4)	-	B (15.4)	-
Westside Parkway at Kimball Bridge Road	D/D	Signalized	B (10.6)	0.47	B (17.4)	0.75

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

The analysis of the future year 2010 traffic volumes for Scenario 2 indicates that five of the study intersections will not operate within the LOS standard. The following are the improvements needed to restore all intersections to the LOS standard for the future year 2010 traffic for scenario two:

- Old Milton Parkway at GA 400 Northbound Ramp
 - Provide a second eastbound left turn lane on Old Milton Parkway creating dual left turn lanes. This improvement can be accommodated within the existing pavement by restriping.
- Old Milton Parkway at Alpha Court
 - Add an additional southbound left turn lane on Alpha Court creating dual left turn lanes and change the phasing from permissive to protected only.
 - The northbound approach on Northwinds Parkway extension should have a dedicated left, through and right turn lane.

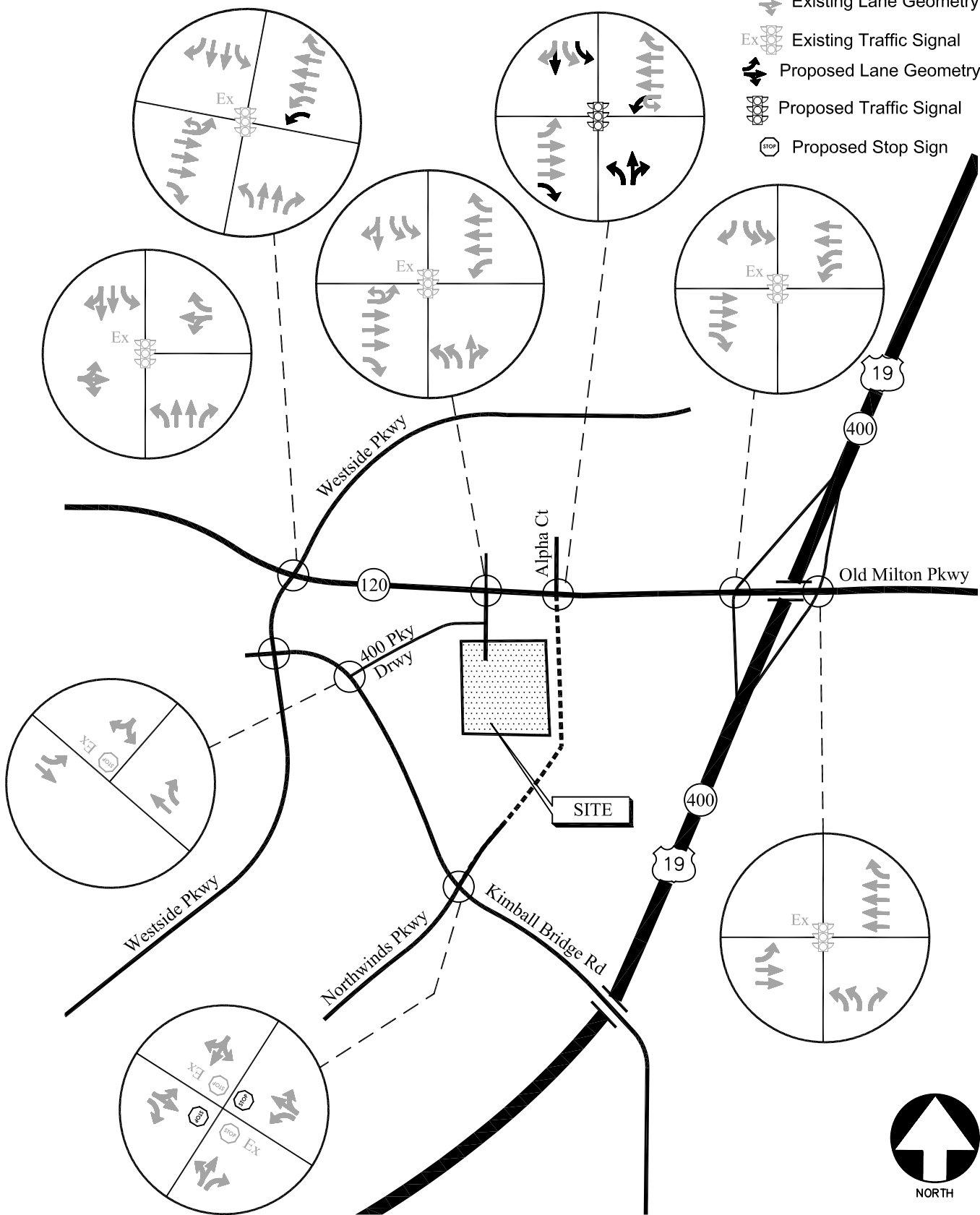
- Old Milton Parkway at Amberpark Drive
 - Change the phasing of eastbound left turn movement on Old Milton Parkway from permissive to protected + permissive.
- Old Milton Parkway at Westside Parkway
 - Add an additional westbound left turn lane on Old Milton Parkway creating dual left turn lanes as per Georgia DOT standards and change the phasing from protected + permissive to protected only phasing.
 - Change the phasing of eastbound shared left turn and U turn movement on Old Milton Parkway from permissive to protected + permissive.
 - Change the phasing of northbound left turn movement and southbound left turn movement on Westside Parkway from permissive to protected + permissive.
- Kimball Bridge Road at Northwinds Parkway Extension
 - Signalize the intersection and add a protected + permissive left turn phase for the westbound left turn movement.
 - The northbound approach on Northwinds Parkway extension should have a dedicated left, through and right turn lane.
 - Add an eastbound left turn lane on Kimball Bridge Road.

The LOS for the above listed intersections in the year 2010 with the addition of site-generated traffic after the implementation of above recommended improvements for Scenario 2 is shown in Table 8. The recommended future intersection traffic control and lane geometry is for the scenario two shown in Figure 15.

TABLE 8						
FUTURE INTERSECTION OPERATIONS WITH IMPROVEMENTS – SCENARIO - 2						
Intersection	AM/PM LOS Standard	Traffic Control	A.M. Peak Hour		P.M. Peak Hour	
			LOS (Delay)	v/c*	LOS (Delay)	v/c*
Old Milton Parkway at GA 400 Northbound Ramp	D/D	Signalized	C (21.0)	0.79	C (28.9)	0.96
Old Milton Parkway at Alpha Court	D/D	Signalized	B (19.1)	0.74	D (36.4)	1.05
Old Milton Parkway at Amberpark Drive	D/D	Signalized	B (12.4)	0.62	D (37.2)	0.96
Old Milton Parkway at Westside Parkway	D/D	Signalized	C (30.3)	0.82	D (44.6)	0.95
Kimball Bridge Road at Northwinds Parkway	D/D	Signalized	B (16.6)	0.43	C (23.4)	0.49

LEGEND

- Ex  Existing Stop Sign
-  Existing Lane Geometry
- Ex  Existing Traffic Signal
-  Proposed Lane Geometry
-  Proposed Traffic Signal
-  Proposed Stop Sign



FUTURE 2010 TRAFFIC CONTROL AND LANE
GEOMETRY (Scenario - 2)

9.2 Site Access Analysis

The future traffic volumes at the site driveways for the two scenarios are shown in Figure 16 and 17. 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 2010 traffic volumes with recommended lane geometry for Scenario 1 assuming Northwinds Parkway will not be extended to Old Milton Parkway. Results of the analysis are shown in Table 9. Traffic control and lane geometry recommended for the intersections to operate at the LOS standard are discussed in the following pages.

TABLE 9						
FUTURE 2010 SITE DRIVEWAY OPERATIONS – SCENARIO - 1						
Intersection	AM/PM LOS Standard	Traffic Control	A.M. Peak Hour		P.M. Peak Hour	
			LOS (Delay)	v/c*	LOS (Delay)	v/c*
Old Milton Parkway at Amberpark Drive	D/D	Signalized	C (23.4)	0.75	E (69.8)	1.22
Kimball Bridge Road at Parkway 400 Driveway		Stop Controlled on				
-Eastbound Left (Kimball Bridge Road)	D/D	Parkway 400	A (8.7)	-	A (9.0)	-
-Southbound Approach (Parkway 400 Driveway)	D/D	Driveway	C (16.3)	-	E (37.3)	-

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

If any site accesses experience decreased level of service in the future after the addition of the site generated traffic, alternate routes will be utilized to exit the development. The following lists the recommended lane geometry for the site driveways for Scenario 1:

- Old Milton Parkway at Amberpark Drive
 - Convert the southbound dedicated through lane to a dedicated left turn lane creating triple southbound left turn lanes. Convert the existing southbound right turn lane to a shared through / right turn lane.
 - Change the phasing of eastbound left turn movement on Old Milton Parkway from permissive to protected + permissive.
- Kimball Bridge Road at Parkway 400 Driveway
 - Add a dedicated southbound right turn lane on the Parkway 400 Driveway.

The future driveway traffic control and lane geometry for the scenario one is shown in Figure 18.

The site access analysis was performed for the Future Year 2010 traffic volumes with recommended lane geometry for Scenario 2 assuming Northwinds Parkway will be extended to Old Milton Parkway. Results of the analysis are shown in Table 10. Traffic control and lane geometry recommended for the intersections to operate at the LOS standard are discussed in the following pages.

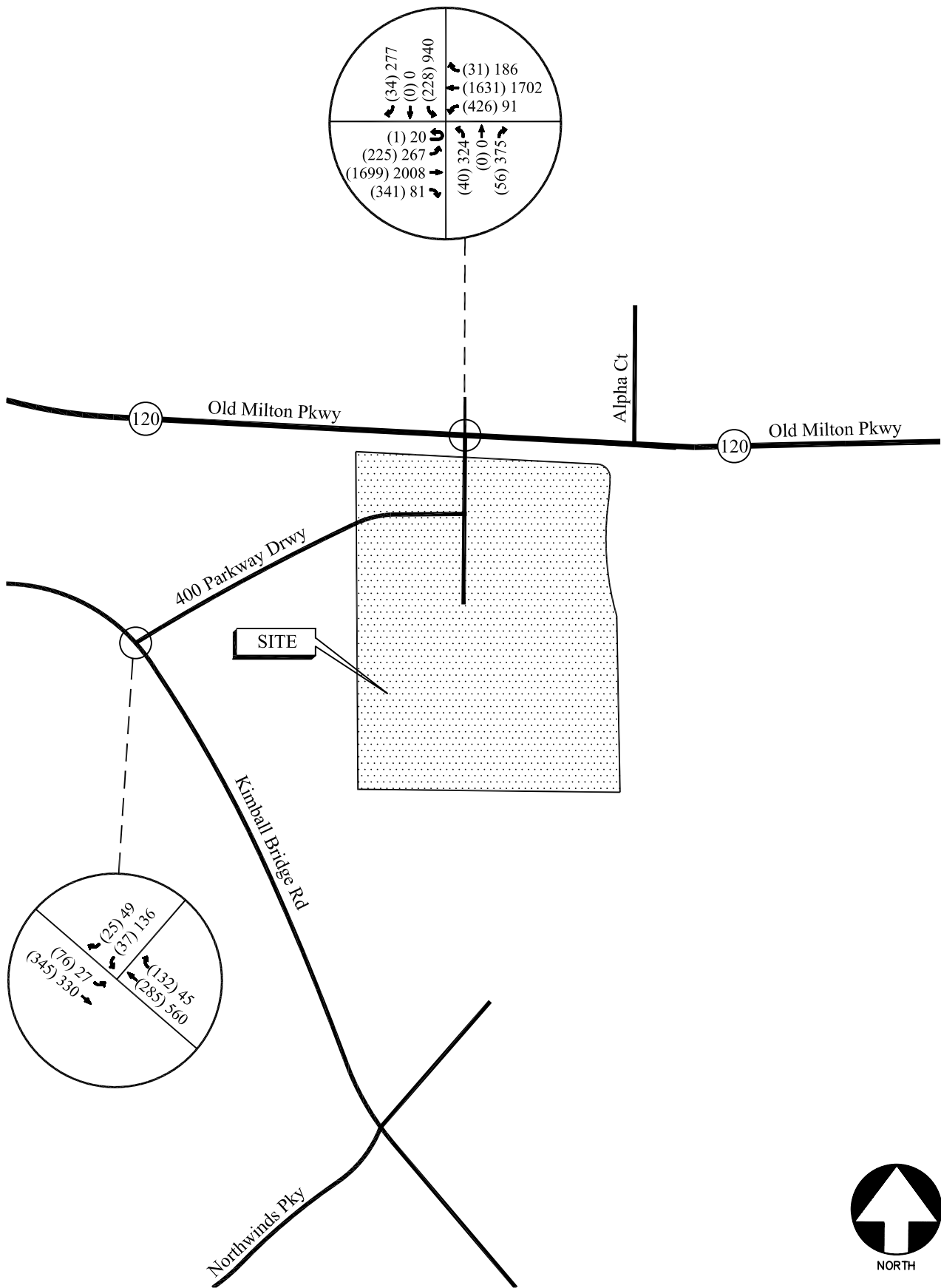
TABLE 10						
FUTURE 2010 SITE DRIVEWAY OPERATIONS – SCENARIO - 2						
Intersection	AM/PM LOS Standard	Traffic Control	A.M. Peak Hour		P.M. Peak Hour	
			LOS (Delay)	v/c*	LOS (Delay)	v/c*
Old Milton Parkway at Amberpark Drive	D/D	Signalized	B (14.0)	0.65	C (32.0)	0.96
Kimball Bridge Road at Parkway 400 Driveway	D/D	Stop Controlled on Parkway 400 Driveway	A (8.0)	-	A (8.6)	-
-Eastbound Left (Kimball Bridge Road)	D/D		B (12.4)	-	C (15.4)	-
-Southbound Approach (Parkway 400 Driveway)	D/D					
Northwinds Parkway Extension at Main Site Driveway		Stop Controlled on Main Site Driveway				
-Eastbound Approach (Main Site Driveway)	D/D		B (14.0)	-	C (15.2)	-
-Northbound Left (Northwinds Parkway Extn)	D/D		A (5.1)	-	A (1.4)	-

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

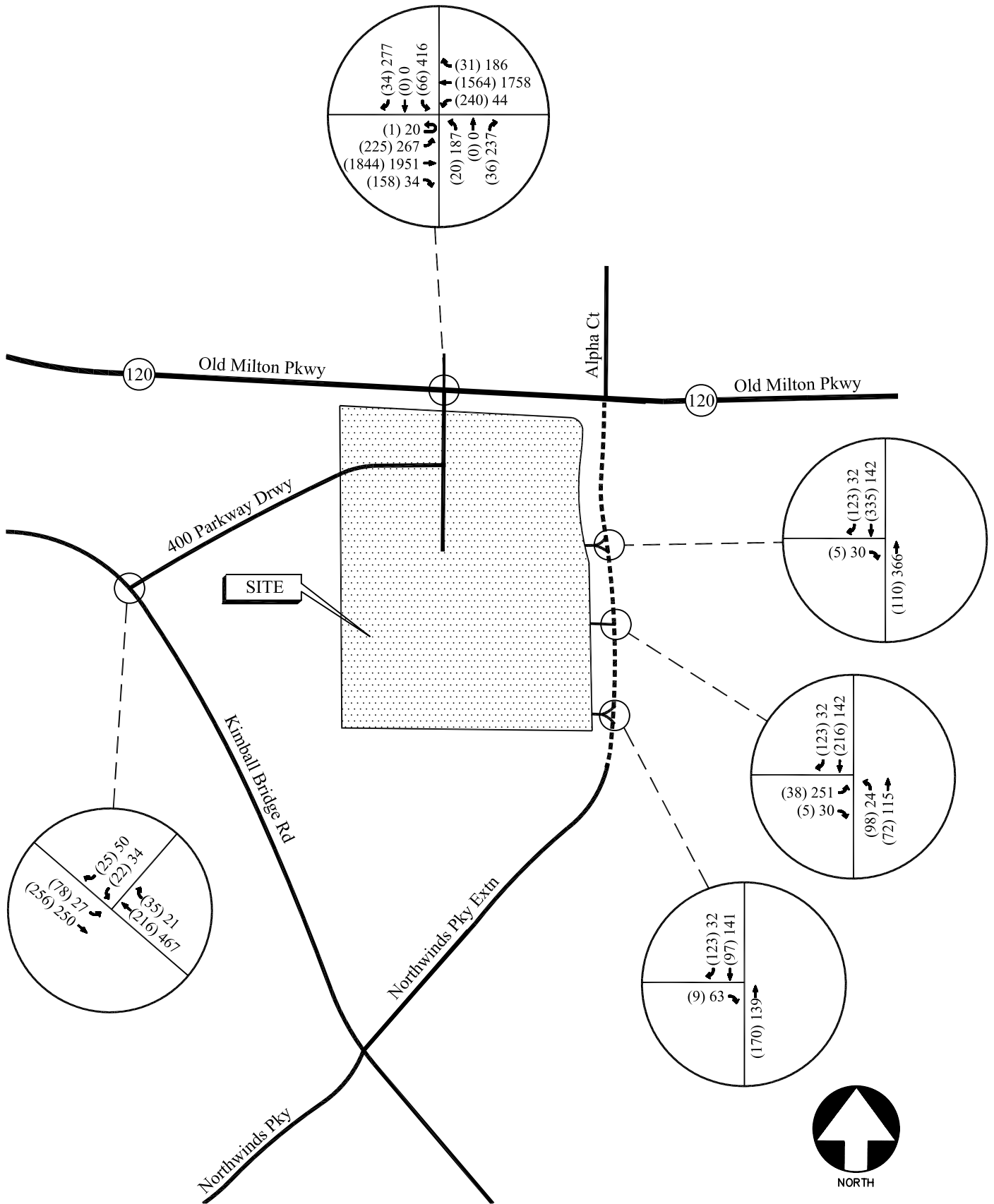
The following lists the recommended lane geometry for the site driveways for Scenario 2:

- Old Milton Parkway at Amberpark Drive
 - Change the phasing of eastbound left turn movement on Old Milton Parkway from permissive to protected + permissive.
- Northwinds Parkway Extension at Main Site Driveway
 - It is recommended that the intersection have a stop controlled side street (Main Site Driveway), with Northwinds Parkway Extension remaining free flow.
 - Provide shared left / right lane on the eastbound approach for traffic exiting the proposed development.
 - Dedicated southbound right and northbound left turn lanes should be provided on Northwinds Parkway for traffic entering the development.
- Northwinds Parkway Extension at Right-in / Right-out Driveways
 - Provided dedicated southbound right turn lanes on Northwinds Parkway at both right-in / right-out driveways.

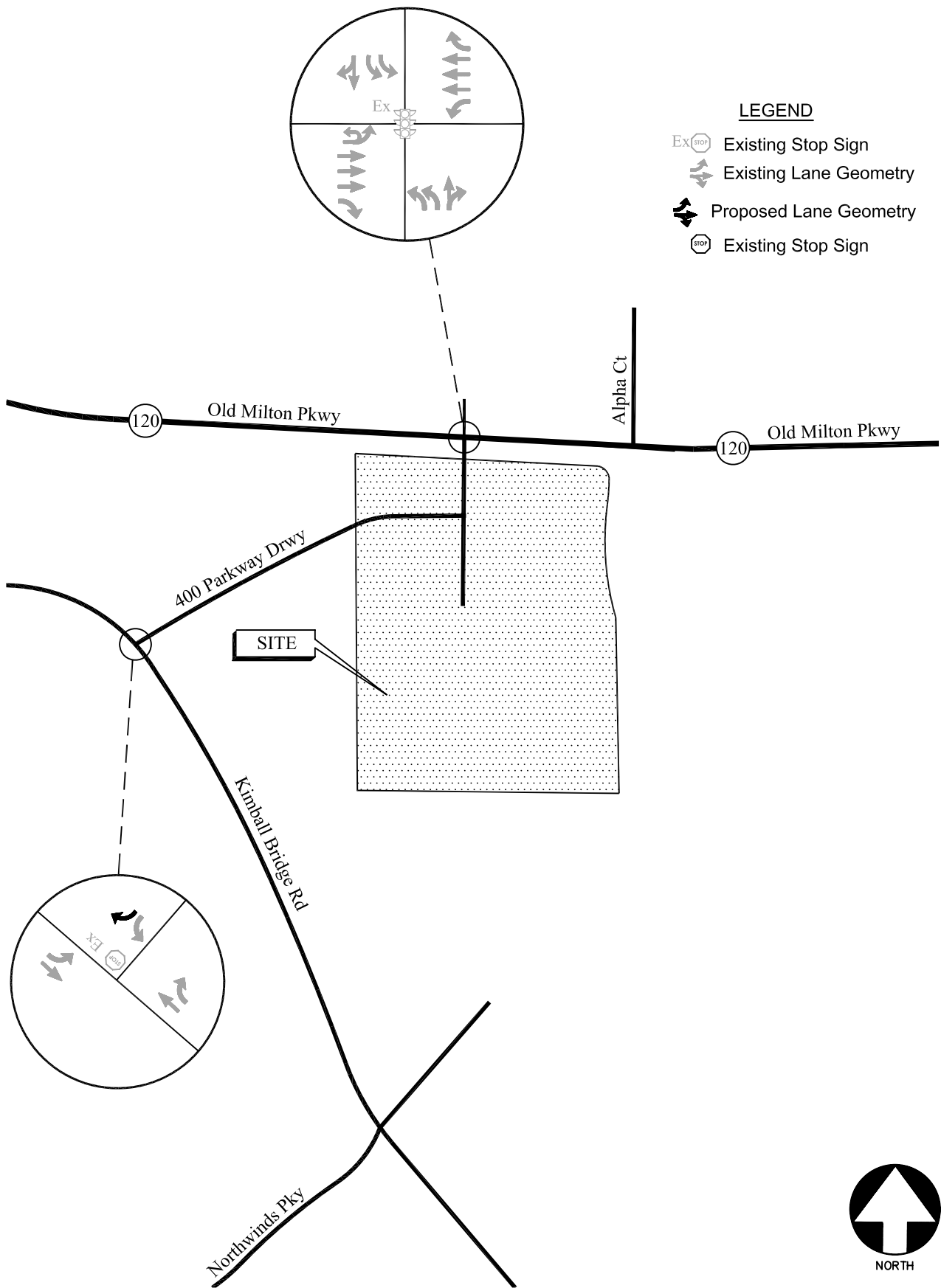
The future driveway traffic control and lane geometry for Scenario 2 is shown in Figure 19.



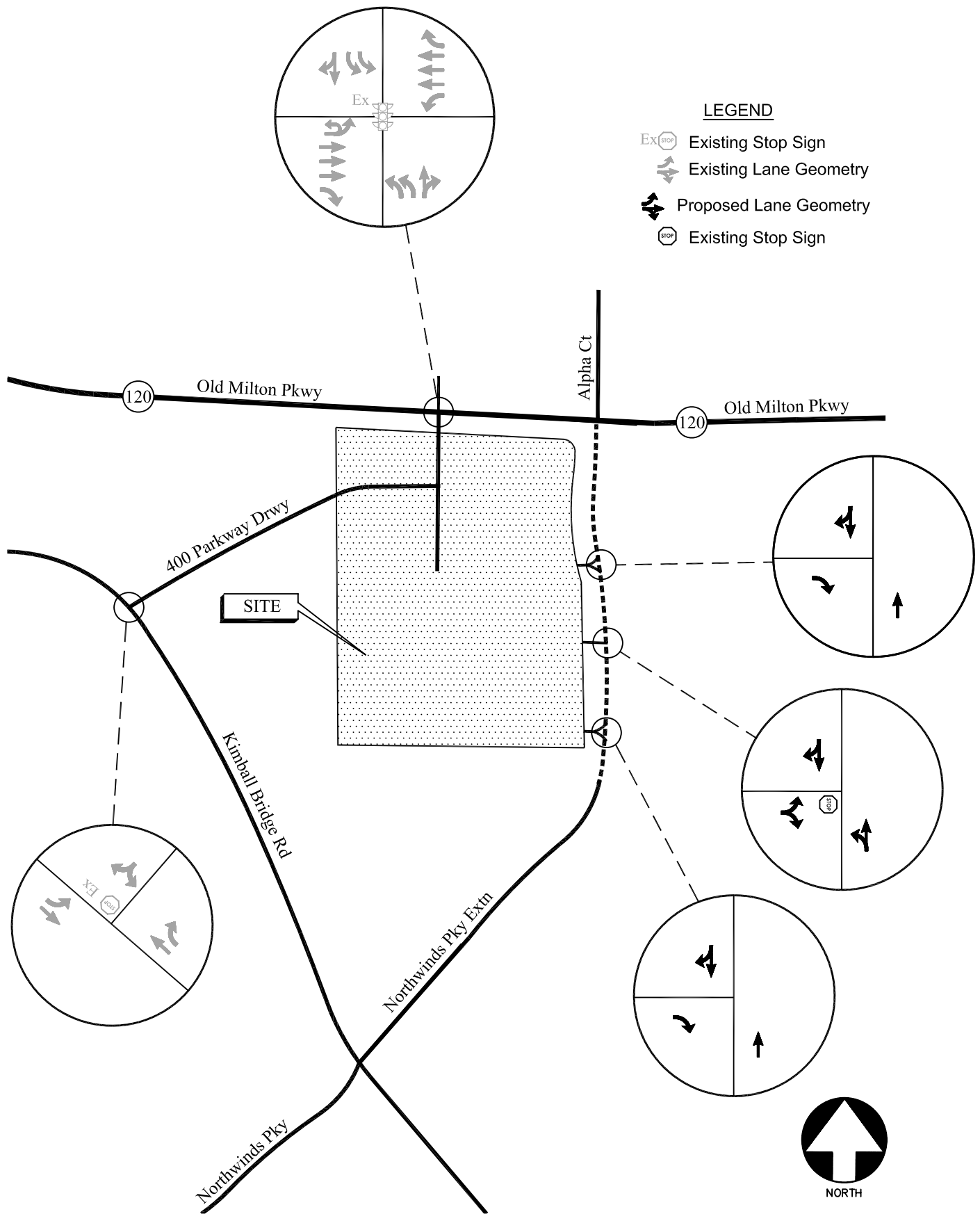
FUTURE 2010 SITE ACCESS PEAK HOUR
VOLUMES (Scenario -1)



FUTURE 2010 SITE ACCESS PEAK HOUR
VOLUMES (Scenario - 2)



FUTURE 2010 SITE ACCESS TRAFFIC CONTROL
AND LANE GEOMETRY (Scenario -1)



FUTURE 2010 SITE ACCESS TRAFFIC CONTROL
AND LANE GEOMETRY (Scenario - 2)

10. NON-EXPEDITED CRITERIA

10.1 Regional Mobility and Location

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

Two MARTA bus routes currently run within the vicinity of the site. These routes will provide alternate means to access the site.

2. Vehicle Miles Traveled

No mixed-use or pass-by reductions are applicable for this project. However, the project will help facilitate the Northwinds Parkway extension, which will help reduce vehicle miles traveled in the vicinity of the site.

3. Relationship Between Location of Proposed DRI and Regional Mobility

The project will help facilitate the extension of Northwinds Parkway from Kimball Bridge Road to Old Milton Parkway. This new roadway will help improve regional mobility.

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

Two MARTA bus routes run within the vicinity of the site. Details of these routes are included in the Appendix. Due to the growth in the area, MARTA may also consider expanding additional bus services to the Old Milton Parkway area.

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

No mixed-use or pass-by reductions are applicable for this project.

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. Fulton County will provide water and wastewater services for the 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

Queues
1: Old Milton Pkwy & NB Ramp

Existing AM
2/16/2007

Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	490	1629	1818	269	55	982
Act Effct Green (s)	48.0	107.5	54.7	54.7	7.2	120.0
Actuated g/C Ratio	0.40	0.90	0.46	0.46	0.06	1.00
v/c Ratio	0.69	0.51	0.62	0.31	0.27	0.62
Control Delay	19.8	2.2	26.6	3.5	56.6	1.8
Queue Delay	0.5	0.1	0.0	0.0	0.0	0.0
Total Delay	20.3	2.3	26.6	3.5	56.6	1.8
LOS	C	A	C	A	E	A
Approach Delay	6.5 23.6					
Approach LOS	A C					
Queue Length 50th (ft)	132	133	313	0	21	0
Queue Length 95th (ft)	m204	144	365	50	42	0
Internal Link Dist (ft)	500 855					
Turn Bay Length (ft)	708 3169 2919 867 486 1583					
Base Capacity (vph)	40	451	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	0.73	0.60	0.62	0.31	0.11	0.62

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 70 (58%), Referenced to phase 2:WBT and 6:EBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 13.0
Intersection Capacity Utilization 76.4%
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Old Milton Pkwy & NB Ramp

Existing AM
2/16/2007

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	0.86	1.00	0.85	1.00	0.97	1.00	0.85	1.00	0.97
Flt Protected	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	6408	1583	3433	1583	3433	1583	3433	1583	3433	1583
Flt Permitted	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	6408	1583	3433	1583	3433	1583	3433	1583	3433	1583
Volume (vph)	475	1580	0	0	1763	261	53	0	953	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	490	1629	0	0	1818	269	55	0	982	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	148	0	0	0	0	0	0
Lane Group Flow (vph)	490	1629	0	0	1818	121	55	0	982	0	0	0
Turn Type	Prot Permcustom Free											
Protected Phases	1	6			2							
Permitted Phases						2	4					
Actuated Green, G (s)	48.0	105.9			53.9	53.9	6.1		120.0			
Effective Green, g (s)	48.0	105.9			53.9	53.9	6.1		120.0			
Actuated g/C Ratio	0.40	0.88			0.45	0.45	0.05		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)	708	3123			2878	711	175		1583			
v/s Ratio Prot	c0.28	0.46			0.28				c0.62			
v/s Ratio Perm												
v/c Ratio	0.69	0.52			0.63	0.17	0.31		0.62			
Uniform Delay, d1	29.9	1.5			25.4	19.7	54.9		0.0			
Progression Factor	0.55	1.12			1.00	1.00	1.00		1.00			
Incremental Delay, d2	1.6	0.3			1.1	0.5	1.0		1.8			
Delay (s)	17.9	2.1			26.5	20.2	56.0		1.8			
Level of Service	B	A			C	C	E		A			
Approach Delay (s)		5.7			25.7		4.7		0.0			
Approach LOS		A			C		A		A			
Intersection Summary												
HCM Average Control Delay	13.5 HCM Level of Service											
HCM Volume to Capacity ratio	0.65											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	76.4%											
Analysis Period (min)	15											
c Critical Lane Group												

Queues
2: Old Milton Pkwy & SB Ramp

Existing AM
2/16/2007

	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	1800	47	860	1133	529	728
Act Effct Green (s)	52.4	52.4	34.0	90.3	21.7	120.0
Actuated g/C Ratio	0.44	0.44	0.28	0.75	0.18	1.00
v/c Ratio	0.81	0.07	0.88	0.43	0.85	0.46
Control Delay	7.9	0.4	27.6	2.2	61.7	1.0
Queue Delay	0.0	0.0	0.0	0.6	0.0	0.0
Total Delay	7.9	0.4	27.6	2.8	61.7	1.0
LOS	A	A	C	A	E	A
Approach Delay	7.7			13.5		
Approach LOS	A			B		
Queue Length 50th (ft)	82	0	75	20	203	0
Queue Length 95th (ft)	92	m0	94	23	263	0
Internal Link Dist (ft)	1743			500		
Turn Bay Length (ft)	300					
Base Capacity (vph)	2219	717	1030	2664	658	1583
Starvation Cap Reductn	0	0	0	1016	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.07	0.83	0.69	0.80	0.46
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: 0.88						
Intersection Signal Delay: 14.6						Intersection LOS: B
Intersection Capacity Utilization 76.4%						ICU Level of Service D
Analysis Period (min) 15						
m Volume for 95th percentile queue is metered by upstream signal.						

HCM Signalized Intersection Capacity Analysis
2: Old Milton Pkwy & SB Ramp

Existing AM
2/16/2007

	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	AAA	AA	AA	AA				AA	AA	A
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
Lane Util. Factor	0.91	1.00	0.97	0.95				0.97	1.00	1.00
Flt Protected	1.00	1.00	0.95	1.00				1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	3433	3539				3433	1583	1583
Flt Permitted	1.00	1.00	0.95	1.00				0.95	1.00	1.00
Satd. Flow (perm)	5085	1583	3433	3539				3433	1583	1583
Volume (vph)	0	1584	41	783	1031	0	0	0	471	0
Peak-hour factor, PHF	0.88	0.88	0.88	0.91	0.91	0.92	0.92	0.89	0.89	0.89
Adj. Flow (vph)	0	1800	47	860	1133	0	0	0	529	0
RTOR Reduction (vph)	0	0	27	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1800	20	860	1133	0	0	0	529	0
Turn Type		Perm	Prot					custom		Free
Protected Phases		6	5	2						
Permitted Phases			6					8		
Actuated Green, G (s)		52.3	52.3	34.0	90.3			21.7		120.0
Effective Green, g (s)		52.3	52.3	34.0	90.3			21.7		120.0
Actuated g/C Ratio		0.44	0.44	0.28	0.75			0.18		1.00
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)		2216	690	973	2663			621		1583
v/s Ratio Prot		c0.35		c0.25	0.32					
v/s Ratio Perm		0.01						c0.15		0.46
v/c Ratio		0.81	0.03	0.88	0.43			0.85		0.46
Uniform Delay, d1		29.6	19.3	41.1	5.4			47.6		0.0
Progression Factor		0.16	0.05	0.42	0.33			1.00		1.00
Incremental Delay, d2		2.8	0.1	8.1	0.4			10.9		1.0
Delay (s)		7.6	1.0	25.6	2.2			58.5		1.0
Level of Service		A	A	C	A			E		A
Approach Delay (s)		7.5		12.3		0.0		25.2		C
Approach LOS		A		B		A				
Intersection Summary										
HCM Average Control Delay			13.7							B
HCM Volume to Capacity ratio			0.84							
Actuated Cycle Length (s)			120.0							12.0
Intersection Capacity Utilization			76.4%							D
Analysis Period (min)			15							
c Critical Lane Group										

Movement	EBU	EBT	EBR	WBL	WBT	NBR
Lane Group	EBU	EBT	EBR	WBL	WBT	NBR
Lane Group Flow (vph)	1	1605	51	111	1599	12
Act Effct Green (s)	58.0	58.0	120.0	85.0	85.0	120.0
Actuated g/C Ratio	0.48	0.48	1.00	0.71	0.71	1.00
v/c Ratio	0.01	0.65	0.03	0.26	0.44	0.01
Control Delay	2.0	3.1	0.0	11.4	3.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.0	3.1	0.0	11.4	3.3	0.0
LOS	A	A	A	B	A	A
Approach Delay	3.0					
Approach LOS	A					
Queue Length 50th (ft)	0	33	0	20	57	0
Queue Length 95th (ft)	m0	42	m0	59	64	0
Internal Link Dist (ft)	1280					
Turn Bay Length (ft)	300	2458	1583	420	3602	1583
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	0.01	0.65	0.03	0.26	0.44	0.01
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 72 (60%), Referenced to phase 2:WBTU and 6:EBTU, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.65						
Intersection Signal Delay: 3.4	Intersection LOS: A					
Intersection Capacity Utilization 42.7%	ICU Level of Service A					
Analysis Period (min) 15						
m Volume for 95th percentile queue is metered by upstream signal.						

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	g	AAA	A	A	AAA	AAA	A
Ideal Flow (vphpl)	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	0.91	1.00	1.00	0.91	1.00	0.85
Flt Protected	0.95	1.00	0.85	1.00	1.00	1.00	0.85
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1583
Flt Permitted	0.11	1.00	1.00	0.08	1.00	1.00	1.00
Satd. Flow (perm)	211	5085	1583	156	5085	1583	1583
Volume (vph)	1	1557	49	108	1551	0	12
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1	1605	51	111	1599	0	12
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	1	1605	51	111	1599	0	12
Turn Type	Perm	Free	Free	pm+pt	Free	Free	Free
Protected Phases	6	5	2				
Permitted Phases	6	Free	2	4	Free		
Actuated Green, G (s)	58.0	58.0	120.0	85.0	85.0	120.0	
Effective Green, g (s)	58.0	58.0	120.0	85.0	85.0	120.0	
Actuated g/C Ratio	0.48	0.48	1.00	0.71	0.71	1.00	
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)	102	2458	1583	420	3602	1583	
v/s Ratio Prot	c0.32			0.05	c0.31		
v/s Ratio Perm	0.00		c0.03	0.14			0.01
v/c Ratio	0.01	0.65	0.03	0.26	0.44	0.01	
Uniform Delay, d1	16.1	23.4	0.0	24.9	7.4	0.0	
Progression Factor	0.11	0.09	1.00	0.50	0.38	1.00	
Incremental Delay, d2	0.1	1.0	0.0	0.3	0.4	0.0	
Delay (s)	1.9	3.1	0.0	12.8	3.2	0.0	
Level of Service	A	A	A	B	A	A	
Approach Delay (s)	3.0			3.9		0.0	
Approach LOS	A			A		A	
Intersection Summary							
HCM Average Control Delay	3.4			HCM Level of Service			A
HCM Volume to Capacity ratio	0.43						
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			4.0
Intersection Capacity Utilization	42.7%			ICU Level of Service			A
Analysis Period (min)	15						
Critical Lane Group							

Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	17	1483	290	568	1254	124	241
Act Effct Green (s)	45.6	45.6	45.6	102.6	102.6	9.4	120.0
Actuated g/C Ratio	0.38	0.38	0.38	0.86	0.86	0.08	1.00
v/c Ratio	0.12	0.77	0.39	0.67	0.29	0.46	0.15
Control Delay	27.9	36.0	8.3	10.3	0.8	55.0	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.9	36.0	8.3	10.3	0.8	55.0	0.4
LOS	C	D	A	B	A	E	A
Approach Delay	31.4						
Approach LOS	C						
Queue Length 50th (ft)	9	365	31	75	19	47	0
Queue Length 95th (ft)	28	434	98	119	22	80	0
Internal Link Dist (ft)	495						
Turn Bay Length (ft)	275	200	300	300	315	200	200
Base Capacity (vph)	140	1934	743	846	4349	315	1583
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	0.12	0.77	0.39	0.67	0.29	0.39	0.15
Intersection Summary							
Cycle Length: 120							
Actuated Cycle Length: 120							
Offset: 65 (54%), Referenced to phase 2:WBTL and 6:EBTU, Start of Green							
Control Type: Actuated-Coordinated							
Maximum v/c Ratio: 0.77							
Intersection Signal Delay: 17.6							
Intersection Capacity Utilization 68.7%							
Analysis Period (min) 15							

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	g	AAA	A	A	AAA	AAA	A
Ideal Flow (vphpl)	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	0.91	1.00	1.00	0.91	0.97	1.00
Flt	1.00	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	3433	1583
Flt Permitted	0.20	1.00	1.00	0.08	1.00	0.95	1.00
Satd. Flow (perm)	375	5085	1583	150	5085	3433	1583
Volume (vph)	16	1364	267	523	1154	114	222
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	1483	290	568	1254	124	241
RTOR Reduction (vph)	0	0	141	0	0	0	0
Lane Group Flow (vph)	17	1483	149	568	1254	124	241
Turn Type	Perm	Perm	Perm	pm+pt			Free
Protected Phases	6	6	5	2	7		
Permitted Phases	6	6	6	2			Free
Actuated Green, G (s)	45.6	45.6	45.6	102.6	102.6	9.4	120.0
Effective Green, g (s)	45.6	45.6	45.6	102.6	102.6	9.4	120.0
Actuated g/C Ratio	0.38	0.38	0.38	0.86	0.86	0.08	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	
Lane Grp Cap (vph)	143	1932	602	844	4348	269	1583
v/s Ratio Prot	c0.29		c0.30	0.25	c0.04		
v/s Ratio Perm	0.05	0.09	0.28				0.15
v/c Ratio	0.12	0.77	0.25	0.67	0.29	0.46	0.15
Uniform Delay, d1	24.2	32.6	25.5	18.5	1.7	52.9	0.0
Progression Factor	1.00	1.00	1.00	0.28	0.37	0.94	1.00
Incremental Delay, d2	1.7	3.0	1.0	2.0	0.2	1.2	0.2
Delay (s)	25.8	35.6	26.4	7.2	0.8	50.9	0.2
Level of Service	C	D	C	A	A	D	A
Approach Delay (s)	34.0						
Approach LOS	C						
Intersection Summary							
HCM Average Control Delay	18.2						
HCM Volume to Capacity ratio	0.67						
Actuated Cycle Length (s)	120.0						
Intersection Capacity Utilization	68.7%						
Analysis Period (min)	15						
Critical Lane Group							

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Baseline
A & R Engineering Inc.
Future 2015 SAT - Improved-Queues
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Baseline
A & R Engineering Inc.

	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group								
Lane Group Flow (vph)	6	98	120	7	243	95	277	662
Act Effct Green (s)	13.0	13.0	13.0	93.1	87.5	87.5	98.9	97.1
Actuated g/C Ratio	0.11	0.11	0.11	0.78	0.73	0.73	0.82	0.81
v/c Ratio	0.03	0.64	0.43	0.01	0.09	0.08	0.34	0.23
Control Delay	35.3	69.7	13.1	2.8	5.4	1.4	2.2	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.3	69.7	13.1	2.8	5.4	1.4	2.2	1.9
LOS	D	E	B	A	A	A	A	A
Approach Delay	35.3	38.5			4.2			2.0
Approach LOS	D	D			A			A
Queue Length 50th (ft)	2	74	0	1	25	0	18	22
Queue Length 95th (ft)	15	126	54	4	46	17	32	54
Internal Link Dist (ft)	158	781			824			569
Turn Bay Length (ft)			150	150		150	200	
Base Capacity (vph)	486	398	535	821	2580	1180	1038	2863
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	0.01	0.25	0.22	0.01	0.09	0.08	0.27	0.23

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 58 (48%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 7.9
Intersection Capacity Utilization 42.0%
Analysis Period (min) 15

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	0.93			0.95			0.95			0.95		0.95
Flt Protected	0.99			0.95			0.95			0.95		0.95
Satd. Flow (prot)	1723			1770			1583			1583		1583
Flt Permitted	0.97			0.75			1.00			1.00		1.00
Satd. Flow (perm)	1680			1404			1583			1583		1583
Volume (vph)	1	2	3	90	0	110	6	224	87	255	607	2
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)	1	2	3	98	0	120	7	243	95	277	660	2
RTOR Reduction (vph)	0	3	0	0	0	107	0	0	26	0	0	0
Lane Group Flow (vph)	0	3	0	0	98	13	7	243	69	277	662	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	pm+pt	Perm	pm+pt	Perm	pm+pt	Perm
Protected Phases	8	8	1	4	4	4	1	6	5	2		
Permitted Phases	8			4			6		6			2
Actuated Green, G (s)	13.0			13.0			13.0		88.6		87.4	99.0
Effective Green, g (s)	13.0			13.0			13.0		88.6		87.4	99.0
Actuated g/C Ratio	0.11			0.11			0.11		0.73		0.73	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)	182			152			171		560		1153	927
v/s Ratio Prot							0.00		0.07		0.04	0.19
v/s Ratio Perm	0.00			c0.07			0.01		0.01		c0.23	
v/c Ratio	0.02			0.64			0.08		0.01		0.06	0.24
Uniform Delay, d1	47.8			51.3			48.1		4.1		4.8	2.3
Progression Factor	1.00			1.00			1.00		1.00		1.00	0.49
Incremental Delay, d2	0.0			9.0			0.2		0.1		0.1	0.2
Delay (s)	47.8			60.3			48.3		4.8		4.7	1.3
Level of Service	D			E			D		A		A	A
Approach Delay (s)	47.8			53.7			4.8		4.8		1.8	
Approach LOS	D			D			A		A		A	

Intersection Summary

HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Existing PM Intersection Analysis

Queues
1: Old Milton Pkwy & NB Ramp

Existing PM
2/16/2007

Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	780	1172	2097	508	45	545
Act Effct Green (s)	52.0	107.7	50.9	50.9	7.0	120.0
Actuated g/C Ratio	0.43	0.90	0.42	0.42	0.06	1.00
v/c Ratio	1.02	0.37	0.77	0.59	0.23	0.34
Control Delay	42.5	1.5	32.5	12.1	56.2	0.6
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	42.5	1.7	32.5	12.1	56.2	0.6
LOS	D	A	C	B	E	A
Approach Delay	18.0 28.6					
Approach LOS	B C					
Queue Length 50th (ft)	~116	47	408	96	17	0
Queue Length 95th (ft) m#782	m95	488	215	37	0	0
Internal Link Dist (ft)	500 855					
Turn Bay Length (ft)	300					
Base Capacity (vph)	767	3177	2720	864	458	1583
Starvation Cap Reductn	0	865	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	1.02	0.51	0.77	0.59	0.10	0.34
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 64 (53%), Referenced to phase 2:WBT and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 1.02						
Intersection Signal Delay: 21.8						
Intersection Capacity Utilization 83.3%						
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.						

HCM Signalized Intersection Capacity Analysis
1: Old Milton Pkwy & NB Ramp

Existing PM
2/16/2007

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		0.86	1.00	0.97			1.00			
Flt Protected	0.95	1.00		1.00	0.85	1.00			0.85			
Satd. Flow (prot)	1770	3539		6408	1583	3433			1583			
Flt Permitted	0.95	1.00		1.00	1.00	0.95			1.00			
Satd. Flow (perm)	1770	3539		6408	1583	3433			1583			
Volume (vph)	757	1137	0	0	2034	493	44	0	529	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	780	1172	0	0	2097	508	45	0	545	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	194	0	0	0	0	0	0
Lane Group Flow (vph)	780	1172	0	0	2097	314	45	0	545	0	0	0
Turn Type	Prot						Permcustom					
Protected Phases	1	6			2		4					
Permitted Phases												
Actuated Green, G (s)	52.0	106.1		50.1	50.1	5.9			120.0			
Effective Green, g (s)	52.0	106.1		50.1	50.1	5.9			120.0			
Actuated g/C Ratio	0.43	0.88		0.42	0.42	0.05			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)	767	3129		2675	661	169			1583			
v/s Ratio Prot	c0.44	0.33		c0.33								
v/s Ratio Perm				0.20	0.01				c0.34			
v/c Ratio	1.02	0.37		0.78	0.48	0.27			0.34			
Uniform Delay, d1	34.0	1.2		30.3	25.4	55.0			0.0			
Progression Factor	0.37	1.07		1.00	1.00	1.00			1.00			
Incremental Delay, d2	26.8	0.2		2.4	2.4	0.8			0.6			
Delay (s)	39.3	1.5		32.6	27.8	55.8			0.6			
Level of Service	D	A		C	C	E			A			
Approach Delay (s)	16.6						31.7					
Approach LOS	B						C					
Intersection Summary												
HCM Average Control Delay	22.9						HCM Level of Service					
HCM Volume to Capacity ratio	0.85						C					
Actuated Cycle Length (s)	120.0						Sum of lost time (s)					
Intersection Capacity Utilization	83.3%						ICU Level of Service					
Analysis Period (min)	15						E					
Critical Lane Group												

Queues
2: Old Milton Pkwy & SB Ramp

Existing PM
2/16/2007

Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	1847	224	1191	1110	285	421
Act Effct Green (s)	49.1	49.1	44.6	97.7	14.3	120.0
Actuated g/C Ratio	0.41	0.41	0.37	0.81	0.12	1.00
v/c Ratio	0.89	0.29	0.93	0.39	0.70	0.27
Control Delay	17.8	1.4	21.6	0.5	60.1	0.4
Queue Delay	0.0	0.0	0.0	0.6	0.0	0.0
Total Delay	17.8	1.4	21.6	1.1	60.1	0.4
LOS	B	A	C	A	E	A
Approach Delay	16.0					
Approach LOS	B					
Queue Length 50th (ft)	494	7	65	4	110	0
Queue Length 95th (ft)	302	12	#559	9	153	0
Internal Link Dist (ft)	1743					
Turn Bay Length (ft)	300					
Base Capacity (vph)	2081	773	1308	2882	458	1583
Starvation Cap Reductn	0	0	0	1251	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	0.29	0.91	0.68	0.62	0.27
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: 0.93						
Intersection Signal Delay: 15.2	Intersection LOS: B					
Intersection Capacity Utilization 83.3%	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.						

HCM Signalized Intersection Capacity Analysis
2: Old Milton Pkwy & SB Ramp

Existing PM
2/16/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
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	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.95	1.00
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	5085	1583	3433	3539	5085	1583	3433	3539	5085	1583	3433	3539
Flt Permitted	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	5085	1583	3433	3539	5085	1583	3433	3539	5085	1583	3433	3539
Volume (vph)	0	1625	197	1084	1010	0	0	0	0	254	0	375
Peak-hour factor, PHF	0.88	0.88	0.88	0.91	0.91	0.91	0.92	0.92	0.92	0.89	0.89	0.89
Adj. Flow (vph)	0	1847	224	1191	1110	0	0	0	0	285	0	421
RTOR Reduction (vph)	0	0	125	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1847	99	1191	1110	0	0	0	0	285	0	421
Turn Type		Perm	Prot							custom		Free
Protected Phases		6	5	2						8		Free
Permitted Phases			6							14.3		120.0
Actuated Green, G (s)		49.1	49.1	44.6	97.7					14.3		120.0
Effective Green, g (s)		49.1	49.1	44.6	97.7					14.3		120.0
Actuated g/C Ratio		0.41	0.41	0.37	0.81					0.12		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)		2081	648	1276	2881					409		1583
v/s Ratio Prot		c0.36		c0.35	0.31					c0.08		0.27
v/s Ratio Perm		0.89	0.15	0.93	0.39					0.70		0.27
Uniform Delay, d1		32.9	22.3	36.3	3.0					50.8		0.0
Progression Factor		0.34	0.14	0.28	0.09					1.00		1.00
Incremental Delay, d2		5.6	0.5	9.3	0.3					5.1		0.4
Delay (s)		16.8	3.5	19.6	0.5					55.9		0.4
Level of Service		B	A	B	A					E		A
Approach Delay (s)		15.4		10.4				0.0		22.8		
Approach LOS		B		B				A		C		
Intersection Summary												
HCM Average Control Delay		14.1						HCM Level of Service		B		
HCM Volume to Capacity ratio		0.88										
Actuated Cycle Length (s)		120.0						Sum of lost time (s)		12.0		
Intersection Capacity Utilization		83.3%						ICU Level of Service		E		
Analysis Period (min)		15										
c Critical Lane Group												

Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	20	1773	8	11	1424	52	81
Act Effct Green (s)	83.1	83.1	120.0	85.0	85.0	27.0	120.0
Actuated g/C Ratio	0.69	0.69	1.00	0.71	0.71	0.22	1.00
v/c Ratio	0.09	0.50	0.01	0.07	0.40	0.07	0.05
Control Delay	1.9	2.1	0.0	2.5	2.2	37.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.9	2.1	0.0	2.5	2.2	37.0	0.1
LOS	A	A	A	A	A	D	A
Approach Delay	2.1				2.2	14.5	
Approach LOS	A				A	B	
Queue Length 50th (ft)	0	14	0	1	37	16	0
Queue Length 95th (ft)	m2	31	m0	m2	42	33	0
Internal Link Dist (ft)		1280			1743	295	
Turn Bay Length (ft)	300		250			100	
Base Capacity (vph)	227	3520	1583	343	3602	772	1583
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	0.09	0.50	0.01	0.03	0.40	0.07	0.05
Intersection Summary							
Cycle Length: 120							
Actuated Cycle Length: 120							
Offset: 79 (66%), Referenced to phase 2:WBTL and 6:EBTU, Start of Green							
Control Type: Actuated-Coordinated							
Maximum v/c Ratio: 0.50							
Intersection Signal Delay: 2.6							Intersection LOS: A
Intersection Capacity Utilization 43.2%							ICU Level of Service A
Analysis Period (min) 15							
m Volume for 95th percentile queue is metered by upstream signal.							

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	g	AAA	A	A	AAA	AAA	A
Ideal Flow (vphpl)	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	0.91	1.00	1.00	0.91	0.97	1.00
Flt Protected	1.00	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	3433	1583
Flt Permitted	0.16	1.00	1.00	0.09	1.00	0.95	1.00
Satd. Flow (perm)	306	5085	1583	165	5085	3433	1583
Volume (vph)	19	1720	8	11	1381	50	79
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	20	1773	8	11	1424	52	81
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	20	1773	8	11	1424	52	81
Turn Type	Perm	Free	Free	pm+pt	Free	Free	Free
Protected Phases	6	5	2				
Permitted Phases	6	Free	2		4	Free	
Actuated Green, G (s)	79.9	79.9	120.0	85.0	85.0	27.0	120.0
Effective Green, g (s)	79.9	79.9	120.0	85.0	85.0	27.0	120.0
Actuated g/C Ratio	0.67	0.67	1.00	0.71	0.71	0.22	1.00
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	3.0	
Lane Grp Cap (vph)	204	3386	1583	132	3602	772	1583
v/s Ratio Prot	0.07	0.06	0.01	0.06	0.028	0.05	
v/s Ratio Perm	0.10	0.52	0.01	0.08	0.40	0.07	0.05
Uniform Delay, d1	7.2	10.3	0.0	7.4	7.1	36.6	0.0
Progression Factor	0.17	0.18	1.00	0.32	0.26	1.00	1.00
Incremental Delay, d2	0.8	0.5	0.0	0.3	0.3	0.2	0.1
Delay (s)	2.0	2.4	0.0	2.6	2.1	36.8	0.1
Level of Service	A	A	A	A	A	D	A
Approach Delay (s)	2.3				2.1	14.4	
Approach LOS	A				A	B	
Intersection Summary							
HCM Average Control Delay			2.7		HCM Level of Service		A
HCM Volume to Capacity ratio			0.41				
Actuated Cycle Length (s)			120.0		Sum of lost time (s)		12.0
Intersection Capacity Utilization			43.2%		ICU Level of Service		A
Analysis Period (min)			15				
c Critical Lane Group							

Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	18	1199	122	342	1300	357	718
Act Effct Green (s)	52.0	52.0	52.0	95.0	95.0	17.0	120.0
Actuated g/C Ratio	0.43	0.43	0.43	0.79	0.79	0.14	1.00
v/c Ratio	0.14	0.54	0.16	0.50	0.32	0.73	0.45
Control Delay	26.4	26.9	5.4	7.7	1.0	50.7	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.4	26.9	5.4	7.7	1.0	50.7	2.3
LOS	C	C	A	A	A	D	A
Approach Delay	24.9						
Approach LOS	C						
Queue Length 50th (ft)	8	246	3	25	17	139	50
Queue Length 95th (ft)	28	321	42	82	23	131	103
Internal Link Dist (ft)	495						
Turn Bay Length (ft)	275	200	300				
Base Capacity (vph)	128	2204	751	680	4026	772	1583
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	0.14	0.54	0.16	0.50	0.32	0.46	0.45
Intersection Summary							
Cycle Length: 120							
Actuated Cycle Length: 120							
Offset: 76 (63%), Referenced to phase 2:WBTL and 6:EBTU, Start of Green							
Control Type: Actuated-Coordinated							
Maximum v/c Ratio: 0.73							
Intersection Signal Delay: 14.1							
Intersection Capacity Utilization 58.1%							
Analysis Period (min) 15							

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	g	AAA	A	A	AAA	AAA	A
Ideal Flow (vphpl)	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	0.91	1.00	1.00	0.91	0.97	1.00
Frt	1.00	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	3433	1583
Flt Permitted	0.18	1.00	1.00	0.15	1.00	0.95	1.00
Satd. Flow (perm)	337	5085	1583	282	5085	3433	1583
Volume (vph)	17	1103	112	315	1196	328	661
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	18	1199	122	342	1300	357	718
RTOR Reduction (vph)	0	0	65	0	0	0	0
Lane Group Flow (vph)	18	1199	57	342	1300	357	718
Turn Type	Perm	Perm	Perm	pm+pt	Free	Free	Free
Protected Phases	6	6	5	2	7		
Permitted Phases	6	6	6	2			
Actuated Green, G (s)	52.0	52.0	52.0	95.0	95.0	17.0	120.0
Effective Green, g (s)	52.0	52.0	52.0	95.0	95.0	17.0	120.0
Actuated g/C Ratio	0.43	0.43	0.43	0.79	0.79	0.14	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)	146	2204	686	707	4026	486	1583
v/s Ratio Prot	c0.24		0.16	0.26	c0.10		
v/s Ratio Perm	0.05		0.04	0.23			c0.45
v/c Ratio	0.12	0.54	0.08	0.48	0.32	0.73	0.45
Uniform Delay, d1	20.4	25.2	20.0	15.9	3.5	49.3	0.0
Progression Factor	1.00	1.00	1.00	0.24	0.22	0.86	1.00
Incremental Delay, d2	1.7	1.0	0.2	0.5	0.2	5.2	0.9
Delay (s)	22.1	26.2	20.2	4.3	1.0	47.6	0.9
Level of Service	C	C	C	A	A	D	A
Approach Delay (s)	25.6						
Approach LOS	C						
Intersection Summary							
HCM Average Control Delay	13.5						
HCM Volume to Capacity ratio	0.54						
Actuated Cycle Length (s)	120.0						
Intersection Capacity Utilization	58.1%						
Analysis Period (min)	15						
Critical Lane Group							

HCM Unsignalized Intersection Capacity Analysis
5: Kimball Bridge Rd & Bailey Johnson Rd
Existing PM
2/16/2007

Existing PM
2/16/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔		↔	↔	↔	↔	↔
Sign Control		Free	Free	Free	Free	Free		Stop	Stop	Stop	Stop	Stop
Grade		0%						0%				0%
Volume (veh/h)	1	243	37	183	362	1	86	0	223	1	1	2
Peak Hour Factor	0.25	0.94	0.84	0.85	0.89	0.25	0.86	0.92	0.87	0.25	0.25	0.50
Hourly flow rate (vph)	4	259	44	215	407	4	100	0	256	4	4	4
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	411		259				1110	1108	259	1106	1106	409
VC1, stage 1 conf vol												
VC2, stage 2 conf vol	411		259				1110	1108	259	1106	1106	409
VCu, unblocked vol												
IC, single (s)	4.1		4.1				7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2		2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100		84				37	100	67	96	98	99
cM capacity (veh/h)	1148		1306				159	175	780	110	175	643
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	263	44	215	411	100	256	12					
Volume Left	4	0	215	0	100	0	4					
Volume Right	0	44	0	4	0	256	4					
cSH	1148	1700	1306	1700	159	780	183					
Volume to Capacity	0.00	0.03	0.16	0.24	0.63	0.33	0.07					
Queue Length 95th (ft)	0	0	15	0	87	36	5					
Control Delay (s)	0.2	0.0	8.3	0.0	59.9	11.9	26.0					
Lane LOS	A		A		F	B	D					
Approach Delay (s)			2.9		25.3		26.0					
Approach LOS	0.1				D		D					
Intersection Summary												
Average Delay			8.6									
Intersection Capacity Utilization			53.4%							A		
Analysis Period (min)			15									

Project	Existing PM
HCM Unsignalized Intersection Capacity Analysis	2/16/2007
6: Kimball Bridge Rd & Parkway 400 Driveway	Existing PM

Existing PM
2/16/2007



Movement		EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	Sign Control	Free	Free	Free	Free	Stop	Stop
Grade		0%	0%	0%	0%	0%	0%
Volume (veh/h)		22	206	462	17	32	33
Peak Hour Factor		0.79	0.90	0.94	0.71	0.80	0.82
Hourly flow rate (vph)		28	229	491	24	40	40
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type						None	
Median storage (veh)							
Upstream signal (ft)		861					
pX, platoon unblocked							
vC, conflicting volume		515				776	491
VC1, stage 1 conf vol							
VC2, stage 2 conf vol		515				776	491
vCu, unblocked vol		4.1				6.4	6.2
IC, single (s)							
IC, 2 stage (s)							
IF (s)		2.2				3.5	3.3
p0 queue free %		97				89	93
cM capacity (veh/h)		1050				356	577
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1		
Volume Total	28	229	491	24	80		
Volume Left	28	0	0	0	40		
Volume Right	0	0	0	24	40		
cSH	1050	1700	1700	1700	441		
Volume to Capacity	0.03	0.13	0.29	0.01	0.18		
Queue Length 95th (ft)	2	0	0	0	16		
Control Delay (s)	8.5	0.0	0.0	0.0	15.0		
Lane LOS	A				B		
Approach Delay (s)	0.9		0.0		15.0		
Approach LOS					B		
Intersection Summary							
Average Delay			1.7				
Intersection Capacity Utilization		34.8%				ICU Level of Service	A
Analysis Period (min)			15				

	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group								
Lane Group Flow (vph)	40	176	351	8	890	73	140	346
Act Effct Green (s)	19.8	19.8	19.8	86.4	80.7	80.7	92.0	90.2
Actuated g/C Ratio	0.16	0.16	0.16	0.72	0.67	0.67	0.77	0.75
v/c Ratio	0.16	0.79	0.65	0.01	0.37	0.07	0.43	0.13
Control Delay	33.9	70.6	11.0	5.0	10.1	3.7	8.8	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.9	70.6	11.0	5.0	10.1	3.7	8.8	4.1
LOS	C	E	B	A	B	A	A	A
Approach Delay	33.9	30.9			9.5			5.5
Approach LOS	C	C			A			A
Queue Length 50th (ft)	21	133	9	1	142	4	17	22
Queue Length 95th (ft)	49	196	89	7	238	26	32	85
Internal Link Dist (ft)	158	781			824			569
Turn Bay Length (ft)			150	150		150	200	
Base Capacity (vph)	476	429	732	885	2381	1083	503	2652
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	0.08	0.41	0.48	0.01	0.37	0.07	0.28	0.13
Intersection Summary								
Cycle Length: 120								
Actuated Cycle Length: 120								
Offset: 51 (43%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.79								
Intersection Signal Delay: 14.6								
Intersection Capacity Utilization 56.0%								
Analysis Period (min) 15								

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
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	0.97	0.97	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected												
Satd. Flow (prot)	1754	1754	1754	1775	1775	1775	1770	1770	1770	1770	1770	1770
Flt Permitted	0.74	0.74	0.74	0.74	0.74	0.74	0.54	0.54	0.54	0.54	0.54	0.54
Satd. Flow (perm)	1337	1337	1337	1386	1386	1386	1386	1386	1386	1386	1386	1386
Volume (vph)	22	6	8	160	2	323	7	819	67	129	311	7
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)	24	7	9	174	2	351	8	890	73	140	338	8
RTOR Reduction (vph)	0	8	0	0	0	282	0	0	18	0	1	0
Lane Group Flow (vph)	0	32	0	0	176	69	8	890	55	140	345	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	pm+pt	Perm	pm+pt	Perm	pm+pt	Perm
Protected Phases	8	8	1	4	4	1	6	5	2			
Permitted Phases	8	8	1	4	4	1	6	5	2			
Actuated Green, G (s)	19.8	19.8	19.8	19.8	19.8	19.8	82.0	80.8	80.8	92.2	87.0	87.0
Effective Green, g (s)	19.8	19.8	19.8	19.8	19.8	19.8	82.0	80.8	80.8	92.2	87.0	87.0
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.68	0.67	0.67	0.77	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)	221	229	261	700	2383	1066	462	2557				
v/s Ratio Prot												
v/s Ratio Perm	0.02	0.02	0.13	0.04	0.01	0.03	0.21					
v/c Ratio	0.15	0.15	0.77	0.26	0.01	0.37	0.05	0.30	0.14			
Uniform Delay, d1	42.9	42.9	47.9	43.7	6.0	8.6	6.6	4.5	5.0			
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.12	0.77		
Incremental Delay, d2	0.3	0.3	14.3	0.5	0.4	0.1	0.3	0.1	0.3	0.1		
Delay (s)	43.2	43.2	62.2	44.3	6.1	9.0	6.7	5.4	4.0			
Level of Service	D	D	E	D	A	A	A	A	A	A		
Approach Delay (s)	43.2	50.3					8.8			4.4		
Approach LOS	D	D					A			A		
Intersection Summary												
HCM Average Control Delay							19.2			HCM Level of Service		B
HCM Volume to Capacity ratio							0.44					
Actuated Cycle Length (s)							120.0			Sum of lost time (s)		12.0
Intersection Capacity Utilization							56.0%			ICU Level of Service		B
Analysis Period (min)							15					
c Critical Lane Group												

Base AM Intersection Analysis

Base 2010 AM

Queues
1: Old Milton Pkwy & NB Ramp

Base AM
2/16/2007

Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	622	1795	2027	301	564	1099
Act Effct Green (s)	46.0	91.0	41.0	41.0	21.0	120.0
Actuated g/C Ratio	0.38	0.76	0.34	0.34	0.18	1.00
v/c Ratio	0.92	0.67	0.93	0.41	0.94	0.69
Control Delay	35.0	6.1	46.5	4.9	73.5	2.5
Queue Delay	6.9	0.1	0.0	0.0	0.0	0.0
Total Delay	41.9	6.2	46.5	4.9	73.5	2.5
LOS	D	A	D	A	E	A
Approach Delay	15.4 41.1					
Approach LOS	B D					
Queue Length 50th (ft)	472	128	437	0	224	0
Queue Length 95th (ft) m#623	147	#490	60	#331	0	0
Internal Link Dist (ft)	500 855					
Turn Bay Length (ft)	300					
Base Capacity (vph)	679	2684	2189	739	601	1583
Starvation Cap Reductn	40	164	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	0.97	0.71	0.93	0.41	0.94	0.69
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 92 (77%), Referenced to phase 2:WBT and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.94						
Intersection Signal Delay: 27.7	Intersection LOS: C					
Intersection Capacity Utilization 83.5%	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.						

HCM Signalized Intersection Capacity Analysis
1: Old Milton Pkwy & NB Ramp

Base AM
2/16/2007

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	0.86	1.00	0.97	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	3539	6408	1583	3433	1583	1583	3433	1583	3433	1583	1583
Flt Permitted	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1770	3539	6408	1583	3433	1583	1583	3433	1583	3433	1583	1583
Volume (vph)	572	1651	0	0	1865	277	519	0	1011	0	0	0
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)	622	1795	0	0	2027	301	564	0	1099	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	198	0	0	0	0	0	0
Lane Group Flow (vph)	622	1795	0	0	2027	103	564	0	1099	0	0	0
Turn Type	Prot Permcustom											
Protected Phases	1	6	2	2	4	4	4	4	4	4	4	4
Permitted Phases	Free											
Actuated Green, G (s)	46.0	91.0	41.0	41.0	21.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0
Effective Green, g (s)	46.0	91.0	41.0	41.0	21.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0
Actuated g/C Ratio	0.38	0.76	0.34	0.34	0.18	1.00	1.00	1.00	1.00	1.00	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	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)	679	2684	2189	541	601	1583	1583	1583	1583	1583	1583	1583
v/s Ratio Prot	c0.35	0.51	0.32	0.32	0.16	0.69	0.69	0.69	0.69	0.69	0.69	0.69
v/s Ratio Perm	0.92	0.67	0.93	0.19	0.94	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Uniform Delay, d1	35.2	7.1	38.0	27.8	48.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Progression Factor	0.64	0.74	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.7	0.7	8.2	0.8	22.4	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Delay (s)	32.2	6.0	46.3	28.6	71.3	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Level of Service	C	A	D	C	E	A	A	A	A	A	A	A
Approach Delay (s)	12.7	44.0	25.8	25.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	B	D	C	C	A	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	27.5 HCM Level of Service C											
HCM Volume to Capacity ratio	0.92											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 12.0											
Intersection Capacity Utilization	83.5% ICU Level of Service E											
Analysis Period (min)	15											
c Critical Lane Group												

	EBT	EBR	WBL	WBT	SBL	SBR	
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR	
Lane Group Flow (vph)	1874	220	903	1686	543	987	
Act Effct Green (s)	52.3	52.3	34.3	90.7	21.3	120.0	
Actuated g/C Ratio	0.44	0.44	0.29	0.76	0.18	1.00	
v/c Ratio	0.84	0.27	0.92	0.63	0.89	0.62	
Control Delay	20.9	1.2	58.0	3.3	65.9	1.9	
Queue Delay	0.0	0.0	0.0	1.1	0.0	0.0	
Total Delay	21.0	1.2	58.0	4.4	65.9	1.9	
LOS	C	A	E	A	E	A	
Approach Delay	18.9			23.1			
Approach LOS	B			C			
Queue Length 50th (ft)	361	0	296	88	212	0	
Queue Length 95th (ft)	358	12	m333	m93	#302	0	
Internal Link Dist (ft)	1226			500			
Turn Bay Length (ft)	300						
Base Capacity (vph)	2218	811	1030	2674	629	1583	
Starvation Cap Reductn	0	0	0	684	0	0	
Spillback Cap Reductn	6	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.85	0.27	0.88	0.85	0.86	0.62	
Intersection Summary							
Cycle Length: 120							
Actuated Cycle Length: 120							
Offset: 115 (96%). Referenced to phase 2:WBT and 6:EBT, Start of Green							
Control Type: Actuated-Coordinated							
Maximum v/c Ratio: 0.92							
Intersection Signal Delay: 22.0							Intersection LOS: C
Intersection Capacity Utilization 83.5%							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.							

	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	0.91	1.00	0.97	0.95	1.00	0.85	1.00	0.97	1.00	0.85	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5085	1583	3433	3539	3539	3539	3539	3433	3433	3433	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	5085	1583	3433	3539	3539	3539	3539	3433	3433	3433	3433	1583
Volume (vph)	0	1724	202	831	1551	0	0	0	0	500	0	908
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)	0	1874	220	903	1686	0	0	0	0	543	0	987
RTOR Reduction (vph)	0	0	121	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1874	99	903	1686	0	0	0	0	543	0	987
Turn Type		Perm	Prot							custom		Free
Protected Phases		6	5	2						8		Free
Permitted Phases												
Actuated Green, G (s)		52.4	52.4	34.3	90.7					21.3		120.0
Effective Green, g (s)		52.4	52.4	34.3	90.7					21.3		120.0
Actuated g/C Ratio		0.44	0.44	0.29	0.76					0.18		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)		2220	691	981	2675					609		1583
v/s Ratio Prot		c0.37		c0.26	0.48							
v/s Ratio Perm			0.06							c0.16		0.62
v/c Ratio		0.84	0.14	0.92	0.63					0.89		0.62
Uniform Delay, d1		30.2	20.3	41.5	6.8					48.2		0.0
Progression Factor		0.55	0.14	1.25	0.41					1.00		1.00
Incremental Delay, d2		3.6	0.4	5.8	0.4					15.3		1.9
Delay (s)		20.2	3.2	57.6	3.2					63.5		1.9
Level of Service		C	A	E	A					E		A
Approach Delay (s)		18.4			22.2			0.0			23.7	
Approach LOS		B			C			A			C	
Intersection Summary												
HCM Average Control Delay			21.3									C
HCM Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			120.0							12.0		
Intersection Capacity Utilization			83.5%							ICU Level of Service		E
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
3: Old Milton Pkwy & Alpha Ct

Base AM
2/16/2007

Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR		
Lane Configurations	↰	↱	↰	↱		↰	↱		
Sign Control	Free	Free	Free	Free	Free	Stop	Stop		
Grade	0%	0%	0%	0%	0%	0%	0%		
Volume (veh/h)	115	1748	16	1758	47	162	14		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	125	1900	0	1911	51	176	15		
Pedestrians									
Lane Width (ft)									
Walking Speed (ft/s)									
Percent Blockage									
Right turn flare (veh)									
Median type						None			
Median storage (veh)									
Upstream signal (ft)	519		1306						
pX, platoon unblocked		0.00				0.77			
vC, conflicting volume	1962		0			2820	662		
VC1, stage 1 conf vol									
VC2, stage 2 conf vol									
VCu, unblocked vol	1962		0			2766	662		
tC, single (s)	4.1		0.0			6.8	6.9		
tC, 2 stage (s)									
tF (s)	2.2		0.0			3.5	3.3		
p0 queue free %	57		0			0	96		
cM capacity (veh/h)	293		0			7	404		
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	SB 1
Volume Total	125	633	633	633	764	764	433	0	191
Volume Left	125	0	0	0	0	0	0	0	176
Volume Right	0	0	0	0	0	0	0	51	0
cSH	293	1700	1700	1700	1700	1700	1700	1700	7
Volume to Capacity	0.43	0.37	0.37	0.37	0.45	0.45	0.25	0.00	25.80
Queue Length 95th (ft)	51	0	0	0	0	0	0	0	Err
Control Delay (s)	26.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Err
Lane LOS	D								F
Approach Delay (s)	1.6				0.0				Err
Approach LOS									F
Intersection Summary									
Average Delay	458.6								
Intersection Capacity Utilization	61.2%								
Analysis Period (min)	15								
	ICU Level of Service								
	B								

Baseline
A & R Engineering Inc.

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Queues
4: Old Milton Pkwy & Amber Park Dr

Base AM
2/16/2007

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT	
Lane Group Flow (vph)	246	1847	57	125	1773	34	14	72	37	
Act Effct Green (s)	72.0	72.0	120.0	84.0	84.0	84.0	18.4	7.5	28.0	
Actuated g/C Ratio	0.60	0.60	1.00	0.70	0.70	0.70	0.15	0.06	0.23	
v/c Ratio	2.34	0.61	0.04	0.60	0.50	0.03	0.04	0.33	0.09	
Control Delay	645.3	2.8	0.0	24.1	3.2	0.5	0.2	57.9	12.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	645.3	2.8	0.0	24.1	3.2	0.5	0.2	57.9	12.4	
LOS	F	A	A	C	A	A	A	E	B	
Approach Delay	76.3									
Approach LOS	E									
Queue Length 50th (ft)	~322	23	0	20	58	0	0	27	1	
Queue Length 95th (ft)	#490	30	m0	m76	95	m0	0	52	29	
Internal Link Dist (ft)	1280									
Turn Bay Length (ft)	300	250								
Base Capacity (vph)	105	3051	1583	207	3560	1118	359	229	397	
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	2.34	0.61	0.04	0.60	0.50	0.03	0.04	0.31	0.09	
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 92 (77%), Referenced to phase 2:WBT and 6:EBTL, Start of Green										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 2.34										
Intersection Signal Delay: 42.1										
Intersection Capacity Utilization 62.6%										
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.									

Baseline
A & R Engineering Inc.

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HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Base AM
2/16/2007

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	3	3	3	3	3	3	3	3	3	3	3	3
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	1.00	0.91	1.00	0.85	1.00	0.85	1.00	0.97	1.00
Flt	1.00	1.00	0.85	1.00	1.00	1.00	0.85	1.00	0.85	1.00	0.95	1.00
Flt Protected	0.95	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)	1770	5085	1583	1770	5085	1583	1583	1583	1583	3433	1583	1583
Flt Permitted	0.09	1.00	1.00	0.07	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	172	5085	1583	138	5085	1583	1583	1583	1583	3433	1583	1583
Volume (vph)	1	225	1699	52	115	1631	31	0	0	13	66	0
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)	1	245	1847	57	125	1773	34	0	0	14	72	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	10	0	12	0	0
Lane Group Flow (vph)	0	246	1847	57	125	1773	24	0	2	0	72	10
Turn Type	Perm	Perm	Free	pm+pt	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	6	6	Free	2	5	2	2	4	4	3	8	8
Permitted Phases	6	6	Free	2	5	2	2	4	4	3	8	8
Actuated Green, G (s)	71.2	71.2	120.0	83.2	83.2	83.2	83.2	18.4	18.4	6.4	28.8	28.8
Effective Green, g (s)	71.2	71.2	120.0	83.2	83.2	83.2	83.2	18.4	18.4	6.4	28.8	28.8
Actuated g/C Ratio	0.59	0.59	1.00	0.69	0.69	0.69	0.69	0.15	0.15	0.05	0.24	0.24
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)	102	3017	1583	204	3526	1098	243	183	380	183	380	380
v/s Ratio Prot	0.36	0.36	0.04	0.35	0.04	0.35	0.00	0.00	0.00	c0.02	0.01	0.01
v/s Ratio Perm	c1.43	0.61	0.04	0.38	0.04	0.38	0.01	0.01	0.01	0.39	0.03	0.03
Uniform Delay, d1	24.4	15.6	0.0	29.5	8.7	5.7	43.1	54.9	34.9	54.9	34.9	34.9
Progression Factor	0.50	0.14	1.00	0.50	0.33	0.24	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	659.7	0.8	0.0	4.2	0.4	0.0	0.1	1.4	0.1	1.4	0.1	0.1
Delay (s)	671.8	2.9	0.0	19.0	3.3	1.4	43.1	56.3	35.0	56.3	35.0	35.0
Level of Service	F	A	A	B	A	A	A	D	D	E	C	C
Approach Delay (s)	79.4	79.4	4.3	43.1	43.1	43.1	43.1	43.1	43.1	49.1	49.1	49.1
Approach LOS	E	E	A	D	D	D	D	D	D	D	D	D

Intersection Summary			
HCM Average Control Delay	44.0	HCM Level of Service	
HCM Volume to Capacity ratio	1.61	D	
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	
Intersection Capacity Utilization	62.6%	ICU Level of Service	
Analysis Period (min)	15	B	
Critical Lane Group			

Baseline
A & R Engineering Inc.

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HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Base AM
2/16/2007

Movement	SBR
Lane Configurations	1900
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	34
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	37
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary	
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Baseline
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Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	323	1799	308	640	1339	134	582	302	24	228	190
Act Effct Green (s)	68.0	68.0	68.0	95.0	95.0	17.0	17.0	120.0	17.0	17.0	17.0
Actuated g/C Ratio	0.57	0.57	0.57	0.79	0.79	0.14	0.14	1.00	0.14	0.14	0.14
v/c Ratio	1.59	0.62	0.33	1.53	0.33	1.04	1.16	0.19	0.39	0.46	0.59
Control Delay	312.3	18.6	11.5	274.2	5.0	135.1	134.4	0.3	66.2	50.5	28.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	312.3	18.6	11.5	274.2	5.0	135.1	134.4	0.3	66.2	50.5	28.4
LOS	F	B	B	F	A	F	F	A	E	D	C
Approach Delay	56.8										
Approach LOS	E										
Queue Length 50th (ft)	~357	325	90	~627	135	~114	~283	0	17	86	55
Queue Length 95th (ft)	#388	374	147	m#859	m144	#245	#404	0	48	128	134
Internal Link Dist (ft)	495										
Turn Bay Length (ft)	275	200	300	250	250	250	250	250	250	250	250
Base Capacity (vph)	203	2882	928	417	4026	129	501	1583	62	501	321
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.59	0.62	0.33	1.53	0.33	1.04	1.16	0.19	0.39	0.46	0.59

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 72 (60%), Referenced to phase 2:WBTl and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.59	
Intersection Signal Delay: 74.1	Intersection LOS: E
Intersection Capacity Utilization 96.1%	ICU Level of Service F
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.	

Movement	EBU	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	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
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	0.91	1.00	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95
Flt	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	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1770	3539	1583	1770	3539	3539
Flt Permitted	0.19	1.00	1.00	1.00	0.07	1.00	0.49	1.00	1.00	0.24	1.00
Satd. Flow (perm)	358	5085	1583	128	5085	911	3539	1583	438	3539	3539
Volume (vph)	17	281	1655	283	589	1232	0	123	535	278	22
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)	18	305	1799	308	640	1339	0	134	582	302	24
RTOR Reduction (vph)	0	0	0	31	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	323	1799	277	640	1339	0	134	582	302	24
Turn Type	Perm	Perm	Perm	Perm	pm+pt	Perm	Perm	Perm	Free	Perm	Perm
Protected Phases	6	6	6	6	5	2	4	4	4	4	8
Permitted Phases	6	6	6	6	2	2	4	4	4	4	8
Actuated Green, G (s)	68.0	68.0	68.0	68.0	95.0	95.0	17.0	17.0	120.0	17.0	17.0
Effective Green, g (s)	68.0	68.0	68.0	68.0	95.0	95.0	17.0	17.0	120.0	17.0	17.0
Actuated g/C Ratio	0.57	0.57	0.57	0.57	0.79	0.79	0.14	0.14	1.00	0.14	0.14
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)	203	2882	897	416	4026	129	501	1583	62	501	321
v/s Ratio Prot	0.90	0.35	0.18	0.18	0.29	0.26	0.15	0.15	0.19	0.05	0.06
v/s Ratio Perm	1.59	0.62	0.31	1.54	0.33	1.04	1.16	0.19	0.39	0.46	0.59
Uniform Delay, d1	26.0	17.4	13.7	37.9	3.5	3.5	51.5	51.5	0.0	46.8	47.3
Progression Factor	1.00	1.00	1.00	0.62	1.36	1.36	0.90	0.91	1.00	1.00	1.00
Incremental Delay, d2	288.1	1.0	0.9	253.1	0.2	0.2	88.0	92.1	0.3	17.3	3.0
Delay (s)	314.1	18.5	14.6	276.4	5.0	134.3	139.0	0.3	64.0	50.2	28.4
Level of Service	F	B	B	F	A	F	F	F	A	E	D
Approach Delay (s)	57.3										
Approach LOS	E										

Intersection Summary

HCM Average Control Delay	75.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Old Milton Pkwy & Westside Pkwy

Base AM
2/16/2007



Movement	SBR
Lane Configurations	↖ ↗
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Volume (vph)	175
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	190
RTOR Reduction (vph)	97
Lane Group Flow (vph)	93
Turn Type	Perm
Protected Phases	
Permitted Phases	8
Actuated Green, G (s)	17.0
Effective Green, g (s)	17.0
Actuated g/C Ratio	0.14
Clearance Time (s)	4.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	224
v/s Ratio Prot	
v/s Ratio Perm	0.06
v/c Ratio	0.42
Uniform Delay, d1	47.0
Progression Factor	1.00
Incremental Delay, d2	5.6
Delay (s)	52.6
Level of Service	D
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Baseline
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HCM Unsignalized Intersection Capacity Analysis
6: Kimball Bridge Rd & Bailey Johnson Rd

Base AM
2/16/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
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)	0	293	81	330	297	1	5	1	133	1	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	318	88	359	323	1	5	1	145	1	0	2
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	324			318			1361	1360	318	1360	1359	323
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	324			318			1361	1360	318	1360	1359	323
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			71			94	99	80	99	100	100
cM capacity (veh/h)	1236			1242			97	106	722	77	106	718
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	318	88	359	324	7	145	3					
Volume Left	0	0	359	0	5	0	1					
Volume Right	0	88	0	1	0	145	2					
cSH	1236	1700	1242	1700	98	722	191					
Volume to Capacity	0.00	0.05	0.29	0.19	0.07	0.20	0.02					
Queue Length 95th (ft)	0	0	30	0	5	19	1					
Control Delay (s)	0.0	0.0	9.1	0.0	44.2	11.2	24.2					
Lane LOS	A	A	E	B	C	C						
Approach Delay (s)	0.0		4.8		12.7		24.2					
Approach LOS			B		C							
Intersection Summary												
Average Delay							4.2					
Intersection Capacity Utilization							47.0%				A	
Analysis Period (min)							15					

Baseline
A & R Engineering Inc.

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HCM Unsignalized Intersection Capacity Analysis
7: Kimball Bridge Rd & Parkway 400 Driveway

Base AM
2/16/2007

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←	↑	↑	↑	↘	↗
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	62	345	285	24	22	23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	375	310	26	24	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		861				
pX, platoon unblocked						
vC, conflicting volume	336				820	310
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	336				820	310
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				93	97
cM capacity (veh/h)	1223				326	730
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	67	375	310	26	49	
Volume Left	67	0	0	0	24	
Volume Right	0	0	0	26	25	
cSH	1223	1700	1700	1700	455	
Volume to Capacity	0.06	0.22	0.18	0.02	0.11	
Queue Length 95th (ft)	4	0	0	0	9	
Control Delay (s)	8.1	0.0	0.0	0.0	13.9	
Lane LOS	A				B	
Approach Delay (s)	1.2		0.0		13.9	
Approach LOS					B	
Intersection Summary						
Average Delay				1.5		
Intersection Capacity Utilization				31.8%		ICU Level of Service A
Analysis Period (min)				15		

Baseline
A & R Engineering Inc.

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Queues
8: Kimball Bridge Rd & Westside Pkwy

Base AM
2/16/2007

Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	6	104	209	7	764	100	320	938
Act Effct Green (s)	13.6	13.6	13.6	87.0	81.3	81.3	98.4	96.4
Actuated g/C Ratio	0.11	0.11	0.11	0.72	0.68	0.68	0.82	0.80
v/c Ratio	0.03	0.65	0.57	0.01	0.32	0.09	0.72	0.33
Control Delay	34.7	68.9	12.7	4.3	9.8	3.6	13.4	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	68.9	12.7	4.3	9.8	3.6	13.4	4.1
LOS	C	E	B	A	A	A	B	A
Approach Delay	34.7	31.4			9.1			6.4
Approach LOS	C	C			A			A
Queue Length 50th (ft)	2	78	0	1	107	4	56	90
Queue Length 95th (ft)	15	132	67	4	229	34	m60	m145
Internal Link Dist (ft)	158	781			824			569
Turn Bay Length (ft)			150	150		150	150	
Base Capacity (vph)	414	340	541	624	2399	1099	716	2842
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	0.01	0.31	0.39	0.01	0.32	0.09	0.45	0.33
Intersection Summary								
Cycle Length: 120								
Actuated Cycle Length: 120								
Offset: 102 (85%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.72								
Intersection Signal Delay: 10.6						Intersection LOS: B		
Intersection Capacity Utilization 57.7%						ICU Level of Service B		
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
8: Kimball Bridge Rd & Westside Pkwy

Base AM
2/16/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	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
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	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Flt Protected	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)	1723	1723	1723	1723	1723	1723	1723	1723	1723	1723	1723
Flt Permitted	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)	1681	1681	1681	1681	1681	1681	1681	1681	1681	1681	1681
Volume (vph)	1	2	3	96	0	192	6	703	92	294	861
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)	1	2	3	104	0	209	7	764	100	320	936
RTOR Reduction (vph)	0	3	0	0	0	185	0	0	26	0	0
Lane Group Flow (vph)	0	3	0	0	104	24	7	764	74	320	936
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	pm+pt	Perm	pm+pt	Perm	pm+pt
Protected Phases	8	8	8	4	4	4	1	6	5	2	2
Permitted Phases	8	8	8	4	4	4	1	6	6	2	2
Actuated Green, G (s)	13.6	13.6	13.6	13.6	13.6	13.6	82.6	81.4	81.4	98.4	93.2
Effective Green, g (s)	13.6	13.6	13.6	13.6	13.6	13.6	82.6	81.4	81.4	98.4	93.2
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11	0.11	0.69	0.68	0.68	0.82	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
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)	191	159	179	403	2401	1074	609	2748			
v/s Ratio Prot	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.05	0.06	0.27	
v/s Ratio Perm	0.02	0.02	0.02	0.02	0.02	0.02	0.32	0.07	0.53	0.34	
Uniform Delay, d1	47.3	50.9	47.9	5.9	7.9	6.5	3.4	4.1			
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.80	1.00	
Incremental Delay, d2	0.0	9.3	0.3	0.0	0.3	0.1	0.3	0.1	0.3	0.1	
Delay (s)	47.3	60.2	48.2	5.9	8.3	6.6	6.3	4.2			
Level of Service	D	E	D	A	A	A	A	A	A	A	
Approach Delay (s)	47.3	52.2	52.2	8.1	8.1	8.1	4.7				
Approach LOS	D	D	D	A	A	A	A				
Intersection Summary											
HCM Average Control Delay	12.1			HCM Level of Service			B				
HCM Volume to Capacity ratio	0.54										
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization	57.7%			ICU Level of Service			B				
Analysis Period (min)	15										
c Critical Lane Group											

Baseline
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Base 2010 AM Improved

Queues
1: Old Milton Pkwy & NB Ramp

Base AM Improved
2/16/2007

	EBL	EBT	WBT	WBR	NBL	NBR	
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR	
Lane Group Flow (vph)	622	1795	2027	301	564	1099	
Act Effct Green (s)	31.0	87.8	52.8	52.8	24.2	120.0	
Actuated g/C Ratio	0.26	0.73	0.44	0.44	0.20	1.00	
v/c Ratio	0.70	0.69	0.72	0.35	0.81	0.69	
Control Delay	33.5	11.6	29.9	3.8	55.5	2.5	
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0	
Total Delay	33.5	11.7	29.9	3.8	55.5	2.5	
LOS	C	B	C	A	E	A	
Approach Delay	17.3 26.5						
Approach LOS	B C						
Queue Length 50th (ft)	185	257	367	0	216	0	
Queue Length 95th (ft)	m219	300	443	54	267	0	
Internal Link Dist (ft)	500 855						
Turn Bay Length (ft)	300						
Base Capacity (vph)	887	2589	2818	865	830	1583	
Starvation Cap Reductn	0	74	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	0.70	0.71	0.72	0.35	0.68	0.69	
Intersection Summary							
Cycle Length: 120							
Actuated Cycle Length: 120							
Offset: 98 (82%), Referenced to phase 2:WBT and 6:EBT, Start of Green							
Control Type: Actuated-Coordinated							
Maximum v/c Ratio: 0.81							
Intersection Signal Delay: 21.5							
Intersection Capacity Utilization 81.3%							
Analysis Period (min) 15							
m Volume for 95th percentile queue is metered by upstream signal.							

HCM Signalized Intersection Capacity Analysis
1: Old Milton Pkwy & NB Ramp

Base AM Improved
2/16/2007

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			
Lane Util. Factor	0.97	0.95		0.86	1.00	0.97			1.00			
Flt Protected	1.00	1.00		1.00	0.85	1.00			0.85			
Satd. Flow (prot)	3433	3539		6408	1583	3433			1583			
Flt Permitted	0.95	1.00		1.00	1.00	0.95			1.00			
Satd. Flow (perm)	3433	3539		6408	1583	3433			1583			
Volume (vph)	572	1651	0	0	1865	277	519	0	1011	0	0	0
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)	622	1795	0	0	2027	301	564	0	1099	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	169	0	0	0	0	0	0
Lane Group Flow (vph)	622	1795	0	0	2027	132	564	0	1099	0	0	0
Turn Type	Prot											
Protected Phases	1 6 2											
Permitted Phases	2 4											
Actuated Green, G (s)	31.0 87.8 52.8 52.8 24.2 120.0											
Effective Green, g (s)	31.0 87.8 52.8 52.8 24.2 120.0											
Actuated g/C Ratio	0.26 0.73 0.44 0.44 0.20 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)	887 2589 2820 697 692 1583											
v/s Ratio Prot	0.18 0.51 0.32											
v/s Ratio Perm	0.08 c0.16 c0.69											
v/c Ratio	0.70 0.69 0.72 0.19 0.82 0.69											
Uniform Delay, d1	40.3 8.8 27.5 20.5 45.8 0.0											
Progression Factor	0.77 1.13 1.00 1.00 1.00 1.00											
Incremental Delay, d2	1.2 0.8 1.6 0.6 7.3 2.5											
Delay (s)	32.2 10.7 29.1 21.1 53.1 2.5											
Level of Service	C B C C D A											
Approach Delay (s)	16.2 28.1 19.7											
Approach LOS	B C B											
Intersection Summary												
HCM Average Control Delay	21.4 HCM Level of Service C											
HCM Volume to Capacity ratio	0.72											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 4.0											
Intersection Capacity Utilization	81.3% ICU Level of Service D											
Analysis Period (min)	15											
Critical Lane Group												

Queues
2: Old Milton Pkwy & SB Ramp

Base AM Improved
2/16/2007

Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	1874	220	903	1686	543	987
Act Effct Green (s)	52.1	52.1	34.5	90.7	21.3	120.0
Actuated g/C Ratio	0.43	0.43	0.29	0.76	0.18	1.00
v/c Ratio	0.85	0.27	0.91	0.63	0.89	0.62
Control Delay	25.4	3.5	43.0	5.3	65.9	1.9
Queue Delay	0.0	0.0	0.0	1.3	0.0	0.0
Total Delay	25.4	3.5	43.0	6.7	65.9	1.9
LOS	C	A	D	A	E	A
Approach Delay	23.1					
Approach LOS	C					
Queue Length 50th (ft)	262	11	204	156	212	0
Queue Length 95th (ft)	338	m31	#367	137	#302	0
Internal Link Dist (ft)	1226					
Turn Bay Length (ft)	300					
Base Capacity (vph)	2209	808	1030	2674	629	1583
Starvation Cap Reductn	0	0	0	714	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.27	0.88	0.86	0.86	0.62
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 9 (8%), Referenced to phase 2:WBT and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.91						
Intersection Signal Delay: 21.9						
Intersection Capacity Utilization 81.3%						
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.						

HCM Signalized Intersection Capacity Analysis
2: Old Milton Pkwy & SB Ramp

Base AM Improved
2/16/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
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	0.91	1.00	0.97	0.95	1.00	0.95	1.00	0.97	1.00	0.95	1.00	0.95
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	3433	3539	5085	1583	3433	3539	5085	1583	3433	3539
Flt Permitted	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	3539	5085	1583	3433	3539	5085	1583	3433	3539
Volume (vph)	0	1724	202	831	1551	0	0	0	0	500	0	908
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)	0	1874	220	903	1686	0	0	0	0	543	0	987
RTOR Reduction (vph)	0	0	121	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1874	99	903	1686	0	0	0	0	543	0	987
Turn Type		Perm	Prot							custom		Free
Protected Phases		6	5	2							8	
Permitted Phases												
Actuated Green, G (s)		52.2	52.2	34.5	90.7					21.3		120.0
Effective Green, g (s)		52.2	52.2	34.5	90.7					21.3		120.0
Actuated g/C Ratio		0.44	0.44	0.29	0.76					0.18		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)		2212	689	987	2675					609		1583
v/s Ratio Prot		c0.37		c0.26	0.48							
v/s Ratio Perm		0.85	0.14	0.91	0.63					c0.16		0.62
v/c Ratio		0.85	0.14	0.91	0.63					0.89		0.62
Uniform Delay, d1		30.3	20.4	41.3	6.8					48.2		0.0
Progression Factor		0.88	0.85	0.79	0.65					1.00		1.00
Incremental Delay, d2		3.8	0.4	8.9	0.7					15.3		1.9
Delay (s)		24.5	17.7	41.6	5.2					63.5		1.9
Level of Service		C	B	D	A					E		A
Approach Delay (s)		23.8			17.9			0.0			23.7	
Approach LOS		C			B			A			C	
Intersection Summary												
HCM Average Control Delay			21.3									C
HCM Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			120.0								12.0	
Intersection Capacity Utilization			81.3%								D	
Analysis Period (min)			15									
c Critical Lane Group												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	246	1847	57	125	1773	34	14	72	37
Act Effct Green (s)	78.3	65.0	120.0	63.3	54.0	54.0	23.3	8.3	33.7
Actuated g/C Ratio	0.65	0.54	1.00	0.53	0.45	0.45	0.19	0.07	0.28
v/c Ratio	0.68	0.67	0.04	0.62	0.77	0.05	0.03	0.30	0.06
Control Delay	38.0	4.7	0.0	34.6	36.4	16.8	0.1	56.1	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
Total Delay	38.0	4.7	0.0	34.6	36.7	16.8	0.1	56.1	0.2
LOS	D	A	A	C	D	B	A	E	A
Approach Delay	8.4								
Approach LOS	A								
Queue Length 50th (ft)	156	70	0	34	372	8	0	27	0
Queue Length 95th (ft)	m169	m68	m0	95	449	m24	0	52	0
Internal Link Dist (ft)	1280								
Turn Bay Length (ft)	300	2754	1583	250	2288	723	478	257	658
Base Capacity (vph)	416	2754	1583	254	2288	723	478	257	658
Starvation Cap Reductn	0	0	0	0	102	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	0.59	0.67	0.04	0.49	0.81	0.05	0.03	0.28	0.06

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 101 (84%). Referenced to phase 2:WBTL and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 21.9	Intersection LOS: C
Intersection Capacity Utilization 62.6%	ICU Level of Service B
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
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	0.91	1.00	1.00	0.91	1.00	0.85	1.00	0.85	1.00	0.97	1.00
Lane Util. Factor	1.00	1.00	1.00	0.85	1.00	0.95	1.00	1.00	0.85	1.00	0.95	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1583	1583	1583	1583	3433	1583
Flt Permitted	0.07	1.00	1.00	1.00	0.08	1.00	1.00	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	130	5085	1583	140	5085	1583	1583	1583	1583	1583	3433	1583
Volume (vph)	1	225	1699	52	115	1631	31	0	0	13	66	0
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)	1	245	1847	57	125	1773	34	0	0	14	72	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	11	0	11	0	0
Lane Group Flow (vph)	0	246	1847	57	125	1773	23	0	3	0	72	11
Turn Type	pm+pt	pm+pt	pm+pt	Free	pm+pt	Perm	Perm	Perm	Perm	Perm	Prot	Prot
Protected Phases	1	1	6	5	2	2	4	4	4	4	3	8
Permitted Phases	6	6	6	Free	2	2	4	4	4	4	3	8
Actuated Green, G (s)	77.5	64.2	120.0	62.5	53.2	53.2	23.3	23.3	23.3	7.2	34.5	34.5
Effective Green, g (s)	77.5	64.2	120.0	62.5	53.2	53.2	23.3	23.3	23.3	7.2	34.5	34.5
Actuated g/C Ratio	0.65	0.54	1.00	0.52	0.44	0.44	0.19	0.19	0.19	0.06	0.29	0.29
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)	361	2720	1583	199	2254	702	307	307	307	206	455	455
v/s Ratio Prot	c0.12	c0.36	c0.04	0.05	c0.35	0.01	0.00	0.00	0.00	c0.02	0.01	0.01
v/s Ratio Perm	0.32	0.68	0.68	0.04	0.63	0.79	0.03	0.01	0.01	0.35	0.02	0.02
v/c Ratio	0.68	0.68	0.68	0.04	0.63	0.79	0.03	0.01	0.01	0.35	0.02	0.02
Uniform Delay, d1	35.0	20.4	0.0	41.1	28.5	18.9	39.0	39.0	39.0	54.2	30.7	30.7
Progression Factor	0.90	0.20	1.00	0.70	1.21	1.59	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	0.6	0.0	5.5	2.6	0.1	0.1	0.1	0.1	1.0	0.1	0.1
Delay (s)	33.8	4.8	0.0	34.1	37.1	30.0	39.1	39.1	39.1	55.2	30.8	30.8
Level of Service	C	A	A	C	D	C	D	D	D	E	C	C
Approach Delay (s)	8.0									39.1	46.9	46.9
Approach LOS	A									D	D	D

Intersection Summary

HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Base AM Improved
2/16/2007

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	34
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	37
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Baseline
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Future 2015 SAT - Improved-Queues
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Queues
5: Old Milton Pkwy & Westside Pkwy

Base AM Improved
2/16/2007

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	323	1799	308	640	1339	134	582	302	24	228	190
Act Effct Green (s)	42.0	42.0	42.0	57.4	57.4	28.0	28.0	120.0	16.0	16.0	16.0
Actuated g/C Ratio	0.35	0.35	0.35	0.48	0.48	0.23	0.23	1.00	0.13	0.13	0.13
v/c Ratio	0.76	1.01	0.45	0.98	0.55	0.57	0.70	0.19	0.27	0.48	0.51
Control Delay	43.5	62.9	13.1	41.6	6.2	32.1	31.9	0.2	55.6	52.0	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.5	62.9	13.1	41.6	6.2	32.1	31.9	0.2	55.6	52.0	11.7
LOS	D	E	B	D	A	C	C	A	E	D	B
Approach Delay	54.0			17.6			22.6			34.9	
Approach LOS	D			B			C			C	
Queue Length 50th (ft)	198	~518	61	411	45	87	218	0	17	87	0
Queue Length 95th (ft)	290	#633	142	#752	50	129	286	0	46	129	67
Internal Link Dist (ft)	495			1280			569			512	
Turn Bay Length (ft)	275	200	300	250	250	250	250	250	250	250	250
Base Capacity (vph)	490	1780	680	653	2431	237	826	1583	88	472	376
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	1.01	0.45	0.98	0.55	0.57	0.70	0.19	0.27	0.48	0.51
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 0 (0%). Referenced to phase 2:WBTL and 6:EBTL, Start of Green											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 1.01											
Intersection Signal Delay: 34.9											
Intersection Capacity Utilization 96.1%											
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.											

Baseline
A & R Engineering Inc.

Future 2015 SAT - Improved-Queues
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HCM Signalized Intersection Capacity Analysis
5: Old Milton Pkwy & Westside Pkwy

Base AM Improved
2/16/2007

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	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	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt	1.00	1.00	0.85	1.00	1.00	1.00	1.00	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1770	3539	1583	1770	3539	1770	3539
Flt Permitted	0.21	1.00	1.00	0.21	1.00	0.38	1.00	1.00	0.36	1.00	0.36	1.00
Satd. Flow (perm)	384	5085	1583	384	5085	714	3539	1583	662	3539	662	3539
Volume (vph)	17	281	1655	283	589	1232	0	123	535	278	22	210
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)	18	305	1799	308	640	1339	0	134	582	302	24	228
RTOR Reduction (vph)	0	0	0	126	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	323	1799	182	640	1339	0	134	582	302	24	228
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	1	6	6	5	2	2	7	4	Free	Perm	8
Permitted Phases	6	6	42.0	42.0	57.4	57.4	28.0	28.0	120.0	16.0	16.0	16.0
Actuated Green, G (s)	42.0	42.0	42.0	42.0	57.4	57.4	28.0	28.0	120.0	16.0	16.0	16.0
Effective Green, g (s)	0.35	0.35	0.35	0.35	0.48	0.48	0.23	0.23	1.00	0.13	0.13	0.13
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)	395	1780	554	623	2432	237	826	1583	88	472		
Lane Grp Cap (vph)	0.15	c0.35	0.11	0.17	c0.33	0.26	0.04	c0.16	0.19	0.04	0.06	0.06
v/s Ratio Prot	0.13	0.82	1.01	0.33	1.03	0.55	0.57	0.70	0.19	0.27	0.48	0.48
v/s Ratio Perm	48.4	39.0	28.6	37.5	22.2	38.4	42.2	0.0	46.8	48.2		
Uniform Delay, d1	1.00	1.00	1.00	0.36	0.24	0.59	0.64	1.00	1.00	1.00	1.00	1.00
Progression Factor	12.4	24.0	1.6	37.5	0.6	2.8	4.6	0.2	7.5	3.5		
Incremental Delay, d2	60.7	63.0	30.2	50.8	5.9	25.6	31.6	0.2	54.3	51.7		
Delay (s)	E	E	C	D	A	C	C	C	A	D	D	D
Level of Service	E	E	C	D	A	C	C	C	A	D	D	D
Approach Delay (s)	58.5				20.4			21.5			49.8	
Approach LOS	E				C			C			D	

Intersection Summary	
HCM Average Control Delay	38.6
HCM Volume to Capacity ratio	0.91
Actuated Cycle Length (s)	120.0
Intersection Capacity Utilization	96.1%
Analysis Period (min)	15
c Critical Lane Group	

Baseline
A & R Engineering Inc.

Future 2015 SAT - Improved-Queues
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HCM Signalized Intersection Capacity Analysis
5: Old Milton Pkwy & Westside Pkwy

Base AM Improved
2/16/2007

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	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	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt	1.00	1.00	0.85	1.00	1.00	1.00	1.00	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1770	3539	1583	1770	3539	1770	3539
Flt Permitted	0.21	1.00	1.00	0.21	1.00	0.38	1.00	1.00	0.36	1.00	0.36	1.00
Satd. Flow (perm)	384	5085	1583	384	5085	714	3539	1583	662	3539	662	3539
Volume (vph)	17	281	1655	283	589	1232	0	123	535	278	22	210
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)	18	305	1799	308	640	1339	0	134	582	302	24	228
RTOR Reduction (vph)	0	0	0	126	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	323	1799	182	640	1339	0	134	582	302	24	228
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	1	6	6	5	2	2	7	4	Free	Perm	8
Permitted Phases	6	6	42.0	42.0	57.4	57.4	28.0	28.0	120.0	16.0	16.0	16.0
Actuated Green, G (s)	42.0	42.0	42.0	42.0	57.4	57.4	28.0	28.0	120.0	16.0	16.0	16.0
Effective Green, g (s)	0.35	0.35	0.35	0.35	0.48	0.48	0.23	0.23	1.00	0.13	0.13	0.13
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)	395	1780	554	623	2432	237	826	1583	88	472		
Lane Grp Cap (vph)	0.15	c0.35	0.11	0.17	c0.33	0.26	0.04	c0.16	0.19	0.04	0.06	0.06
v/s Ratio Prot	0.13	0.82	1.01	0.33	1.03	0.55	0.57	0.70	0.19	0.27	0.48	0.48
v/s Ratio Perm	48.4	39.0	28.6	37.5	22.2	38.4	42.2	0.0	46.8	48.2		
Uniform Delay, d1	1.00	1.00	1.00	0.36	0.24	0.59	0.64	1.00	1.00	1.00	1.00	1.00
Progression Factor	12.4	24.0	1.6	37.5	0.6	2.8	4.6	0.2	7.5	3.5		
Incremental Delay, d2	60.7	63.0	30.2	50.8	5.9	25.6	31.6	0.2	54.3	51.7		
Delay (s)	E	E	C	D	A	C	C	C	A	D	D	D
Level of Service	E	E	C	D	A	C	C	C	A	D	D	D
Approach Delay (s)	58.5				20.4			21.5			49.8	
Approach LOS	E				C			C			D	

Intersection Summary	
HCM Average Control Delay	38.6
HCM Volume to Capacity ratio	0.91
Actuated Cycle Length (s)	120.0
Intersection Capacity Utilization	96.1%
Analysis Period (min)	15
c Critical Lane Group	

Baseline
A & R Engineering Inc.

Future 2015 SAT - Improved-Queues
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HCM Unsignalized Intersection Capacity Analysis
6: Kimball Bridge Rd & Bailey Johnson Rd

Base AM Improved
2/16/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
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)	0	293	81	330	297	1	5	1	133	1	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	318	88	359	323	1	5	1	145	1	0	2
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	324			318			1361	1360	318	1360	1359	323
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	324			318			1361	1360	318	1360	1359	323
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			71			94	99	80	99	100	100
cM capacity (veh/h)	1236			1242			97	106	722	77	106	718
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	318	88	359	324	7	145	3					
Volume Left	0	0	359	0	5	0	1					
Volume Right	0	88	0	1	0	145	2					
cSH	1236	1700	1242	1700	98	722	191					
Volume to Capacity	0.00	0.05	0.29	0.19	0.07	0.20	0.02					
Queue Length 95th (ft)	0	0	30	0	5	19	1					
Control Delay (s)	0.0	0.0	9.1	0.0	44.2	11.2	24.2					
Lane LOS			A		E	B	C					
Approach Delay (s)	0.0		4.8		12.7		24.2					
Approach LOS			B		C		C					
Intersection Summary												
Average Delay							4.2					
Intersection Capacity Utilization							47.0%				A	
Analysis Period (min)							15					

Base PM Intersection Analysis

Base 2010 PM

Queues
1: Old Milton Pkwy & NB Ramp

Base PM
2/16/2007

Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	1143	1453	2392	568	411	610
Act Effct Green (s)	56.0	96.0	36.0	36.0	16.0	120.0
Actuated g/C Ratio	0.47	0.80	0.30	0.30	0.13	1.00
v/c Ratio	1.38	0.51	1.24	0.85	0.90	0.39
Control Delay	189.6	2.2	150.6	33.6	74.9	0.7
Queue Delay	2.3	0.1	0.0	0.0	0.0	0.0
Total Delay	191.9	2.3	150.6	33.6	74.9	0.7
LOS	F	A	F	C	E	A
Approach Delay	85.8 128.1					
Approach LOS	F F					
Queue Length 50th (ft)	~1156	72	~670	231	163	0
Queue Length 95th (ft)	#1096	m70	#744	#440	#254	0
Internal Link Dist (ft)	500 855					
Turn Bay Length (ft)	300					
Base Capacity (vph)	826	2832	1924	667	458	1583
Starvation Cap Reductn	3	403	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	1.39	0.60	1.24	0.85	0.90	0.39
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 93 (78%), Referenced to phase 2:WBT and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 1.38						
Intersection Signal Delay: 96.3						
Intersection Capacity Utilization 103.7%						
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.					
	Volume for 95th percentile queue is metered by upstream signal.					

HCM Signalized Intersection Capacity Analysis
1: Old Milton Pkwy & NB Ramp

Base PM
2/16/2007

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	0.86	1.00	0.97	1.00	0.85	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	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	6408	1583	3433	1583	1583	3433	1583	3433	1583	3433
Flt Permitted	0.95	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	6408	1583	3433	1583	1583	3433	1583	3433	1583	3433
Volume (vph)	1052	1337	0	0	2201	523	378	0	561	0	0	0
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)	1143	1453	0	0	2392	568	411	0	610	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	192	0	0	0	0	0	0
Lane Group Flow (vph)	1143	1453	0	0	2392	376	411	0	610	0	0	0
Turn Type	Prot Permcustom											
Protected Phases	1	6	2	2	4	4	4	4	4	4	4	4
Permitted Phases	Free											
Actuated Green, G (s)	56.0	96.0	36.0	36.0	16.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0
Effective Green, g (s)	56.0	96.0	36.0	36.0	16.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0
Actuated g/C Ratio	0.47	0.80	0.30	0.30	0.13	1.00	1.00	1.00	1.00	1.00	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	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)	826	2831	1922	475	458	1583	1583	1583	1583	1583	1583	1583
v/s Ratio Prot	c0.65	0.41	c0.37	0.24	c0.12	0.39	0.39	0.39	0.39	0.39	0.39	0.39
v/s Ratio Perm	1.38	0.51	1.24	0.79	0.90	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Uniform Delay, d1	32.0	4.1	42.0	38.6	51.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Progression Factor	0.25	0.51	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	173.4	0.1	114.6	12.7	19.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Delay (s)	181.4	2.1	156.6	51.3	71.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Level of Service	F	A	F	D	E	A	A	A	A	A	A	A
Approach Delay (s)	81.1	136.4	29.0	29.0	29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	F	F	C	C	C	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	97.9											
HCM Volume to Capacity ratio	1.27											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	103.7%											
Analysis Period (min)	15											
c Critical Lane Group												

Queues
2: Old Milton Pkwy & SB Ramp

Base PM
2/16/2007

	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	2287	877	1250	1633	293	562
Act Effct Green (s)	51.0	51.0	42.6	97.6	14.4	120.0
Actuated g/C Ratio	0.42	0.42	0.36	0.81	0.12	1.00
v/c Ratio	1.06	1.03	1.03	0.57	0.71	0.36
Control Delay	62.2	50.4	43.3	4.8	60.5	0.6
Queue Delay	1.8	0.0	0.0	9.8	0.2	0.0
Total Delay	64.0	50.4	43.3	14.7	60.8	0.6
LOS	E	D	D	B	E	A
Approach Delay	60.2			27.1		
Approach LOS	E			C		
Queue Length 50th (ft)	~718	~463	~513	136	112	0
Queue Length 95th (ft) m#708	m#733	m193	m45	159	0	
Internal Link Dist (ft)	1226		500			
Turn Bay Length (ft)	300					
Base Capacity (vph)	2161	852	1218	2877	458	1583
Starvation Cap Reductn	0	0	0	1228	0	0
Spillback Cap Reductn	9	0	0	0	12	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.06	1.03	1.03	0.99	0.66	0.36
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 9 (8%), Referenced to phase 2:WBT and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 1.06						
Intersection Signal Delay: 41.6						Intersection LOS: D
Intersection Capacity Utilization 103.7%						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.						

HCM Signalized Intersection Capacity Analysis
2: Old Milton Pkwy & SB Ramp

Base PM
2/16/2007

	EBT	EBR	WBL	WBT	SBL	SBR
Movement	EBT	EBR	WBL	WBT	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	0.91	1.00	0.97	0.95	1.00	1.00
Flt Protected	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	5085	1583	3433	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	5085	1583	3433	3539	3433	1583
Volume (vph)	0	2104	807	1150	1502	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2287	877	1250	1633	0
RTOR Reduction (vph)	0	0	179	0	0	0
Lane Group Flow (vph)	0	2287	698	1250	1633	0
Turn Type		Perm	Prot		custom	Free
Protected Phases		6	5	2		
Permitted Phases						8
Actuated Green, G (s)		51.0	51.0	42.6	97.6	14.4
Effective Green, g (s)		51.0	51.0	42.6	97.6	14.4
Actuated g/C Ratio		0.42	0.42	0.36	0.81	0.12
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)		2161	673	1219	2878	412
v/s Ratio Prot		c0.45		c0.36		
v/s Ratio Perm		1.06	1.04	1.03	0.57	c0.09
Uniform Delay, d1		34.5	34.5	38.7	3.9	50.8
Progression Factor		0.79	0.64	0.67	1.15	1.00
Incremental Delay, d2		34.5	39.6	15.4	0.1	5.7
Delay (s)		61.7	61.6	41.2	4.5	56.5
Level of Service		E	E	D	A	E
Approach Delay (s)		61.7		20.4		19.8
Approach LOS		E		C		B
Intersection Summary						
HCM Average Control Delay		39.3				D
HCM Volume to Capacity ratio		1.00				
Actuated Cycle Length (s)		120.0				12.0
Intersection Capacity Utilization		103.7%				G
Analysis Period (min)		15				
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

Base PM
2/16/2007

Queues

4: Old Milton Pkwy & Amber Park Dr

Base PM
2/16/2007

Movement	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔
Sign Control	Free	Free	Free	Free	Free	Free	Stop
Grade	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	147	2345	5	1752	192	524	137
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	160	2549	0	1904	209	570	149
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type							None
Median storage (veh)							
Upstream signal (ft)		519		1306			
pX, platoon unblocked	0.96		0.00			0.74	0.96
vC, conflicting volume	2113		0			3178	739
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	2075		0			2988	641
tC, single (s)	4.1		0.0			6.8	6.9
tC, 2 stage (s)							
tF (s)	2.2		0.0			3.5	3.3
p0 queue free %	37		0			0	63
cM capacity (veh/h)	253		0			3	400
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3
Volume Total	160	850	850	850	762	762	590
Volume Left	160	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	0
cSH	253	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.63	0.50	0.50	0.50	0.45	0.45	0.35
Queue Length 95th (ft)	96	0	0	0	0	0	0
Control Delay (s)	40.6	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	E						F
Approach Delay (s)	2.4				0.0		
Approach LOS							F
Intersection Summary							
Average Delay	1297.9						
Intersection Capacity Utilization	96.0%						
Analysis Period (min)	15						

Baseline
A & R Engineering Inc.

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	312	2183	9	13	1850	202	58	91	452	301
Act Effct Green (s)	77.1	77.1	120.0	81.0	81.0	81.0	16.0	16.0	11.0	31.0
Actuated g/C Ratio	0.64	0.64	1.00	0.68	0.68	0.68	0.13	0.13	0.09	0.26
v/c Ratio	2.64	0.67	0.01	0.09	0.54	0.18	0.21	0.30	1.43	0.70
Control Delay	774.3	6.5	0.0	3.1	2.9	0.3	48.6	9.5	252.2	47.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	774.3	6.5	0.0	3.1	2.9	0.3	48.6	9.5	252.2	47.1
LOS	F	A	A	A	A	A	D	A	F	D
Approach Delay	102.2									
Approach LOS	F									
Queue Length 50th (ft)	~392	160	0	1	57	0	21	0	~244	195
Queue Length 95th (ft)	m#517	183	m0	m2	63	0	42	39	#351	299
Internal Link Dist (ft)	1280									
Turn Bay Length (ft)	300			250		150	100			
Base Capacity (vph)	118	3269	1583	180	3432	1131	278	301	315	427
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	2.64	0.67	0.01	0.07	0.54	0.18	0.21	0.30	1.43	0.70
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 117 (98%), Referenced to phase 2:WBT and 6:EBTL, Start of Green										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 2.64										
Intersection Signal Delay: 71.9										
Intersection Capacity Utilization 81.5%										
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.										

Baseline
A & R Engineering Inc.

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HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Base PM
2/16/2007

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	3	3	3	3	3	3	3	3	3	3	3	3
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	1.00	0.91	1.00	0.97	1.00	0.97	1.00	0.97	1.00
Flt	1.00	1.00	0.85	1.00	1.00	0.85	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	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1583	3433	1583	3433	1583
Flt Permitted	0.09	1.00	1.00	0.05	1.00	1.00	0.58	1.00	0.58	1.00	0.95	1.00
Satd. Flow (perm)	171	5085	1583	95	5085	1583	2083	1583	2083	1583	3433	1583
Volume (vph)	20	267	2008	8	12	1702	186	53	0	84	416	0
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)	22	290	2183	9	13	1850	202	58	0	91	452	0
RTOR Reduction (vph)	0	0	0	0	0	0	63	0	79	0	0	19
Lane Group Flow (vph)	0	312	2183	9	13	1850	139	58	12	0	452	282
Turn Type	Perm	Perm	Free	pm+pt	Perm	Perm	Perm	Perm	Prot	Prot	Prot	Prot
Protected Phases	6	6	Free	2	5	2	2	4	4	3	8	8
Permitted Phases	6	6	Free	2	5	2	2	4	4	3	8	8
Actuated Green, G (s)	74.7	74.7	120.0	81.0	81.0	81.0	16.0	16.0	16.0	11.0	31.0	31.0
Effective Green, g (s)	74.7	74.7	120.0	81.0	81.0	81.0	16.0	16.0	16.0	11.0	31.0	31.0
Actuated g/C Ratio	0.62	0.62	1.00	0.68	0.68	0.68	0.13	0.13	0.13	0.09	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)	106	3165	1583	96	3432	1069	278	211	211	315	409	409
v/s Ratio Prot	c1.83	0.43	0.01	0.09	0.00	c0.36	0.01	0.01	0.01	c0.13	c0.18	c0.18
v/s Ratio Perm	2.94	0.69	0.01	0.14	0.54	0.13	0.21	0.06	0.06	1.43	0.69	0.69
Uniform Delay, d1	22.7	15.0	0.0	12.3	10.0	6.9	46.4	45.4	45.4	54.5	40.2	40.2
Progression Factor	0.58	0.40	1.00	0.32	0.24	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	894.1	1.0	0.0	0.6	0.5	0.2	1.7	0.5	0.5	213.0	9.2	9.2
Delay (s)	907.1	7.0	0.0	4.5	2.9	0.2	48.1	45.9	45.9	267.5	49.4	49.4
Level of Service	F	A	A	A	A	A	D	D	D	F	D	D
Approach Delay (s)	119.1	F	F	A	2.7	A	46.8	D	D	180.3	F	F
Approach LOS	F	F	F	A	A	A	D	D	D	D	F	F

Intersection Summary			
HCM Average Control Delay	81.6	HCM Level of Service	F
HCM Volume to Capacity ratio	2.31		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		
Critical Lane Group			

Baseline
A & R Engineering Inc.

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HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Base PM
2/16/2007

Movement	SBR
Lane Configurations	1900
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Flt	1.00
Flt Protected	0.95
Satd. Flow (prot)	1770
Flt Permitted	0.09
Satd. Flow (perm)	171
Volume (vph)	277
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	301
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	Prot
Protected Phases	6
Permitted Phases	6
Actuated Green, G (s)	74.7
Effective Green, g (s)	74.7
Actuated g/C Ratio	0.62
Clearance Time (s)	4.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	106
v/s Ratio Prot	c1.83
v/s Ratio Perm	2.94
Uniform Delay, d1	22.7
Progression Factor	0.58
Incremental Delay, d2	894.1
Delay (s)	907.1
Level of Service	F
Approach Delay (s)	119.1
Approach LOS	F
Intersection Summary	

Baseline
A & R Engineering Inc.

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Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	257	1482	129	496	1799	378	448	811	225	729	352
Act Effct Green (s)	53.0	53.0	53.0	69.0	69.0	43.0	43.0	120.0	43.0	43.0	43.0
Actuated g/C Ratio	0.44	0.44	0.44	0.58	0.58	0.36	0.36	1.00	0.36	0.36	0.36
v/c Ratio	4.15	0.66	0.18	1.92	0.62	2.49	0.35	0.51	0.83	0.57	0.61
Control Delay	1465.5	28.2	11.8	448.1	14.2	701.1	17.0	2.1	61.5	33.3	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
Total Delay	1465.5	28.2	11.8	448.1	14.2	701.1	17.0	2.1	61.5	33.3	35.8
LOS	F	C	B	F	B	F	B	A	E	C	D
Approach Delay	224.8			108.0			167.6			38.8	
Approach LOS	F			F			F			D	
Queue Length 50th (ft)	~322	324	31	~521	202	~409	74	29	158	238	214
Queue Length 95th (ft)	#493	378	70	m#786	m249	m#667	m98	36	#304	301	318
Internal Link Dist (ft)	495			1280			569			512	
Turn Bay Length (ft)	275	200	300	300	250	250	250	250	250	250	250
Base Capacity (vph)	62	2246	732	259	2924	152	1268	1583	271	1268	576
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	4.15	0.66	0.18	1.92	0.62	2.49	0.35	0.51	0.83	0.57	0.61

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 112 (93%). Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 4.15	
Intersection Signal Delay: 139.7	Intersection LOS: F
Intersection Capacity Utilization 102.8%	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.	

Movement	EBU	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	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
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	0.91	1.00	1.00	0.91	1.00	0.95	1.00	0.85	1.00	0.95
Flt	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	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1770	5085	1583	1770	5085	1770
Flt Permitted	0.08	1.00	1.00	0.09	1.00	0.09	1.00	0.23	1.00	0.41	1.00
Satd. Flow (perm)	141	5085	1583	173	5085	424	3539	1583	1583	756	3539
Volume (vph)	18	218	1363	119	456	1655	0	348	412	746	207
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)	20	237	1482	129	496	1799	0	378	448	811	225
RTOR Reduction (vph)	0	0	0	33	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	257	1482	96	496	1799	0	378	448	811	225
Turn Type	Perm	Perm	Perm	Perm	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	6	6	5	2	2	4	4	4	8
Permitted Phases	6	6	6	6	2	2	2	4	4	4	8
Actuated Green, G (s)	53.0	53.0	53.0	53.0	69.0	69.0	43.0	43.0	120.0	43.0	43.0
Effective Green, g (s)	53.0	53.0	53.0	53.0	69.0	69.0	43.0	43.0	120.0	43.0	43.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.57	0.57	0.36	0.36	1.00	0.36	0.36
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)	62	2246	699	259	2924	152	1268	1583	271	1268	576
v/s Ratio Prot	0.29	0.29	0.06	0.06	0.19	0.35	0.89	0.13	0.51	0.30	0.21
v/s Ratio Perm	4.15	0.66	0.14	1.92	0.62	2.49	0.35	0.51	0.83	0.57	0.61
Uniform Delay, d1	33.5	26.4	19.9	37.8	16.8	38.5	28.3	0.0	35.2	31.1	31.1
Progression Factor	1.00	1.00	1.00	0.81	0.79	0.65	0.58	1.00	1.00	1.00	1.00
Incremental Delay, d2	1452.6	1.5	0.4	423.6	0.8	682.0	0.5	0.8	24.6	1.9	1.9
Delay (s)	1486.1	27.9	20.3	454.3	14.1	707.0	16.9	0.8	59.7	33.0	33.0
Level of Service	F	C	C	F	B	F	B	A	E	C	C
Approach Delay (s)	228.0			109.2			168.3			38.5	
Approach LOS	F			F			F			D	

Intersection Summary

HCM Average Control Delay	141.1	HCM Level of Service	F
HCM Volume to Capacity ratio	3.12		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Old Milton Pkwy & Westside Pkwy

Base PM
2/16/2007



Movement	SBR
Lane Configurations	↖ ↗
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Flt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Volume (vph)	324
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	352
RTOR Reduction (vph)	9
Lane Group Flow (vph)	343
Turn Type	Perm
Protected Phases	
Permitted Phases	8
Actuated Green, G (s)	43.0
Effective Green, g (s)	43.0
Actuated g/C Ratio	0.36
Clearance Time (s)	4.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	567
v/s Ratio Prot	
v/s Ratio Perm	0.22
v/c Ratio	0.60
Uniform Delay, d1	31.5
Progression Factor	1.00
Incremental Delay, d2	4.7
Delay (s)	36.3
Level of Service	D
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Baseline
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HCM Unsignalized Intersection Capacity Analysis
6: Kimball Bridge Rd & Bailey Johnson Rd

Base PM
2/16/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
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)	1	369	39	194	454	1	91	0	237	1	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	401	42	211	493	1	99	0	258	1	1	2
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	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	402	42	211	495	99	258	4					
Volume Left	1	0	211	0	99	0	1					
Volume Right	0	42	0	1	0	258	2					
cSH	1069	1700	1158	1700	114	649	156					
Volume to Capacity	0.00	0.02	0.18	0.29	0.87	0.40	0.03					
Queue Length 95th (ft)	0	0	17	0	131	48	2					
Control Delay (s)	0.0	0.0	8.8	0.0	122.6	14.1	28.8					
Lane LOS	A	A	A	F	B	D	D					
Approach Delay (s)	0.0		2.6		44.2		28.8					
Approach LOS			E		D		D					
Intersection Summary												
Average Delay			11.8									
Intersection Capacity Utilization			65.1%							C		
Analysis Period (min)			15									

Baseline
A & R Engineering Inc.

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HCM Unsignalized Intersection Capacity Analysis
7: Kimball Bridge Rd & Parkway 400 Driveway

Base PM
2/16/2007

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	23	330	560	18	34	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	359	609	20	37	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		861				
pX, platoon unblocked					1.00	
vC, conflicting volume	628				1017	609
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	628				1017	609
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				86	92
cM capacity (veh/h)	954				255	495
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	25	359	609	20	75	
Volume Left	25	0	0	0	37	
Volume Right	0	0	0	20	38	
cSH	954	1700	1700	1700	338	
Volume to Capacity	0.03	0.21	0.36	0.01	0.22	
Queue Length 95th (ft)	2	0	0	0	21	
Control Delay (s)	8.9	0.0	0.0	0.0	18.6	
Lane LOS	A				C	
Approach Delay (s)	0.6		0.0		18.6	
Approach LOS					C	
Intersection Summary						
Average Delay	1.5					
Intersection Capacity Utilization	40.2%					
Analysis Period (min)	15					
	ICU Level of Service A					

Baseline
A & R Engineering Inc.

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Queues
8: Kimball Bridge Rd & Westside Pkwy

Base PM
2/16/2007

Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	41	187	449	8	1365	77	270	1145
Act Effct Green (s)	21.2	21.2	21.2	64.8	64.8	64.8	88.7	88.7
Actuated g/C Ratio	0.18	0.18	0.18	0.54	0.54	0.54	0.74	0.74
v/c Ratio	0.15	0.78	0.81	0.04	0.71	0.09	0.64	0.44
Control Delay	33.2	67.3	23.6	16.0	24.5	8.3	25.8	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	33.2	67.3	23.6	16.0	24.5	8.3	25.8	2.5
LOS	C	E	C	B	C	A	C	A
Approach Delay	33.2	36.5		23.6				7.0
Approach LOS	C	D		C				A
Queue Length 50th (ft)	21	139	82	3	405	12	124	41
Queue Length 95th (ft)	50	207	201	12	560	41	m165	m66
Internal Link Dist (ft)	158	781		824				569
Turn Bay Length (ft)			150	150		150	150	
Base Capacity (vph)	358	330	637	226	1910	874	422	2613
Starvation Cap Reductn	0	0	0	0	0	0	0	439
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	0.11	0.57	0.70	0.04	0.71	0.09	0.64	0.53
Intersection Summary								
Cycle Length: 120								
Actuated Cycle Length: 120								
Offset: 63 (53%), Referenced to phase 2:SBTL and 6:NBT, Start of Green								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.81								
Intersection Signal Delay: 19.4	Intersection LOS: B							
Intersection Capacity Utilization 73.6%	ICU Level of Service D							
Analysis Period (min) 15								
m Volume for 95th percentile queue is metered by upstream signal.								

Baseline
A & R Engineering Inc.

Future 2015 SAT - Improved-Queues
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Base PM

2/16/2007



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	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Flt	0.97			1.00	0.85	1.00	1.00	1.00	0.85	1.00	1.00	1.00
Flt Protected	0.97			0.95	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1754			1775	1583	1770	3539	1583	1770	3536		
Flt Permitted	0.74			0.74	1.00	0.18	1.00	1.00	0.10	1.00	1.00	1.00
Satd. Flow (perm)	1329			1378	1583	329	3539	1583	189	3536		
Volume (vph)	23	6	8	170	2	413	7	1256	71	248	1046	7
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)	25	7	9	185	2	449	8	1365	77	270	1137	8
RTOR Reduction (vph)	0	7	0	0	0	277	0	0	21	0	0	0
Lane Group Flow (vph)	0	34	0	0	187	172	8	1365	56	270	1145	0
Turn Type	Perm		Perm	Perm	pm+pt	Perm	pm+pt	Perm	pm+pt			
Protected Phases	8		4	4	4	4	6	6	6	2	2	
Permitted Phases		8										
Actuated Green, G (s)	21.2			21.2	21.2	61.6	61.6	61.6	61.6	85.5	85.5	
Effective Green, g (s)	21.2			21.2	21.2	61.6	61.6	61.6	61.6	85.5	85.5	
Actuated g/C Ratio	0.18			0.18	0.18	0.51	0.51	0.51	0.51	0.71	0.71	
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)	235			243	280	184	1817	813	467	2519		
g/s Ratio Prot	0.03			c0.14	0.11	0.02	c0.39	0.04	c0.12	0.32		
g/s Ratio Perm	0.14			0.77	0.62	0.04	0.75	0.07	0.58	0.45		
Uniform Delay, d1	41.7			47.1	45.6	15.6	23.1	14.7	27.5	7.3		
Progression Factor	1.00			1.00	1.00	1.00	1.00	1.00	0.77	0.31		
Incremental Delay, d2	0.3			13.6	4.0	0.1	2.9	0.2	0.5	0.2		
Delay (s)	42.0			60.7	49.6	15.7	26.0	14.9	21.6	2.4		
Level of Service	D			E	D	B	C	B	C	A		
Approach Delay (s)	42.0			52.9			25.4			6.1		
Approach LOS	D			D			C			A		

Intersection Summary

	C	D
HCM Average Control Delay	22.8	HCM Level of Service
HCM Volume to Capacity ratio	0.69	
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	73.6%	ICU Level of Service
Analysis Period (min)	15	
Critical Lane Group		

Future 2015 SAT - Improved-Queues
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Base 2010 PM Improved

Queues
1: Old Milton Pkwy & NB Ramp

Base PM Improved
2/16/2007

	EBL	EBT	WBT	WBR	NBL	NBR	
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR	
Lane Group Flow (vph)	1143	1453	2392	568	411	610	
Act Effct Green (s)	43.0	96.0	49.0	49.0	16.0	120.0	
Actuated g/C Ratio	0.36	0.80	0.41	0.41	0.13	1.00	
v/c Ratio	0.93	0.51	0.91	0.69	0.90	0.39	
Control Delay	22.7	4.8	40.0	17.6	74.9	0.7	
Queue Delay	0.5	0.2	5.2	0.0	0.0	0.0	
Total Delay	23.1	5.1	45.2	17.6	74.9	0.7	
LOS	C	A	D	B	E	A	
Approach Delay	13.0 39.9						
Approach LOS	B D						
Queue Length 50th (ft)	242	158	500	165	163	0	
Queue Length 95th (ft)	m218	m152	556	302	#254	0	
Internal Link Dist (ft)	500 855						
Turn Bay Length (ft)	300						
Base Capacity (vph)	1230	2832	2619	828	458	1583	
Starvation Cap Reductn	9	590	0	0	0	0	
Spillback Cap Reductn	0	0	193	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.94	0.65	0.99	0.69	0.90	0.39	
Intersection Summary							
Cycle Length: 120							
Actuated Cycle Length: 120							
Offset: 90 (75%), Referenced to phase 2:WBT and 6:EBT, Start of Green							
Control Type: Actuated-Coordinated							
Maximum v/c Ratio: 0.93							
Intersection Signal Delay: 27.8	Intersection LOS: C						
Intersection Capacity Utilization 100.5%	ICU Level of Service G						
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.							

HCM Signalized Intersection Capacity Analysis
1: Old Milton Pkwy & NB Ramp

Base PM Improved
2/16/2007

	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	0.86	1.00	0.97	1.00	0.85	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)	3433	3539	3539	6408	1583	3433	1583	3433	1583	3433	3539	3539
Flt Permitted	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (perm)	3433	3539	3539	6408	1583	3433	1583	3433	1583	3433	3539	3539
Volume (vph)	1052	1337	0	0	2201	523	378	0	561	0	0	0
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)	1143	1453	0	0	2392	568	411	0	610	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	181	0	0	0	0	0	0
Lane Group Flow (vph)	1143	1453	0	0	2392	387	411	0	610	0	0	0
Turn Type	Prot Permcustom											
Protected Phases	1	6			2							
Permitted Phases						2	4					
Actuated Green, G (s)	43.0	96.0			49.0	49.0	16.0					
Effective Green, g (s)	43.0	96.0			49.0	49.0	16.0					
Actuated g/C Ratio	0.36	0.80			0.41	0.41	0.13					
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)	1230	2831			2617	646	458					
v/s Ratio Prot	c0.33	0.41			c0.37							
v/s Ratio Perm						0.24	c0.12					
v/c Ratio	0.93	0.51			0.91	0.60	0.90					
Uniform Delay, d1	37.0	4.1			33.5	27.8	51.2					
Progression Factor	0.54	1.16			1.00	1.00	1.00					
Incremental Delay, d2	1.4	0.1			6.3	4.1	19.8					
Delay (s)	21.4	4.8			39.8	31.9	71.0					
Level of Service	C	A			D	C	E					
Approach Delay (s)	12.1				38.3		29.0					
Approach LOS	B				D		C					
Intersection Summary												
HCM Average Control Delay	26.5 HCM Level of Service C											
HCM Volume to Capacity ratio	0.92											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 12.0											
Intersection Capacity Utilization	100.5% ICU Level of Service G											
Analysis Period (min)	15											
c Critical Lane Group												

Queues
2: Old Milton Pkwy & SB Ramp

Base PM Improved
2/16/2007

Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	2287	877	1250	1633	293	562
Act Effct Green (s)	51.0	51.0	42.6	97.6	14.4	120.0
Actuated g/C Ratio	0.42	0.42	0.36	0.81	0.12	1.00
v/c Ratio	1.06	1.03	1.03	0.57	0.71	0.36
Control Delay	55.1	44.2	49.8	2.3	60.5	0.6
Queue Delay	9.3	0.0	0.0	2.6	0.0	0.0
Total Delay	64.5	44.2	49.8	4.9	60.5	0.6
LOS	E	D	D	A	E	A
Approach Delay	58.9 24.4					
Approach LOS	E C					
Queue Length 50th (ft)	~701	~567	~523	65	112	0
Queue Length 95th (ft) m#716 m#450 m#635	1226	m73	500	500	159	0
Internal Link Dist (ft)	1226					
Turn Bay Length (ft)	300					
Base Capacity (vph)	2161	852	1218	2877	458	1583
Starvation Cap Reductn	0	0	0	1083	0	0
Spillback Cap Reductn	45	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.08	1.03	1.03	0.91	0.64	0.36
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 14 (12%), Referenced to phase 2:WBT and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 1.06						
Intersection Signal Delay: 39.8	Intersection LOS: D					
Intersection Capacity Utilization 100.5%	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.						

HCM Signalized Intersection Capacity Analysis
2: Old Milton Pkwy & SB Ramp

Base PM Improved
2/16/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
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	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.97	1.00
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	3433	3539	5085	1583	3433	3539	5085	1583	3433	3539
Flt Permitted	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	3539	5085	1583	3433	3539	5085	1583	3433	3539
Volume (vph)	0	2104	807	1150	1502	0	0	0	0	270	0	517
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)	0	2287	877	1250	1633	0	0	0	0	293	0	562
RTOR Reduction (vph)	0	0	179	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2287	698	1250	1633	0	0	0	0	293	0	562
Turn Type		Perm	Prot							custom		Free
Protected Phases		6	5	2						8		Free
Permitted Phases												
Actuated Green, G (s)		51.0	51.0	42.6	97.6					14.4		120.0
Effective Green, g (s)		51.0	51.0	42.6	97.6					14.4		120.0
Actuated g/C Ratio		0.42	0.42	0.36	0.81					0.12		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)		2161	673	1219	2878					412		1583
v/s Ratio Prot		c0.45		c0.36	0.46					c0.09		0.35
v/s Ratio Perm		1.06	1.04	1.03	0.57					0.71		0.36
Uniform Delay, d1		34.5	34.5	38.7	3.9					50.8		0.0
Progression Factor		0.61	0.50	0.61	0.47					1.00		1.00
Incremental Delay, d2		32.7	35.6	23.9	0.4					5.7		0.6
Delay (s)		53.8	52.7	47.5	2.2					56.5		0.6
Level of Service		D	D	D	A					E		A
Approach Delay (s)		53.5			21.8			0.0			19.8	
Approach LOS		D			C			A			B	
Intersection Summary												
HCM Average Control Delay								36.1		HCM Level of Service		D
HCM Volume to Capacity ratio								1.00				
Actuated Cycle Length (s)								120.0		Sum of lost time (s)		12.0
Intersection Capacity Utilization								100.5%		ICU Level of Service		G
Analysis Period (min)								15				
c Critical Lane Group												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	312	2183	9	13	1850	202	58	91	452	301
Act Effct Green (s)	72.6	67.8	120.0	55.5	49.0	49.0	17.4	17.4	18.0	39.4
Actuated g/C Ratio	0.60	0.56	1.00	0.46	0.41	0.41	0.14	0.14	0.15	0.33
v/c Ratio	0.89	0.76	0.01	0.08	0.89	0.28	0.44	0.28	0.88	0.44
Control Delay	48.7	9.0	0.0	7.8	34.8	13.6	59.9	7.9	69.0	9.0
Queue Delay	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0
Total Delay	48.7	9.0	0.0	7.8	36.5	13.6	59.9	7.9	69.0	9.0
LOS	D	A	A	A	D	B	E	A	E	A
Approach Delay	13.9									
Approach LOS	B									
Queue Length 50th (ft)	207	204	0	2	311	34	21	0	178	30
Queue Length 95th (ft)	m228	m177	m0	m3	469	79	45	34	#268	103
Internal Link Dist (ft)	1280									
Turn Bay Length (ft)	300	2873	1583	250	150	100	100	323	515	686
Base Capacity (vph)	372	2873	1583	180	2076	709	131	323	515	686
Starvation Cap Reductn	0	0	0	0	108	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	0.76	0.01	0.07	0.94	0.28	0.44	0.28	0.88	0.44

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 103 (86%). Referenced to phase 2:WBTL and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 26.2	Intersection LOS: C
Intersection Capacity Utilization 81.5%	ICU Level of Service D
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	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	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	1.00	0.91	1.00	0.97	1.00	0.85	1.00	0.85	1.00
Flt	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	0.85	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	0.95
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1583	3433	1583	3433	1583
Flt Permitted	0.08	1.00	1.00	0.09	1.00	0.09	1.00	0.23	1.00	0.09	1.00	1.00
Satd. Flow (perm)	147	5085	1583	160	5085	1583	831	1583	3433	1583	3433	1583
Volume (vph)	20	267	2008	8	12	1702	186	53	0	84	416	0
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)	22	290	2183	9	13	1850	202	58	0	91	452	0
RTOR Reduction (vph)	0	0	0	0	0	0	65	0	78	0	0	166
Lane Group Flow (vph)	0	312	2183	9	13	1850	137	58	13	0	452	135
Turn Type	pm+pt	pm+pt	Free	pm+pt	Free	pm+pt	Perm	Perm	Perm	Perm	Prot	Prot
Protected Phases	1	1	6	5	2	2	4	4	4	4	3	8
Permitted Phases	6	6	Free	2	2	2	4	4	4	4	3	8
Actuated Green, G (s)	72.6	65.4	120.0	49.8	46.6	46.6	17.4	17.4	17.4	18.0	39.4	39.4
Effective Green, g (s)	72.6	65.4	120.0	49.8	46.6	46.6	17.4	17.4	17.4	18.0	39.4	39.4
Actuated g/C Ratio	0.60	0.55	1.00	0.42	0.39	0.39	0.14	0.14	0.14	0.15	0.33	0.33
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)	386	2771	1583	109	1975	615	120	230	230	515	520	520
v/s Ratio Prot	c0.15	c0.43	0.01	0.05	0.00	c0.36	0.01	0.01	0.01	c0.13	0.09	0.09
v/s Ratio Perm	0.34	0.81	0.79	0.01	0.12	0.94	0.22	0.48	0.06	0.88	0.26	0.26
Uniform Delay, d1	40.8	21.8	0.0	50.9	35.3	24.6	47.2	44.2	44.2	49.9	29.6	29.6
Progression Factor	0.80	0.39	1.00	0.56	0.88	1.15	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.8	1.1	0.0	0.4	8.5	0.7	13.3	0.5	0.5	15.5	1.2	1.2
Delay (s)	38.2	9.5	0.0	29.1	39.7	28.8	60.4	44.7	44.7	65.4	30.8	30.8
Level of Service	D	A	A	C	D	C	E	D	D	E	C	C
Approach Delay (s)	13.1											
Approach LOS	B											

Intersection Summary

HCM Average Control Delay	29.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Base PM Improved
2/16/2007

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	277
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	301
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Baseline
A & R Engineering Inc.

Future 2015 SAT - Improved-Queues
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Queues
5: Old Milton Pkwy & Westside Pkwy

Base PM Improved
2/16/2007

EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	257	1482	129	496	1799	378	448	811	225	729
Lane Group Flow (vph)	34.0	34.0	34.0	46.0	46.0	48.0	48.0	120.0	26.0	26.0
Act Effct Green (s)	0.28	0.28	0.28	0.38	0.38	0.40	1.00	0.22	0.22	0.22
Actuated g/C Ratio	0.96	1.03	0.25	1.11	0.92	1.15	0.32	0.51	1.13	0.95
v/c Ratio	83.0	73.7	13.2	91.6	19.4	117.4	11.3	2.1	146.6	69.1
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	83.0	73.7	13.2	91.6	19.4	117.4	11.3	2.1	146.6	69.1
Total Delay	F	E	B	F	B	F	B	A	F	E
LOS	F	E	B	F	B	F	B	A	F	E
Approach Delay	70.8			35.0		31.3			71.4	
Approach LOS	E			C		C			E	
Queue Length 50th (ft)	167	~449	22	~183	157	~283	80	29	~202	295
Queue Length 95th (ft)	#313	#546	71	m#453	#326	m#470	m73	37	#362	#416
Internal Link Dist (ft)	495			1280		569			512	
Turn Bay Length (ft)	275	200	300	250	250	250	250	250	250	250
Base Capacity (vph)	269	1441	513	446	1949	328	1416	1583	199	767
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	0.96	1.03	0.25	1.11	0.92	1.15	0.32	0.51	1.13	0.95
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 2 (2%). Referenced to phase 2:WBTL and 6:EBTL, Start of Green										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 1.15										
Intersection Signal Delay: 50.2										
Intersection Capacity Utilization 102.8%										
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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Future 2015 SAT - Improved-Queues
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HCM Signalized Intersection Capacity Analysis
5: Old Milton Pkwy & Westside Pkwy

Base PM Improved
2/16/2007

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	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	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt	1.00	1.00	0.85	1.00	1.00	1.00	1.00	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	5085	1583	1770	5085	1770	5085	1770	3539	1583	1770	3539
Flt Permitted	0.20	1.00	1.00	0.20	1.00	0.20	1.00	0.13	1.00	1.00	0.49	1.00
Satd. Flow (perm)	373	5085	1583	373	5085	373	5085	248	3539	1583	918	3539
Volume (vph)	18	218	1363	119	456	1655	0	348	412	746	207	671
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)	20	237	1482	129	496	1799	0	378	448	811	225	729
RTOR Reduction (vph)	0	0	0	65	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	257	1482	65	496	1799	0	378	448	811	225	729
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	1	6	6	5	2	2	7	4	Free	Free	8
Permitted Phases	6	6	34.0	34.0	46.0	46.0	46.0	48.0	48.0	120.0	26.0	26.0
Actuated Green, G (s)	34.0	34.0	34.0	34.0	46.0	46.0	46.0	48.0	48.0	120.0	26.0	26.0
Effective Green, g (s)	34.0	34.0	34.0	34.0	46.0	46.0	46.0	48.0	48.0	120.0	26.0	26.0
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.38	0.38	0.38	0.40	0.40	1.00	0.22	0.22
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)	269	1441	449	446	1949	328	1416	1583	199	767		
v/s Ratio Prot	0.11	c0.29	0.04	c0.19	c0.24	0.35	c0.17	0.13	0.51	0.25	0.21	
v/s Ratio Perm	0.16	0.96	1.03	0.14	1.11	0.92	1.15	0.32	0.51	1.13	0.95	
v/c Ratio	54.8	43.0	32.1	43.3	35.3	35.3	35.3	24.7	0.0	47.0	46.4	
Uniform Delay, d1	1.00	1.00	1.00	1.00	0.48	0.37	0.78	0.44	1.00	1.00	1.00	
Progression Factor	42.4	31.3	0.7	67.7	5.5	89.7	0.4	0.8	103.3	22.4		
Incremental Delay, d2	97.1	74.3	32.8	88.5	18.6	117.2	11.2	0.8	150.3	68.8		
Delay (s)	F	E	C	F	B	F	B	F	B	A	F	E
Level of Service												
Approach Delay (s)												
Approach LOS												

Intersection Summary

HCM Average Control Delay	51.8	HCM Level of Service	D
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	102.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Baseline
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Future 2015 SAT - Improved-Queues
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HCM Signalized Intersection Capacity Analysis
5: Old Milton Pkwy & Westside Pkwy

Base PM Improved
2/16/2007

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	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	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt	1.00	1.00	0.85	1.00	1.00	1.00	1.00	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	5085	1583	1770	5085	1770	5085	1770	3539	1583	1770	3539
Flt Permitted	0.20	1.00	1.00	0.20	1.00	0.20	1.00	0.13	1.00	1.00	0.49	1.00
Satd. Flow (perm)	373	5085	1583	373	5085	373	5085	248	3539	1583	918	3539
Volume (vph)	18	218	1363	119	456	1655	0	348	412	746	207	671
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)	20	237	1482	129	496	1799	0	378	448	811	225	729
RTOR Reduction (vph)	0	0	0	65	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	257	1482	65	496	1799	0	378	448	811	225	729
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	1	6	6	5	2	2	7	4	Free	Free	8
Permitted Phases	6	6	34.0	34.0	46.0	46.0	46.0	48.0	48.0	120.0	26.0	26.0
Actuated Green, G (s)	34.0	34.0	34.0	34.0	46.0	46.0	46.0	48.0	48.0	120.0	26.0	26.0
Effective Green, g (s)	34.0	34.0	34.0	34.0	46.0	46.0	46.0	48.0	48.0	120.0	26.0	26.0
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.38	0.38	0.38	0.40	0.40	1.00	0.22	0.22
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)	269	1441	449	446	1949	328	1416	1583	199	767		
v/s Ratio Prot	0.11	c0.29	0.04	c0.19	c0.24	0.35	c0.17	0.13	0.51	0.25	0.21	
v/s Ratio Perm	0.16	0.96	1.03	0.14	1.11	0.92	1.15	0.32	0.51	1.13	0.95	
v/c Ratio	54.8	43.0	32.1	43.3	35.3	35.3	35.3	24.7	0.0	47.0	46.4	
Uniform Delay, d1	1.00	1.00	1.00	1.00	0.48	0.37	0.78	0.44	1.00	1.00	1.00	
Progression Factor	42.4	31.3	0.7	67.7	5.5	89.7	0.4	0.8	103.3	22.4		
Incremental Delay, d2	97.1	74.3	32.8	88.5	18.6	117.2	11.2	0.8	150.3	68.8		
Delay (s)	F	E	C	F	B	F	B	F	B	A	F	E
Level of Service												
Approach Delay (s)												
Approach LOS												

Intersection Summary

HCM Average Control Delay	51.8	HCM Level of Service	D
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	102.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Baseline
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**Future Intersection Analysis
(Scenario1)**

Future AM Intersection Analysis

Future 2010 AM

Queues
1: Old Milton Pkwy & NB Ramp

Future AM Sc-1
2/16/2007

	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	598	1715	2020	286	699	1042
Act Effct Green (s)	43.0	86.2	39.2	39.2	25.8	120.0
Actuated g/C Ratio	0.36	0.72	0.33	0.33	0.22	1.00
v/c Ratio	0.94	0.67	0.96	0.40	0.95	0.66
Control Delay	35.6	2.7	52.9	5.4	69.1	2.2
Queue Delay	0.0	0.3	0.0	0.0	0.0	0.0
Total Delay	35.6	3.0	52.9	5.4	69.1	2.2
LOS	D	A	D	A	E	A
Approach Delay	11.5 47.0					
Approach LOS	B D					
Queue Length 50th (ft)	421	48	446	2	276	0
Queue Length 95th (ft) m#556	67	#534	63	#391	0	
Internal Link Dist (ft)	595 855					
Turn Bay Length (ft)	300					
Base Capacity (vph)	634	2542	2094	707	744	1583
Starvation Cap Reductn	0	285	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	0.94	0.76	0.96	0.40	0.94	0.66
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 36 (30%), Referenced to phase 2:WBT and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.96						
Intersection Signal Delay: 29.2						
Intersection Capacity Utilization 89.9%						
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
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Synchro 6 Report
Page 1

HCM Signalized Intersection Capacity Analysis
1: Old Milton Pkwy & NB Ramp

Future AM Sc-1
2/16/2007

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		0.86	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		1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	3539		6408	1583	3433			1583			
Flt Permitted	0.95	1.00		1.00	1.00	0.95	1.00		1.00			
Satd. Flow (perm)	1770	3539		6408	1583	3433			1583			
Volume (vph)	580	1664	0	0	1959	277	678	0	1011	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	598	1715	0	0	2020	286	699	0	1042	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	190	0	0	0	0	0	0
Lane Group Flow (vph)	598	1715	0	0	2020	96	699	0	1042	0	0	0
Turn Type	Prot											
Protected Phases	1	6	2									
Permitted Phases	2 4											
Actuated Green, G (s)	43.0	86.2	39.2 39.2 25.8									
Effective Green, g (s)	43.0	86.2	39.2 39.2 25.8									
Actuated g/C Ratio	0.36	0.72	0.33 0.33 0.22									
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)	634	2542	2093 517 738									
v/s Ratio Prot	c0.34	0.48	c0.32									
v/s Ratio Perm	0.06 c0.20											
v/c Ratio	0.94	0.67	0.97 0.19 0.95									
Uniform Delay, d1	37.3	9.2	39.7 29.0 46.4									
Progression Factor	0.56	0.22	1.00 1.00 1.00									
Incremental Delay, d2	12.0	0.6	13.0 0.8 21.0									
Delay (s)	32.8	2.7	52.7 29.8 67.4									
Level of Service	C	A	D C E									
Approach Delay (s)	10.5		49.9		28.4		0.0					
Approach LOS	B		D		C		A					
Intersection Summary												
HCM Average Control Delay	29.7		HCM Level of Service									
HCM Volume to Capacity ratio	0.95		C									
Actuated Cycle Length (s)	120.0		Sum of lost time (s)									
Intersection Capacity Utilization	89.9%		E									
Analysis Period (min)	15		ICU Level of Service									
Critical Lane Group												

Baseline
A & R Engineering Inc.

Synchro 6 Report
Page 2

Queues
2: Old Milton Pkwy & SB Ramp

Future AM Sc-1
2/16/2007

	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	1983	255	913	1982	562	1085
Act Effct Green (s)	52.1	52.1	34.3	90.4	21.6	120.0
Actuated g/C Ratio	0.43	0.43	0.29	0.75	0.18	1.00
v/c Ratio	0.90	0.31	0.93	0.74	0.91	0.69
Control Delay	19.5	1.2	63.3	6.5	68.4	2.4
Queue Delay	0.0	0.0	0.0	0.4	0.0	0.0
Total Delay	19.5	1.2	63.3	6.9	68.4	2.4
LOS	B	A	E	A	E	A
Approach Delay	17.5		24.7			
Approach LOS	B		C			
Queue Length 50th (ft)	197	0	337	144	221	0
Queue Length 95th (ft)	m228	m9	m366	m148	#312	0
Internal Link Dist (ft)	1226		595			
Turn Bay Length (ft)	300					
Base Capacity (vph)	2207	822	1001	2666	629	1583
Starvation Cap Reductn	0	0	0	250	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.31	0.91	0.82	0.89	0.69
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 43 (36%), Referenced to phase 2:WBT and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.93						
Intersection Signal Delay: 22.4						Intersection LOS: C
Intersection Capacity Utilization 89.9%						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.						

HCM Signalized Intersection Capacity Analysis
2: Old Milton Pkwy & SB Ramp

Future AM Sc-1
2/16/2007

	EBT	EBR	WBL	WBT	SBL	SBR
Movement	EBT	EBR	WBL	WBT	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	0.91	1.00	0.97	0.95	1.00	0.97
Fr.	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	3433	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	3539	3433	1583
Volume (vph)	0	1745	224	831	1804	0
Peak-hour factor, PHF	0.88	0.88	0.88	0.91	0.91	0.91
Adj. Flow (vph)	0	1983	255	913	1982	0
RTOR Reduction (vph)	0	0	135	0	0	0
Lane Group Flow (vph)	0	1983	120	913	1982	0
Turn Type		Perm	Prot		custom	Free
Protected Phases	6	5	2			
Permitted Phases		6			8	
Actuated Green, G (s)	52.1	52.1	34.3	90.4	21.6	120.0
Effective Green, g (s)	52.1	52.1	34.3	90.4	21.6	120.0
Actuated g/C Ratio	0.43	0.43	0.29	0.75	0.18	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)	2208	687	981	2666	618	1583
v/s Ratio Prot	c0.39		c0.27	0.56		
v/s Ratio Perm		0.08			c0.16	0.69
v/c Ratio	0.90	0.18	0.93	0.74	0.91	0.69
Uniform Delay, d1	31.5	20.8	41.7	8.3	48.2	0.0
Progression Factor	0.43	0.12	1.34	0.65	1.00	1.00
Incremental Delay, d2	5.3	0.5	7.3	0.8	17.3	2.4
Delay (s)	18.8	3.0	63.0	6.2	65.5	2.4
Level of Service	B	A	E	A	E	A
Approach Delay (s)	17.0		24.1		24.0	
Approach LOS	B		C		C	
Intersection Summary						
HCM Average Control Delay		21.7				C
HCM Volume to Capacity ratio		0.91				
Actuated Cycle Length (s)		120.0				12.0
Intersection Capacity Utilization		89.9%				E
Analysis Period (min)		15				
c Critical Lane Group						

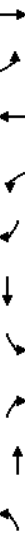
HCM Unsignalized Intersection Capacity Analysis
3: Old Milton Pkwy & Alpha Ct

Future AM-SC-1
2/16/2007

Intersection has too many lanes per leg.
HCM All-Way analysis is limited to two lanes per leg.
Channelized right turn lanes are not counted.

Queues
4: Old Milton Pkwy & Amber Park Dr

Future AM-SC-1
2/16/2007



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	246	1752	352	439	1681	34	41	58	248	37
Act Effct Green (s)	66.0	66.0	120.0	84.0	84.0	84.0	16.0	16.0	8.0	28.0
Actuated g/C Ratio	0.55	0.55	1.00	0.70	0.70	0.70	0.13	0.13	0.07	0.23
v/c Ratio	2.30	0.63	0.22	1.51	0.47	0.03	0.12	0.16	1.08	0.09
Control Delay	623.1	7.8	0.2	267.1	5.4	1.2	46.8	0.9	135.4	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	623.1	7.8	0.2	267.1	5.4	1.2	46.8	0.9	135.4	9.5
LOS	F	A	A	F	A	A	D	A	F	A
Approach Delay	71.1			58.7			19.9		119.1	
Approach LOS	E			E			B		F	
Queue Length 50th (ft)	~244	238	0	~400	105	0	14	0	~110	0
Queue Length 95th (ft)	m#382	m199	m0	#610	109	m1	32	0	#196	25
Internal Link Dist (ft)	1280			172			295		127	
Turn Bay Length (ft)	300	250		150		100		402		
Base Capacity (vph)	107	2797	1583	291	3560	1118	353	371	229	402
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	2.30	0.63	0.22	1.51	0.47	0.03	0.12	0.16	1.08	0.09

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HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Future AM-SC-1
2/16/2007

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	3	3	3	3	3	3	3	3	3	3	3	3
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	1.00	0.91	1.00	0.97	1.00	0.97	1.00	0.97	1.00
Flt	1.00	1.00	0.85	1.00	1.00	0.85	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	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1583	3433	1583	3433	1583
Flt Permitted	0.10	1.00	1.00	0.08	1.00	0.08	1.00	0.73	1.00	0.95	1.00	0.95
Satd. Flow (perm)	193	5085	1583	145	5085	1583	2649	1583	3433	1583	3433	1583
Volume (vph)	1	225	1699	341	426	1631	31	40	0	56	228	0
Peak-hour factor, PHF	0.92	0.92	0.97	0.97	0.97	0.97	0.92	0.97	0.92	0.97	0.92	0.92
Adj. Flow (vph)	1	245	1752	352	439	1681	34	41	0	58	248	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	10	0	50	0	0
Lane Group Flow (vph)	0	246	1752	352	439	1681	24	41	8	0	248	9
Turn Type	Perm	Perm	Free	Free	Perm	Perm	Perm	Perm	Prot	Prot	Prot	Prot
Protected Phases	6	6	Free	2	5	2	2	4	4	3	8	8
Permitted Phases	6	6	Free	2	5	2	2	4	4	3	8	8
Actuated Green, G (s)	66.0	66.0	120.0	84.0	84.0	84.0	16.0	16.0	16.0	8.0	28.0	28.0
Effective Green, g (s)	66.0	66.0	120.0	84.0	84.0	84.0	16.0	16.0	16.0	8.0	28.0	28.0
Actuated g/C Ratio	0.55	0.55	1.00	0.70	0.70	0.70	0.13	0.13	0.13	0.07	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
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)	106	2797	1583	291	3560	1108	353	211	229	369	229	369
v/s Ratio Prot	c0.27	c0.22	c0.22	c0.18	c0.33	c0.18	0.02	0.02	0.00	c0.07	0.01	0.01
v/s Ratio Perm	2.32	0.63	0.22	1.51	0.47	0.02	0.12	0.04	1.08	0.02	1.08	0.02
Uniform Delay, d1	27.0	18.5	0.0	31.7	8.1	5.5	45.8	45.3	56.0	35.5	56.0	35.5
Progression Factor	0.64	0.37	1.00	0.72	0.63	0.64	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	614.9	0.8	0.2	240.7	0.3	0.0	0.7	0.3	83.3	0.1	83.3	0.1
Delay (s)	632.2	7.7	0.2	263.7	5.4	3.6	46.4	45.6	139.3	35.6	139.3	35.6
Level of Service	F	A	A	F	A	A	D	D	F	D	F	D
Approach Delay (s)	72.0	E	58.0	E	46.0	D	125.8	F	125.8	F	125.8	F
Approach LOS	E	E	E	E	D	D	F	F	F	F	F	F

Intersection Summary	
HCM Average Control Delay	68.4 HCM Level of Service
HCM Volume to Capacity ratio	1.67
Actuated Cycle Length (s)	120.0 Sum of lost time (s)
Intersection Capacity Utilization	79.6% ICU Level of Service
Analysis Period (min)	15
Critical Lane Group	

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HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Future AM-SC-1
2/16/2007

Movement	SBR
Lane Configurations	1900
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Flt	1.00
Flt Protected	0.95
Satd. Flow (prot)	1770
Flt Permitted	0.10
Satd. Flow (perm)	193
Volume (vph)	34
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	37
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	Prot
Protected Phases	3
Permitted Phases	3
Actuated Green, G (s)	66.0
Effective Green, g (s)	66.0
Actuated g/C Ratio	0.55
Clearance Time (s)	4.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	106
v/s Ratio Prot	c0.27
v/s Ratio Perm	2.32
Uniform Delay, d1	27.0
Progression Factor	0.64
Incremental Delay, d2	614.9
Delay (s)	632.2
Level of Service	F
Approach Delay (s)	72.0
Approach LOS	E

Intersection Summary	
HCM Average Control Delay	68.4 HCM Level of Service
HCM Volume to Capacity ratio	1.67
Actuated Cycle Length (s)	120.0 Sum of lost time (s)
Intersection Capacity Utilization	79.6% ICU Level of Service
Analysis Period (min)	15
Critical Lane Group	

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A & R Engineering Inc.

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Queues
5: Old Milton Pkwy & Westside Pkwy

Future AM-SC-1
2/16/2007

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	323	1972	308	649	1363	11	134	582	365	102	228	190
Act Effct Green (s)	64.0	64.0	64.0	87.0	87.0	87.0	25.0	25.0	120.0	25.0	25.0	25.0
Actuated g/C Ratio	0.53	0.53	0.53	0.72	0.72	0.72	0.21	0.21	1.00	0.21	0.21	0.21
v/c Ratio	2.01	0.73	0.34	1.89	0.37	0.01	0.64	0.79	0.23	1.59	0.31	0.48
Control Delay	496.0	23.3	8.6	438.7	8.2	2.7	50.7	46.8	0.3	361.6	41.6	26.6
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	496.0	23.3	8.6	438.7	8.2	2.7	50.7	46.8	0.3	361.6	41.6	26.6
LOS	F	C	A	F	A	A	D	D	A	F	D	C
Approach Delay	80.2											
Approach LOS	F											
Queue Length 50th (ft)	~269	409	59	~665	178	1	97	231	0	~113	79	68
Queue Length 95th (ft)	#456	468	117	m#957	m189	m3	#179	300	0	#229	117	143
Internal Link Dist (ft)	495											
Turn Bay Length (ft)	275	200	300	300	3687	1151	210	737	1583	64	737	399
Base Capacity (vph)	161	2712	916	343	3687	1151	210	737	1583	64	737	399
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	2.01	0.73	0.34	1.89	0.37	0.01	0.64	0.79	0.23	1.59	0.31	0.48

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: 2.01												
Intersection Signal Delay: 94.8	Intersection LOS: F											
Intersection Capacity Utilization: 101.5%	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.												

HCM Signalized Intersection Capacity Analysis
5: Old Milton Pkwy & Westside Pkwy

Future AM-SC-1
2/16/2007

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
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	0.91	1.00	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.85	1.00
Flt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	1.00	0.85	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	5085	1583	1770	5085	1583	1770	3539	1583	1770	3539	3539
Flt Permitted	0.16	1.00	1.00	0.06	1.00	0.06	1.00	0.54	1.00	0.16	1.00	1.00
Satd. Flow (perm)	302	5085	1583	110	5085	1583	1009	3539	1583	307	3539	3539
Volume (vph)	17	281	1814	283	597	1254	10	123	535	336	94	210
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)	18	305	1972	308	649	1363	11	134	582	365	102	228
RTOR Reduction (vph)	0	0	0	72	0	0	3	0	0	0	0	0
Lane Group Flow (vph)	0	323	1972	236	649	1363	8	134	582	365	102	228
Turn Type	Perm	Perm	Perm	Perm	pm+pt	Perm	Perm	Perm	Perm	Free	Perm	Perm
Protected Phases	6	6	6	6	5	2	2	4	4	Free	8	8
Permitted Phases	6	6	6	6	2	2	2	4	4	Free	8	8
Actuated Green, G (s)	64.0	64.0	64.0	64.0	87.0	87.0	87.0	25.0	25.0	120.0	25.0	25.0
Effective Green, g (s)	64.0	64.0	64.0	64.0	87.0	87.0	87.0	25.0	25.0	120.0	25.0	25.0
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.72	0.72	0.72	0.21	0.21	1.00	0.21	0.21
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)	161	2712	844	343	3687	1148	210	737	1583	64	737	399
v/s Ratio Prot	0.39	0.15	1.08	0.01	0.13	0.01	0.13	0.16	0.16	0.23	0.33	0.06
v/s Ratio Perm	c1.07	0.78	0.28	1.89	0.37	0.01	0.64	0.79	0.23	1.59	0.31	0.48
Uniform Delay, d1	28.0	21.3	15.4	34.4	6.2	4.6	43.4	45.0	0.0	47.5	40.2	40.2
Progression Factor	1.00	1.00	1.00	1.00	1.02	1.28	1.19	0.84	0.85	1.00	1.00	1.00
Incremental Delay, d2	474.1	1.7	0.8	411.6	0.3	0.0	13.1	7.9	0.3	328.6	1.1	1.1
Delay (s)	502.1	23.1	16.2	446.7	8.2	5.4	49.4	46.3	0.3	376.1	41.3	41.3
Level of Service	F	C	B	F	A	A	D	D	D	A	F	D
Approach Delay (s)	81.7											
Approach LOS	F											
Intersection Summary												
HCM Average Control Delay	96.9											
HCM Volume to Capacity ratio	1.83											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	101.5%											
Analysis Period (min)	15											
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: Old Milton Pkwy & Westside Pkwy

Future AM-SC-1
2/16/2007

Movement	SBR
Lane Configurations	↗
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Flt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Volume (vph)	175
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	190
RTOR Reduction (vph)	69
Lane Group Flow (vph)	121
Turn Type	Perm
Protected Phases	
Permitted Phases	8
Actuated Green, G (s)	25.0
Effective Green, g (s)	25.0
Actuated g/C Ratio	0.21
Clearance Time (s)	4.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	330
v/s Ratio Prot	
v/s Ratio Perm	0.08
v/c Ratio	0.37
Uniform Delay, d1	40.7
Progression Factor	1.00
Incremental Delay, d2	3.1
Delay (s)	43.8
Level of Service	D
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM Unsignalized Intersection Capacity Analysis
6: Kimball Bridge Rd & Bailey Johnson Rd

Future AM-SC-1
2/16/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↘	↘	↙	↘	↘	↙	↘	↘	↙	↘	↘
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)	0	298	91	330	333	1	77	1	133	1	0	2
Peak Hour Factor	0.92	0.88	0.86	0.87	0.86	0.25	0.62	0.25	0.74	0.25	0.92	0.25
Hourly flow rate (vph)	0	339	106	379	387	4	124	4	180	4	0	8
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	391			339			1492	1488	339	1488	1486	389
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	391			339			1492	1488	339	1488	1486	389
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			69			0	95	74	93	100	99
cM capacity (veh/h)	1167			1221			76	85	704	56	86	659
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	339	106	379	391	128	180	12					
Volume Left	0	0	379	0	124	0	4					
Volume Right	0	106	0	4	0	180	8					
cSH	1167	1700	1221	1700	76	704	143					
Volume to Capacity	0.00	0.06	0.31	0.23	1.68	0.26	0.08					
Queue Length 95th (ft)	0	0	33	0	272	25	7					
Control Delay (s)	0.0	0.0	9.3	0.0	446.4	11.9	32.4					
Lane LOS	A	A	F	F	B	D	D					
Approach Delay (s)	0.0		4.6		192.8		32.4					
Approach LOS			F		F		D					
Intersection Summary												
Average Delay			41.2									
Intersection Capacity Utilization			54.7%							A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
7: Kimball Bridge Rd & Parkway 400 Driveway

Future AM-SC-1
2/16/2007

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	76	345	285	132	37	25
Peak Hour Factor	0.81	0.91	0.88	0.72	0.66	0.61
Hourly flow rate (vph)	94	379	324	183	56	41
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		905				
pX, platoon unblocked						
vC, conflicting volume	507				891	324
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCU, unblocked vol	507				891	324
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				80	94
cM capacity (veh/h)	1058				285	717
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	94	379	324	183	97	
Volume Left	94	0	0	0	56	
Volume Right	0	0	0	183	41	
cSH	1058	1700	1700	1700	383	
Volume to Capacity	0.09	0.22	0.19	0.11	0.25	
Queue Length 95th (ft)	7	0	0	0	25	
Control Delay (s)	8.7	0.0	0.0	0.0	17.6	
Lane LOS	A				C	
Approach Delay (s)	1.7	0.0	0.0		17.6	
Approach LOS					C	
Intersection Summary						
Average Delay				2.3		
Intersection Capacity Utilization				32.8%		ICU Level of Service A
Analysis Period (min)				15		

Baseline
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Queues
8: Kimball Bridge Rd & Westside Pkwy

Future AM-SC-1
2/16/2007

Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	6	107	209	7	827	115	320	947
Act Effct Green (s)	13.9	13.9	13.9	82.3	76.6	76.6	98.1	96.0
Actuated g/C Ratio	0.12	0.12	0.12	0.69	0.64	0.64	0.82	0.80
v/c Ratio	0.03	0.66	0.57	0.02	0.37	0.11	0.63	0.33
Control Delay	34.5	68.8	12.5	4.8	12.0	4.1	8.4	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.5	68.8	12.5	4.8	12.0	4.1	8.4	1.9
LOS	C	E	B	A	B	A	A	A
Approach Delay	34.5	31.6		11.0				3.5
Approach LOS	C	C		B				A
Queue Length 50th (ft)	2	81	0	1	140	7	70	27
Queue Length 95th (ft)	15	135	67	4	249	39	m57	m67
Internal Link Dist (ft)	158	825		595				569
Turn Bay Length (ft)			150	150		150		150
Base Capacity (vph)	414	340	541	458	2258	1042	759	2831
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	0.01	0.31	0.39	0.02	0.37	0.11	0.42	0.33
Intersection Summary								
Cycle Length: 120								
Actuated Cycle Length: 120								
Offset: 55 (46%), Referenced to phase 2:SBTL and 6:NBT, Start of Green								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.66								
Intersection Signal Delay: 9.9								Intersection LOS: A
Intersection Capacity Utilization 59.4%								ICU Level of Service B
Analysis Period (min) 15								
m Volume for 95th percentile queue is metered by upstream signal.								

Baseline
A & R Engineering Inc.

Synchro 6 Report
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HCM Signalized Intersection Capacity Analysis
8: Kimball Bridge Rd & Westside Pkwy

Future AM-SC-1
2/16/2007

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	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
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)	1723	1723	1723	1723	1723	1723	1723	1723	1723	1723	1723	1723
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)	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682
Volume (vph)	1	2	3	98	0	192	6	761	106	294	869	2
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)	1	2	3	107	0	209	7	827	115	320	945	2
RTOR Reduction (vph)	0	3	0	0	0	185	0	0	34	0	0	0
Lane Group Flow (vph)	0	3	0	0	107	24	7	827	81	320	947	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	pm+pt	Perm	pm+pt	Perm	pm+pt	Perm
Protected Phases	8	8	8	4	4	4	1	6	5	2	2	2
Permitted Phases	8	8	8	4	4	4	1	6	6	6	6	2
Actuated Green, G (s)	13.9	13.9	13.9	13.9	13.9	13.9	74.7	73.4	73.4	98.1	92.8	92.8
Effective Green, g (s)	13.9	13.9	13.9	13.9	13.9	13.9	74.7	73.4	73.4	98.1	92.8	92.8
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.62	0.61	0.61	0.82	0.77	0.77
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)	195	163	183	334	2165	968	657	2736				
v/s Ratio Prot	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.05	0.08	0.27		
v/s Ratio Perm	0.02	0.02	0.02	0.02	0.02	0.02	0.38	0.08	0.08	0.49	0.35	
Uniform Delay, d1	47.0	50.8	47.6	8.8	11.8	9.5	9.0	4.2				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.52	0.44	
Incremental Delay, d2	0.0	9.2	0.3	0.0	0.5	0.2	0.1	0.0				
Delay (s)	47.0	59.9	48.0	8.8	12.3	9.7	4.8	1.9				
Level of Service	D	E	D	A	B	A	B	A	A	A	A	A
Approach Delay (s)	47.0	52.0	52.0	12.0	12.0	12.0	2.6					
Approach LOS	D	D	D	B	B	B	A					
Intersection Summary												
HCM Average Control Delay	12.4	HCM Level of Service	B									
HCM Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0									
Intersection Capacity Utilization	59.4%	ICU Level of Service	B									
Analysis Period (min)	15											
c Critical Lane Group												

Future 2010 AM Improved

Queues
1: Old Milton Pkwy & NB Ramp

Future AM Sc-1 improved
2/16/2007

	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	598	1715	2020	286	699	1042
Act Effct Green (s)	24.8	83.2	54.4	54.4	28.8	120.0
Actuated g/C Ratio	0.21	0.69	0.45	0.45	0.24	1.00
v/c Ratio	0.84	0.70	0.69	0.33	0.85	0.66
Control Delay	65.7	1.5	29.1	3.9	53.8	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.7	1.6	29.1	3.9	53.8	2.2
LOS	E	A	C	A	D	A
Approach Delay	18.1 26.0					
Approach LOS	B C					
Queue Length 50th (ft)	215	4	363	0	285	0
Queue Length 95th (ft)	m252	14	454	55	324	0
Internal Link Dist (ft)	595 855					
Turn Bay Length (ft)	300					
Base Capacity (vph)	831	2454	2907	874	944	1583
Starvation Cap Reductn	0	29	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	0.71	0.69	0.33	0.74	0.66
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 85 (71%), Referenced to phase 2:WBT and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.85						
Intersection Signal Delay: 22.3	Intersection LOS: C					
Intersection Capacity Utilization 81.7%	ICU Level of Service D					
Analysis Period (min) 15						
m Volume for 95th percentile queue is metered by upstream signal.						

HCM Signalized Intersection Capacity Analysis
1: Old Milton Pkwy & NB Ramp

Future AM Sc-1 improved
2/16/2007

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	0.97	0.95	0.86	1.00	0.97	1.00	0.97	1.00	0.85	0.85
Flt Protected	1.00	1.00	1.00	0.85	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3433	3539	6408	1583	3433	3433	1583	1583	1583	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3433	3539	6408	1583	3433	3433	1583	1583	1583	1583
Volume (vph)	580	1664	0	0	1959	277	678	0	1011	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	598	1715	0	0	2020	286	699	0	1042	0
RTOR Reduction (vph)	0	0	0	0	156	0	0	0	0	0
Lane Group Flow (vph)	598	1715	0	0	2020	130	699	0	1042	0
Turn Type	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	6	2	2	4	4	4	4	4	4
Permitted Phases										
Actuated Green, G (s)	24.8	83.2	54.4	54.4	28.8	28.8	120.0	120.0	120.0	120.0
Effective Green, g (s)	24.8	83.2	54.4	54.4	28.8	28.8	120.0	120.0	120.0	120.0
Actuated g/C Ratio	0.21	0.69	0.45	0.45	0.24	0.24	1.00	1.00	1.00	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0
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)	709	2454	2905	718	824	824	1583	1583	1583	1583
v/s Ratio Prot	c0.17	c0.48	0.32							
v/s Ratio Perm			0.08	c0.20	0.66	0.66				
v/c Ratio	0.84	0.70	0.70	0.18	0.85	0.66				
Uniform Delay, d1	45.7	10.9	26.2	19.5	43.5	0.0				
Progression Factor	1.34	0.07	1.00	1.00	1.00	1.00				
Incremental Delay, d2	3.8	0.7	1.4	0.6	8.1	2.2				
Delay (s)	64.9	1.5	27.6	20.1	51.6	2.2				
Level of Service	E	A	C	C	D	A				
Approach Delay (s)	17.9		26.7		22.0					
Approach LOS	B		C		C					
Intersection Summary										
HCM Average Control Delay	22.2				HCM Level of Service					
HCM Volume to Capacity ratio	0.76				C					
Actuated Cycle Length (s)	120.0				Sum of lost time (s)					
Intersection Capacity Utilization	81.7%				ICU Level of Service					
Analysis Period (min)	15				D					
Critical Lane Group										

Queues
2: Old Milton Pkwy & SB Ramp

Future AM Sc-1 improved
2/16/2007

Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	1983	255	913	1982	562	1085
Act Effct Green (s)	51.4	120.0	35.0	90.4	21.6	120.0
Actuated g/C Ratio	0.43	1.00	0.29	0.75	0.18	1.00
v/c Ratio	0.91	0.16	0.91	0.74	0.91	0.69
Control Delay	16.6	0.2	43.0	7.2	68.4	2.4
Queue Delay	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	16.6	0.2	43.0	7.7	68.4	2.4
LOS	B	A	D	A	E	A
Approach Delay	14.7		18.8			
Approach LOS	B		B			
Queue Length 50th (ft)	190	0	337	133	221	0
Queue Length 95th (ft)	209	m0	#472	130	#312	0
Internal Link Dist (ft)	1226		595			
Turn Bay Length (ft)	300					
Base Capacity (vph)	2179	1583	1001	2666	629	1583
Starvation Cap Reductn	0	0	0	262	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	0.16	0.91	0.82	0.89	0.69
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 71 (59%), Referenced to phase 2:WBT and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.91						
Intersection Signal Delay: 19.0						Intersection LOS: B
Intersection Capacity Utilization 81.7%						ICU Level of Service D
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.						

HCM Signalized Intersection Capacity Analysis
2: Old Milton Pkwy & SB Ramp

Future AM Sc-1 improved
2/16/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
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	0.91	1.00	0.97	0.95	1.00	0.95	1.00	0.97	1.00	0.95	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	5085	1583	3433	3539	5085	1583	3433	3539	5085	1583	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	5085	1583	3433	3539	5085	1583	3433	3539	5085	1583	3433	1583
Volume (vph)	0	1745	224	831	1804	0	0	0	0	500	0	966
Peak-hour factor, PHF	0.88	0.88	0.88	0.91	0.91	0.91	0.92	0.92	0.92	0.89	0.89	0.89
Adj. Flow (vph)	0	1983	255	913	1982	0	0	0	0	562	0	1085
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1983	255	913	1982	0	0	0	0	562	0	1085
Turn Type		Free	Prot							custom		Free
Protected Phases	6	5	2									
Permitted Phases		Free								8		Free
Actuated Green, G (s)	51.4	120.0	35.0	90.4						21.6		120.0
Effective Green, g (s)	51.4	120.0	35.0	90.4						21.6		120.0
Actuated g/C Ratio	0.43	1.00	0.29	0.75						0.18		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)	2178	1583	1001	2666						618		1583
v/s Ratio Prot	c0.39		c0.27	0.56								
v/s Ratio Perm	0.16		0.16	0.91	0.74					c0.16		0.69
v/c Ratio	0.91	0.16	0.91	0.74						0.91		0.69
Uniform Delay, d1	32.1	0.0	41.0	8.3						48.2		0.0
Progression Factor	0.31	1.00	0.77	0.67						1.00		1.00
Incremental Delay, d2	5.8	0.2	9.2	1.4						17.3		2.4
Delay (s)	15.9	0.2	41.0	7.0						65.5		2.4
Level of Service	B	A	D	A						E		A
Approach Delay (s)	14.1		17.7							24.0		
Approach LOS	B		B							C		
Intersection Summary												
HCM Average Control Delay			18.0							HCM Level of Service		B
HCM Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			120.0							Sum of lost time (s)		12.0
Intersection Capacity Utilization			81.7%							ICU Level of Service		D
Analysis Period (min)			15									
c Critical Lane Group												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	246	1752	352	439	1681	34	41	60	248	39
Act Effct Green (s)	56.7	56.7	120.0	19.9	52.6	67.0	8.1	17.0	10.4	21.1
Actuated g/C Ratio	0.47	0.47	1.00	0.17	0.44	0.56	0.07	0.14	0.09	0.18
v/c Ratio	0.58	0.73	0.22	0.77	0.75	0.04	0.18	0.22	0.58	0.12
Control Delay	12.8	4.7	0.0	48.4	23.4	1.5	54.0	14.3	58.2	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.8	4.7	0.0	48.4	23.4	1.5	54.0	14.3	58.2	15.6
LOS	B	A	A	D	C	A	D	B	E	B
Approach Delay	4.9									
Approach LOS	A									
Queue Length 50th (ft)	76	71	0	156	415	1	15	1	66	1
Queue Length 95th (ft)	m71	m62	m0	210	423	m2	34	41	95	33
Internal Link Dist (ft)	1280									
Turn Bay Length (ft)	300	2404	1583	658	2231	883	257	275	457	312
Base Capacity (vph)	424	2404	1583	658	2231	883	257	275	457	312
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	0.58	0.73	0.22	0.67	0.75	0.04	0.16	0.22	0.54	0.13

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 48 (40%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 18.4	Intersection LOS: B
Intersection Capacity Utilization 66.0%	ICU Level of Service C
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
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	0.91	1.00	0.97	0.91	1.00	0.85	1.00	0.86	1.00	0.86	1.00
Flt Protected	0.95	1.00	1.00	0.85	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	3433	5085	1583	3433	1583	3433	1583	3433	1583
Flt Permitted	0.12	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	233	5085	1583	3433	5085	1583	3433	1583	3433	1583	3433	1583
Volume (vph)	1	225	1699	341	426	1631	31	40	2	56	228	2
Peak-hour factor, PHF	0.92	0.92	0.97	0.97	0.97	0.97	0.92	0.97	0.92	0.97	0.92	0.92
Adj. Flow (vph)	1	245	1752	352	439	1681	34	41	2	58	248	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	12	0	50	0	30
Lane Group Flow (vph)	0	246	1752	352	439	1681	22	41	10	0	248	9
Turn Type	pm+pt	pm+pt	Free	Free	Prot	pm+ov	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	1	1	6	5	2	3	7	4	3	8	3	8
Permitted Phases	6	6	Free	Free	2	2	2	2	2	2	2	2
Actuated Green, G (s)	56.0	56.0	120.0	19.9	51.9	63.0	7.0	17.0	11.1	11.1	21.1	21.1
Effective Green, g (s)	56.0	56.0	120.0	19.9	51.9	63.0	7.0	17.0	11.1	11.1	21.1	21.1
Actuated g/C Ratio	0.47	0.47	1.00	0.17	0.43	0.52	0.06	0.14	0.09	0.09	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)	416	2373	1583	569	2199	884	200	226	462	281	462	281
v/s Ratio Prot	0.12	c0.34	0.13	c0.33	0.00	0.01	0.01	0.01	c0.05	0.01	c0.05	0.01
v/s Ratio Perm	0.16	c0.22	0.13	c0.22	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
v/c Ratio	0.59	0.74	0.22	0.77	0.76	0.02	0.20	0.05	0.54	0.03	0.54	0.03
Uniform Delay, d1	31.6	26.0	0.0	47.9	28.9	13.7	53.8	44.5	52.0	41.0	52.0	41.0
Progression Factor	0.33	0.17	1.00	0.87	0.76	0.27	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.2	0.0	4.4	1.8	0.0	0.5	0.4	1.2	0.2	1.2	0.2
Delay (s)	10.6	4.7	0.0	46.3	23.7	3.7	54.4	44.9	53.2	41.2	53.2	41.2
Level of Service	B	A	A	D	C	A	D	D	D	D	D	D
Approach Delay (s)	4.6										48.7	51.6
Approach LOS	A										D	D

Intersection Summary

HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	34
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	37
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	323	1972	308	649	1363	11	134	582	365	102	228	190
Act Effct Green (s)	51.0	51.0	51.0	24.0	53.7	53.7	30.8	21.2	120.0	27.2	19.4	19.4
Actuated g/C Ratio	0.42	0.42	0.42	0.20	0.45	0.45	0.26	0.18	1.00	0.23	0.16	0.16
v/c Ratio	0.81	0.91	0.39	0.94	0.60	0.02	0.46	0.93	0.23	0.57	0.40	0.46
Control Delay	42.8	40.1	9.6	48.5	7.3	1.0	29.6	62.3	0.3	47.4	47.6	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.8	40.1	9.6	48.5	7.3	1.0	29.6	62.3	0.3	47.4	47.6	10.1
LOS	D	D	A	D	A	A	C	E	A	D	D	B
Approach Delay	36.8			20.4			37.3			33.9		
Approach LOS	D			C			D			C		
Queue Length 50th (ft)	173	516	51	268	58	0	81	236	0	61	84	0
Queue Length 95th (ft)	274	590	119	#379	302	m1	101	#348	0	109	125	65
Internal Link Dist (ft)	495			1280			569			483		
Turn Bay Length (ft)	275	200	300	788	2275	712	298	625	1583	181	571	415
Base Capacity (vph)	490	2161	788	687	2275	712	298	625	1583	181	571	415
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	0.66	0.91	0.39	0.94	0.60	0.02	0.45	0.93	0.23	0.56	0.40	0.46

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 24 (20%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 31.3	Intersection LOS: C
Intersection Capacity Utilization 85.4%	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.	

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	3	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
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	0.97	0.91	1.00	0.85	1.00	0.95	1.00	0.85	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	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	3433	5085	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.13	1.00	1.00	1.00	0.95	1.00	0.47	1.00	1.00	0.47	1.00	0.21
Satd. Flow (perm)	251	5085	1583	3433	5085	1583	868	3539	1583	868	3539	3539
Volume (vph)	17	281	1814	283	597	1254	10	123	535	336	94	210
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)	18	305	1972	308	649	1363	11	134	582	365	102	228
RTOR Reduction (vph)	0	0	0	115	0	0	4	0	0	0	0	0
Lane Group Flow (vph)	0	323	1972	193	649	1363	7	134	582	365	102	228
Turn Type	pm+pt	pm+pt	pm+pt	Perm	Prot	Perm	pm+pt	Perm	pm+pt	Free	pm+pt	Free
Protected Phases	1	1	6	6	5	2	7	4	4	3	8	8
Permitted Phases	6	6	6	6	6	6	2	4	4	Free	8	8
Actuated Green, G (s)	51.0	51.0	51.0	51.0	24.0	53.7	30.8	21.2	120.0	27.2	19.4	19.4
Effective Green, g (s)	51.0	51.0	51.0	51.0	24.0	53.7	30.8	21.2	120.0	27.2	19.4	19.4
Actuated g/C Ratio	0.42	0.42	0.42	0.42	0.20	0.45	0.45	0.26	0.18	1.00	0.23	0.16
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)	376	2161	673	687	2276	708	295	625	1583	177	572	415
v/s Ratio Prot	0.15	c0.39		c0.19	0.27		0.04	c0.16		c0.04	0.06	
v/s Ratio Perm	0.21		0.12			0.00	0.08		0.23	0.09		
v/s Ratio	0.86	0.91	0.29	0.94	0.60	0.01	0.45	0.93	0.23	0.58	0.40	
Uniform Delay, d1	32.2	32.4	22.6	47.3	25.0	18.4	36.0	48.7	0.0	39.0	45.1	
Progression Factor	1.00	1.00	1.00	0.57	0.24	0.07	0.71	0.82	1.00	1.00	1.00	
Incremental Delay, d2	17.4	7.3	1.1	18.4	0.9	0.0	1.0	21.5	0.3	4.5	2.1	
Delay (s)	49.6	39.7	23.7	45.6	7.0	1.3	26.6	61.2	0.3	43.5	47.1	
Level of Service	D	D	C	D	A	A	C	E	A	D	D	
Approach Delay (s)	39.1			19.3			36.4			45.3		
Approach LOS	D			B			D			D		

Intersection Summary

HCM Average Control Delay	32.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Old Milton Pkwy & Westside Pkwy

Future AM SC-1 Improved
2/16/2007

Movement	SBR
Lane Configurations	↖ ↗
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Flt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Volume (vph)	175
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	190
RTOR Reduction (vph)	159
Lane Group Flow (vph)	31
Turn Type	Perm
Protected Phases	
Permitted Phases	8
Actuated Green, G (s)	19.4
Effective Green, g (s)	19.4
Actuated g/C Ratio	0.16
Clearance Time (s)	4.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	256
v/s Ratio Prot	
v/s Ratio Perm	0.02
v/c Ratio	0.12
Uniform Delay, d1	43.0
Progression Factor	1.00
Incremental Delay, d2	1.0
Delay (s)	44.0
Level of Service	D
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Baseline
A & R Engineering Inc.

Future 2015 SAT - Improved-Queues
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HCM Unsignalized Intersection Capacity Analysis
6: Kimball Bridge Rd & Bailey Johnson Rd

Future AM SC-1 Improved
2/16/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
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)	0	298	91	330	333	1	77	1	133	1	0	2
Peak Hour Factor	0.92	0.88	0.86	0.87	0.86	0.25	0.62	0.25	0.74	0.25	0.92	0.25
Hourly flow rate (vph)	0	339	106	379	387	4	124	4	180	4	0	8
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	391			339			1492	1488	339	1488	1486	389
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	391			339			1492	1488	339	1488	1486	389
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			69			0	95	74	93	100	99
cM capacity (veh/h)	1167			1221			76	85	704	56	86	659
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	339	106	379	391	128	180	12					
Volume Left	0	0	379	0	124	0	4					
Volume Right	0	106	0	4	0	180	8					
cSH	1167	1700	1221	1700	76	704	143					
Volume to Capacity	0.00	0.06	0.31	0.23	1.68	0.26	0.08					
Queue Length 95th (ft)	0	0	33	0	272	25	7					
Control Delay (s)	0.0	0.0	9.3	0.0	446.4	11.9	32.4					
Lane LOS	A	A	F	F	B	D	D					
Approach Delay (s)	0.0		4.6		192.8		32.4					
Approach LOS			F		F		D					
Intersection Summary												
Average Delay			41.2									
Intersection Capacity Utilization			54.7%							A		
Analysis Period (min)			15									

Baseline
A & R Engineering Inc.

Future 2015 SAT - Improved-Queues
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Future PM Intersection Analysis

Future 2010 PM

Queues
1: Old Milton Pkwy & NB Ramp

Future PM Sc-1
2/16/2007

	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	1140	1469	2294	539	431	578
Act Effct Green (s)	57.0	96.0	35.0	35.0	16.0	120.0
Actuated g/C Ratio	0.48	0.80	0.29	0.29	0.13	1.00
v/c Ratio	1.36	0.52	1.23	0.82	0.94	0.37
Control Delay	177.1	1.9	144.6	30.8	81.5	0.7
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	177.1	2.1	144.6	30.8	81.5	0.7
LOS	F	A	F	C	F	A
Approach Delay	78.5 122.9					
Approach LOS	E F					
Queue Length 50th (ft)	~1140	70	~636	204	172	0
Queue Length 95th (ft)	#1052	m66	#711	#396	#271	0
Internal Link Dist (ft)	595 855					
Turn Bay Length (ft)	300					
Base Capacity (vph)	841	2831	1869	655	458	1583
Starvation Cap Reductn	0	364	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	1.36	0.60	1.23	0.82	0.94	0.37
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: 1.36						
Intersection Signal Delay: 91.2						
Intersection Capacity Utilization 115.2%						
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.						
m Volume for 95th percentile queue is metered by upstream signal.						

HCM Signalized Intersection Capacity Analysis
1: Old Milton Pkwy & NB Ramp

Future PM Sc-1
2/16/2007

	EBL	EBT	WBT	WBR	NBL	NBR
Movement	EBL	EBT	WBT	WBR	NBL	NBR
Lane Configurations	EBL	EBT	WBT	WBR	NBL	NBR
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	0.86	1.00	0.97	1.00
Fr.	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	6408	1583	3433	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	6408	1583	3433	1583
Volume (vph)	1106	1425	0	2225	523	418
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1140	1469	0	2294	539	431
RTOR Reduction (vph)	0	0	0	0	193	0
Lane Group Flow (vph)	1140	1469	0	2294	346	431
Turn Type	Prot	Permut	Permut	Permut	Free	Free
Protected Phases	1	6	2	2	4	4
Permitted Phases						
Actuated Green, G (s)	57.0	96.0	35.0	35.0	16.0	120.0
Effective Green, g (s)	57.0	96.0	35.0	35.0	16.0	120.0
Actuated g/C Ratio	0.48	0.80	0.29	0.29	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)	841	2831	1869	462	458	1583
v/s Ratio Prot	c0.64	0.42	c0.36	0.22	c0.13	0.37
v/s Ratio Perm	1.36	0.52	1.23	0.75	0.94	0.37
v/c Ratio	31.5	4.1	42.5	38.5	51.5	0.0
Uniform Delay, d1	0.28	0.45	1.00	1.00	1.00	1.00
Progression Factor	160.7	0.1	107.3	10.6	27.7	0.7
Incremental Delay, d2	169.5	1.9	149.8	49.1	79.3	0.7
Delay (s)	F	A	F	D	E	A
Level of Service	F	A	F	D	E	A
Approach Delay (s)	75.1	130.6	34.2	0.0	0.0	0.0
Approach LOS	E	F	C	A	A	A
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						

Queues
2: Old Milton Pkwy & SB Ramp

Future PM Sc-1
2/16/2007

Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	2552	1086	1264	1721	303	598
Act Effct Green (s)	56.0	56.0	37.4	97.4	14.6	120.0
Actuated g/C Ratio	0.47	0.47	0.31	0.81	0.12	1.00
v/c Ratio	1.08	1.18	1.18	0.60	0.72	0.38
Control Delay	55.2	97.2	119.7	5.1	61.0	0.7
Queue Delay	0.0	0.0	0.0	11.5	0.0	0.0
Total Delay	55.2	97.2	119.7	16.6	61.0	0.7
LOS	E	F	F	B	E	A
Approach Delay	67.7			60.2		
Approach LOS	E			E		
Queue Length 50th (ft)	~800	~854	~592	149	117	0
Queue Length 95th (ft)	m441	m#510	m#468	m70	162	0
Internal Link Dist (ft)	1226			595		
Turn Bay Length (ft)	300					
Base Capacity (vph)	2373	919	1069	2871	458	1583
Starvation Cap Reductn	0	0	0	1149	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.08	1.18	1.18	1.00	0.66	0.38
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 38 (32%), Referenced to phase 2:WBT and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 1.18						
Intersection Signal Delay: 59.1						Intersection LOS: E
Intersection Capacity Utilization 115.2%						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.						
Queue shown is maximum after two cycles.						
m Volume for 95th percentile queue is metered by upstream signal.						

HCM Signalized Intersection Capacity Analysis
2: Old Milton Pkwy & SB Ramp

Future PM Sc-1
2/16/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
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	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.97	1.00
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	3433	3539	5085	1583	3433	3539	5085	1583	3433	3539
Flt Permitted	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	3539	5085	1583	3433	3539	5085	1583	3433	3539
Volume (vph)	0	2246	956	1150	1566	0	0	0	0	270	0	532
Peak-hour factor, PHF	0.88	0.88	0.88	0.91	0.91	0.91	0.92	0.92	0.92	0.89	0.89	0.89
Adj. Flow (vph)	0	2552	1086	1264	1721	0	0	0	0	303	0	598
RTOR Reduction (vph)	0	0	180	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2552	906	1264	1721	0	0	0	0	303	0	598
Turn Type		Perm	Prot	Prot	Prot					custom		Free
Protected Phases		6	5	2						8		Free
Permitted Phases			6									Free
Actuated Green, G (s)		56.0	56.0	37.4	97.4					14.6		120.0
Effective Green, g (s)		56.0	56.0	37.4	97.4					14.6		120.0
Actuated g/C Ratio		0.47	0.47	0.31	0.81					0.12		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)		2373	739	1070	2872					418		1583
v/s Ratio Prot		0.50		c0.37	0.49					c0.09		0.38
v/s Ratio Perm		1.08	1.23	1.18	0.60					0.72		0.38
Uniform Delay, d1		32.0	32.0	41.3	4.1					50.8		0.0
Progression Factor		0.58	0.42	0.97	1.14					1.00		1.00
Incremental Delay, d2		34.9	102.7	82.6	0.1					6.1		0.7
Delay (s)		53.4	116.2	122.7	4.8					56.9		0.7
Level of Service		D	F	F	A					E		A
Approach Delay (s)		72.2			54.7			0.0				19.6
Approach LOS		E			D			A				B
Intersection Summary												
HCM Average Control Delay												E
HCM Volume to Capacity ratio												
Actuated Cycle Length (s)												
Intersection Capacity Utilization												H
Analysis Period (min)												
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
3: Old Milton Pkwy & Alpha Ct

Future PM-SC-1
2/16/2007

Intersection has too many lanes per leg.
HCM All-Way analysis is limited to two lanes per leg.
Channelized right turn lanes are not counted.

Queues

4: Old Milton Pkwy & Amber Park Dr

Future PM-SC-1
2/16/2007



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	312	2070	84	94	1755	202	334	387	1022	301
Act Effct Green (s)	61.0	61.0	120.0	73.0	73.0	73.0	17.0	17.0	18.0	39.0
Actuated g/C Ratio	0.51	0.51	1.00	0.61	0.61	0.61	0.14	0.14	0.15	0.32
v/c Ratio	4.16	0.80	0.05	0.52	0.57	0.20	1.13	1.24	1.98	0.57
Control Delay	1456.6	8.7	0.0	53.0	22.6	6.0	139.4	162.8	477.9	36.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1456.6	8.7	0.0	53.0	22.6	6.0	139.4	162.8	477.9	36.3
LOS	F	A	A	D	C	A	F	F	F	D
Approach Delay	191.6			22.4			152.0			377.4
Approach LOS	F			C			F			F
Queue Length 50th (ft)	~392	166	0	49	44.1	43	~154	~300	~635	180
Queue Length 95th (ft)	m#562	124	m0	m81	428	74	#250	#499	#765	274
Internal Link Dist (ft)	1280			172			295			127
Turn Bay Length (ft)	300	2585	1583	180	3093	1029	295	313	515	528
Base Capacity (vph)	75	2585	1583	180	3093	1029	295	313	515	528
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	4.16	0.80	0.05	0.52	0.57	0.20	1.13	1.24	1.98	0.57

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 43 (36%), Referenced to phase 2:WBT and 6:EBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 4.16

Intersection Signal Delay: 171.8

Intersection Capacity Utilization 112.2%

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.

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

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HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Future PM-SC-1
2/16/2007

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	3	3	3	3	3	3	3	3	3	3	3	3
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	1.00	1.00	0.91	1.00	0.97	1.00	0.97	1.00	1.00
Flt Protected	1.00	1.00	0.85	1.00	1.00	0.95	1.00	0.85	1.00	0.85	1.00	0.85
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1583	3433	1583	3433	1583
Flt Permitted	0.08	1.00	1.00	0.06	1.00	0.06	1.00	0.58	1.00	0.95	1.00	0.95
Satd. Flow (perm)	147	5085	1583	115	5085	1583	2083	1583	3433	1583	3433	1583
Volume (vph)	20	267	2008	81	91	1702	186	324	0	375	940	0
Peak-hour factor, PHF	0.92	0.92	0.97	0.97	0.97	0.97	0.92	0.97	0.92	0.97	0.92	0.92
Adj. Flow (vph)	22	290	2070	84	94	1755	202	334	0	387	1022	0
RTOR Reduction (vph)	0	0	0	0	0	0	66	0	88	0	0	14
Lane Group Flow (vph)	0	312	2070	84	94	1755	136	334	299	0	1022	288
Turn Type	Perm	Perm	Free	pm+pt	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	6	6	Free	5	2	2	4	4	4	3	8	8
Permitted Phases	6	6	Free	2	5	2	2	4	4	3	8	8
Actuated Green, G (s)	61.0	61.0	120.0	73.0	73.0	73.0	73.0	17.0	17.0	18.0	39.0	39.0
Effective Green, g (s)	61.0	61.0	120.0	73.0	73.0	73.0	73.0	17.0	17.0	18.0	39.0	39.0
Actuated g/C Ratio	0.51	0.51	1.00	0.61	0.61	0.61	0.61	0.14	0.14	0.15	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)	75	2585	1583	180	3093	963	295	224	224	515	514	514
v/s Ratio Prot	0.41	0.03	c0.35	0.03	c0.35	0.03	0.16	c0.19	c0.19	c0.30	0.18	0.18
v/s Ratio Perm	c2.13	4.16	0.80	0.05	0.52	0.57	0.14	1.13	1.33	1.98	0.56	0.56
Uniform Delay, d1	29.5	24.5	0.0	40.5	14.1	10.1	51.5	51.5	51.5	51.0	33.4	33.4
Progression Factor	0.41	0.27	1.00	1.30	1.55	2.34	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1445.0	2.0	0.0	2.4	0.7	0.3	92.9	177.1	449.9	4.3	4.3	4.3
Delay (s)	1457.0	8.7	0.0	55.0	22.4	23.8	144.4	228.6	500.9	37.8	37.8	37.8
Level of Service	F	A	A	E	C	C	F	F	F	F	D	D
Approach Delay (s)	191.6	24.0	189.6	189.6	189.6	189.6	189.6	189.6	189.6	189.6	189.6	189.6
Approach LOS	F	C	F	F	F	F	F	F	F	F	F	F
Intersection Summary												
HCM Average Control Delay	180.1	HCM Level of Service										
HCM Volume to Capacity ratio	2.95	F										
Actuated Cycle Length (s)	120.0	Sum of lost time (s)										
Intersection Capacity Utilization	112.2%	ICU Level of Service										
Analysis Period (min)	15	H										
Critical Lane Group	D											

Baseline
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HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Future PM-SC-1
2/16/2007

Movement	SBR
Lane Configurations	1900
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Flt Protected	1.00
Satd. Flow (prot)	1770
Flt Permitted	0.08
Satd. Flow (perm)	147
Volume (vph)	277
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	301
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	Prot
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

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A & R Engineering Inc.

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	257	1525	129	554	1961	74	378	448	827	245	729	352
Act Effct Green (s)	51.0	51.0	51.0	69.0	69.0	69.0	43.0	43.0	120.0	43.0	43.0	43.0
Actuated g/C Ratio	0.42	0.42	0.42	0.58	0.58	0.58	0.36	0.36	1.00	0.36	0.36	0.36
v/c Ratio	4.15	0.71	0.18	2.01	0.67	0.08	2.49	0.35	0.52	0.90	0.57	0.61
Control Delay	1465.6	30.6	12.8	488.4	7.9	1.6	703.8	32.1	2.3	72.9	33.3	36.3
Queue Delay	1465.6	30.6	12.8	488.4	7.9	1.6	703.8	32.1	2.3	72.9	33.3	36.3
LOS	F	C	B	F	A	A	F	C	A	E	C	D
Approach Delay	222.3			110.6			170.8			41.4		
Approach LOS	F			F			F			D		
Queue Length 50th (ft)	~323	349	33	~629	129	1	~481	100	30	179	238	216
Queue Length 95th (ft)	#493	405	73	m#835	m177	m4	m#671	m190	42	#341	301	321
Internal Link Dist (ft)	495			1280			569			483		
Turn Bay Length (ft)	275	200	300	275	2924	932	152	1268	1583	271	1268	574
Base Capacity (vph)	62	2161	706	275	2924	932	152	1268	1583	271	1268	574
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	4.15	0.71	0.18	2.01	0.67	0.08	2.49	0.35	0.52	0.90	0.57	0.61

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 36 (30%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 4.15	
Intersection Signal Delay: 140.2	Intersection LOS: F
Intersection Capacity Utilization 106.5%	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.	

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
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	0.91	1.00	1.00	0.91	1.00	0.85	1.00	0.95	1.00	0.85	1.00
Flt	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	1.00	0.85	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	5085	1583	1770	5085	1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.08	1.00	1.00	0.08	1.00	0.08	1.00	0.23	1.00	0.23	1.00	0.41
Satd. Flow (perm)	146	5085	1583	146	5085	1583	146	5085	1583	146	5085	1583
Volume (vph)	18	218	1403	119	510	1804	68	348	412	761	225	671
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)	20	237	1525	129	554	1961	74	378	448	827	245	729
RTOR Reduction (vph)	0	0	0	33	0	0	22	0	0	0	0	0
Lane Group Flow (vph)	0	257	1525	96	554	1961	52	378	448	827	245	729
Turn Type	Perm	Perm	Perm	Perm	pm+pt	Perm	Perm	Perm	Perm	Free	Perm	Perm
Protected Phases	6	6	6	6	5	2	2	4	4	Free	8	8
Permitted Phases	6	6	6	6	2	2	2	4	4	Free	8	8
Actuated Green, G (s)	51.0	51.0	51.0	51.0	69.0	69.0	69.0	43.0	43.0	120.0	43.0	43.0
Effective Green, g (s)	51.0	51.0	51.0	51.0	69.0	69.0	69.0	43.0	43.0	120.0	43.0	43.0
Actuated g/C Ratio	0.42	0.42	0.42	0.42	0.57	0.57	0.57	0.36	0.36	1.00	0.36	0.36
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)	62	2161	673	275	2924	910	152	1268	1583	271	1268	574
v/s Ratio Prot	0.30	0.30	0.06	0.06	0.24	0.39	0.03	0.89	0.13	0.52	0.32	0.21
v/s Ratio Perm	c1.76	4.15	0.71	0.14	2.01	0.67	0.06	2.49	0.35	0.52	0.90	0.57
Uniform Delay, d1	34.5	28.3	21.1	39.0	17.6	11.2	38.5	28.3	0.0	36.5	31.1	31.1
Progression Factor	1.00	1.00	1.00	1.00	0.64	0.39	0.31	0.97	1.11	1.00	1.00	1.00
Incremental Delay, d2	1452.6	2.0	0.4	466.4	1.0	0.1	682.8	0.5	0.9	34.7	1.9	1.9
Delay (s)	1487.1	30.3	21.6	491.4	7.9	3.6	720.2	31.9	0.9	71.2	33.0	33.0
Level of Service	F	C	C	F	A	A	F	C	A	E	C	C
Approach Delay (s)	225.6			111.2			173.8			41.0		
Approach LOS	F			F			F			D		

Intersection Summary

HCM Average Control Delay	141.8	HCM Level of Service	F
HCM Volume to Capacity ratio	3.10		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	106.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Old Milton Pkwy & Westside Pkwy

Future PM-SC-1
2/16/2007

Movement	SBR
Lane Configurations	↖ ↗
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Flt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Volume (vph)	324
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	352
RTOR Reduction (vph)	6
Lane Group Flow (vph)	346
Turn Type	Perm
Protected Phases	
Permitted Phases	8
Actuated Green, G (s)	43.0
Effective Green, g (s)	43.0
Actuated g/C Ratio	0.36
Clearance Time (s)	4.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	567
v/s Ratio Prot	
v/s Ratio Perm	0.22
v/c Ratio	0.61
Uniform Delay, d1	31.6
Progression Factor	1.00
Incremental Delay, d2	4.8
Delay (s)	36.4
Level of Service	D
Approach Delay (s)	
Approach LOS	
Intersection Summary	

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HCM Unsignalized Intersection Capacity Analysis
6: Kimball Bridge Rd & Bailey Johnson Rd

Future PM-SC-1
2/16/2007

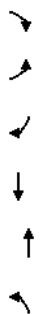
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1	403	107	194	463	1	109	0	237	1	1	2
Peak Hour Factor	0.25	0.94	0.84	0.85	0.89	0.25	0.86	0.92	0.87	0.25	0.25	0.50
Hourly flow rate (vph)	4	429	127	228	520	4	127	0	272	4	4	4
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	524			429			1419	1417	429	1415	1415	522
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	524			429			1419	1417	429	1415	1415	522
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			80			0	100	56	93	96	99
cM capacity (veh/h)	1042			1131			93	109	626	55	109	554
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	433	127	228	524	127	272	12					
Volume Left	4	0	228	0	127	0	4					
Volume Right	0	127	0	4	0	272	4					
cSH	1042	1700	1131	1700	93	626	103					
Volume to Capacity	0.00	0.07	0.20	0.31	1.36	0.44	0.12					
Queue Length 95th (ft)	0	0	19	0	233	55	10					
Control Delay (s)	0.1	0.0	9.0	0.0	300.1	15.1	44.7					
Lane LOS	A		A		F	C	E					
Approach Delay (s)	0.1		2.7		105.6		44.7					
Approach LOS			F		F		E					
Intersection Summary												
Average Delay							26.0					
Intersection Capacity Utilization							68.4%					C
Analysis Period (min)							15					

Baseline
A & R Engineering Inc.

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HCM Unsignalized Intersection Capacity Analysis
7: Kimball Bridge Rd & Parkway 400 Driveway

Future PM-SC-1
2/16/2007



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Stop	Stop
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	27	330	560	45	136	49
Peak Hour Factor	0.79	0.90	0.94	0.71	0.80	0.82
Hourly flow rate (vph)	34	367	596	63	170	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		905				
pX, platoon unblocked						
vC, conflicting volume	659				1031	596
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	659				1031	596
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				32	88
cM capacity (veh/h)	929				249	504
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	34	367	596	63	230	
Volume Left	34	0	0	0	170	
Volume Right	0	0	0	63	60	
cSH	929	1700	1700	1700	287	
Volume to Capacity	0.04	0.22	0.35	0.04	0.80	
Queue Length 95th (ft)	3	0	0	0	160	
Control Delay (s)	9.0	0.0	0.0	0.0	53.7	
Lane LOS	A				F	
Approach Delay (s)	0.8		0.0		53.7	
Approach LOS					F	
Intersection Summary						
Average Delay	9.8					
Intersection Capacity Utilization	46.7%					
Analysis Period (min)	15					
	ICU Level of Service					
	A					

Baseline
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Queues
8: Kimball Bridge Rd & Westside Pkwy

Future PM-SC-1
2/16/2007



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	41	202	449	8	1382	82	270
Act Effct Green (s)	22.2	22.2	22.2	69.9	69.9	87.4	87.4
Actuated g/C Ratio	0.18	0.18	0.18	0.58	0.58	0.73	0.73
v/c Ratio	0.15	0.80	0.79	0.02	0.67	0.83	0.47
Control Delay	32.6	68.4	22.5	15.7	21.3	7.9	44.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	32.6	68.4	22.5	15.7	21.3	7.9	44.2
LOS	C	E	C	B	C	A	D
Approach Delay	32.6	36.8			20.5		10.1
Approach LOS	C	D			C		B
Queue Length 50th (ft)	21	150	81	3	375	12	118
Queue Length 95th (ft)	50	224	202	12	571	44	m122
Internal Link Dist (ft)	158	825			595		569
Turn Bay Length (ft)			150	150		150	150
Base Capacity (vph)	355	330	637	343	2062	941	408
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	0.12	0.61	0.70	0.02	0.67	0.09	0.54
Intersection Summary							
Cycle Length: 120							
Actuated Cycle Length: 120							
Offset: 2 (2%), Referenced to phase 2:SBTTL and 6:NBTL, Start of Green							
Control Type: Actuated-Coordinated							
Maximum v/c Ratio: 0.83							
Intersection Signal Delay: 19.3							Intersection LOS: B
Intersection Capacity Utilization 74.0%							ICU Level of Service D
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
8: Kimball Bridge Rd & Westside Pkwy

Future PM-SC-1
2/16/2007

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	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flt Protected	0.97	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)	1754	1754	1754	1754	1754	1754	1754	1754	1754	1754	1754	1754
Flt Permitted	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Satd. Flow (perm)	1303	1303	1303	1303	1303	1303	1303	1303	1303	1303	1303	1303
Volume (vph)	23	6	8	184	2	413	7	1271	75	248	1100	7
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)	25	7	9	200	2	449	8	1382	82	270	1196	8
RTOR Reduction (vph)	0	7	0	0	0	273	0	0	19	0	0	0
Lane Group Flow (vph)	0	34	0	0	202	176	8	1382	63	270	1204	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	8	8	8	4	4	4	1	6	5	2		
Permitted Phases	8	8	8	4	4	4	1	6	6	2		
Actuated Green, G (s)	22.2	22.2	22.2	22.2	22.2	22.2	70.0	70.0	70.0	84.2	84.2	84.2
Effective Green, g (s)	22.2	22.2	22.2	22.2	22.2	22.2	70.0	70.0	70.0	84.2	84.2	84.2
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.58	0.58	0.58	0.70	0.70	0.70
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)	241	255	293	272	2064	923	338	2481				
v/s Ratio Prot												
v/s Ratio Perm	0.03	c0.15	0.11	0.02			c0.39		0.04	c0.46		
v/c Ratio	0.14	0.79	0.60	0.03	0.67	0.07	0.80	0.49				
Uniform Delay, d1	40.9	46.7	44.8	10.6	17.1	10.9	27.2	8.1				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.66	0.28		
Incremental Delay, d2	0.3	15.4	3.4	0.0	1.7	0.1	1.3	0.1				
Delay (s)	41.2	62.1	48.3	10.7	18.8	11.0	46.3	2.3				
Level of Service	D	E	D	B	B	B	D	A				
Approach Delay (s)	41.2	52.6		18.4			10.4					
Approach LOS	D	D		B			B					
Intersection Summary												
HCM Average Control Delay		21.5		HCM Level of Service			C					
HCM Volume to Capacity ratio		0.77										
Actuated Cycle Length (s)		120.0		Sum of lost time (s)			8.0					
Intersection Capacity Utilization		74.0%		ICU Level of Service			D					
Analysis Period (min)		15										
c Critical Lane Group												

Future 2010 PM Improved

Queues
1: Old Milton Pkwy & NB Ramp

Future PM Sc-1 Improved
2/16/2007

	EBL	EBT	WBT	WBR	NBL	NBR	
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR	
Lane Group Flow (vph)	1140	1469	2294	539	431	578	
Act Effct Green (s)	42.3	94.5	48.2	48.2	17.5	120.0	
Actuated g/C Ratio	0.35	0.79	0.40	0.40	0.15	1.00	
v/c Ratio	0.94	0.53	0.89	0.65	0.86	0.37	
Control Delay	40.7	0.1	39.5	15.2	67.7	0.7	
Queue Delay	0.0	0.6	0.0	0.0	0.0	0.0	
Total Delay	40.7	0.6	39.5	15.2	67.7	0.7	
LOS	D	A	D	B	E	A	
Approach Delay	18.1 34.9						
Approach LOS	B C						
Queue Length 50th (ft)	287	0	490	130	169	0	
Queue Length 95th (ft)	m272	m0	545	260	#247	0	
Internal Link Dist (ft)	595 855						
Turn Bay Length (ft)	300						
Base Capacity (vph)	1259	2787	2572	832	515	1583	
Starvation Cap Reductn	0	808	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	0.74	0.89	0.65	0.84	0.37	
Intersection Summary							
Cycle Length: 120							
Actuated Cycle Length: 120							
Offset: 105 (88%), Referenced to phase 2:WBT and 6:EBT, Start of Green							
Control Type: Actuated-Coordinated							
Maximum v/c Ratio: 0.94							
Intersection Signal Delay: 27.2	Intersection LOS: C						
Intersection Capacity Utilization 93.9%	ICU Level of Service F						
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.							

HCM Signalized Intersection Capacity Analysis
1: Old Milton Pkwy & NB Ramp

Future PM Sc-1 Improved
2/16/2007

	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	0.86	1.00	0.97	0.86	1.00	0.97	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	3433	3539	3539	6408	1583	3433	1583	3433	1583	3433	3539	3539
Flt Permitted	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	3433	3539	3539	6408	1583	3433	1583	3433	1583	3433	3539	3539
Volume (vph)	1106	1425	0	0	2225	523	418	0	561	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1140	1469	0	0	2294	539	431	0	578	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	196	0	0	0	0	0	0
Lane Group Flow (vph)	1140	1469	0	0	2294	343	431	0	578	0	0	0
Turn Type	Prot Permcustom Free											
Protected Phases	1	6	2	2	4	4	4	4	4	4	4	4
Permitted Phases												
Actuated Green, G (s)	42.3	94.5	48.2	48.2	17.5	120.0	120.0	120.0	120.0	120.0	120.0	120.0
Effective Green, g (s)	42.3	94.5	48.2	48.2	17.5	120.0	120.0	120.0	120.0	120.0	120.0	120.0
Actuated g/C Ratio	0.35	0.79	0.40	0.40	0.15	1.00	1.00	1.00	1.00	1.00	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	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)	1210	2787	2574	636	501	1583	1583	1583	1583	1583	1583	1583
v/s Ratio Prot	c0.33	0.42	c0.36	c0.36	c0.13	0.37	0.37	0.37	0.37	0.37	0.37	0.37
v/s Ratio Perm	0.94	0.53	0.89	0.54	0.86	0.37	0.37	0.37	0.37	0.37	0.37	0.37
Uniform Delay, d1	37.7	4.6	33.5	27.4	50.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Progression Factor	1.03	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.1	5.2	3.3	14.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Delay (s)	40.5	0.1	38.6	30.7	64.1	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Level of Service	D	A	D	C	E	A	A	A	A	A	A	A
Approach Delay (s)	17.8	37.1	37.1	37.1	27.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	B	D	D	D	C	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	27.8 HCM Level of Service C											
HCM Volume to Capacity ratio	0.91											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 12.0											
Intersection Capacity Utilization	93.9% ICU Level of Service F											
Analysis Period (min)	15											
c Critical Lane Group												

Queues
2: Old Milton Pkwy & SB Ramp

Future PM Sc-1 Improved
2/16/2007

Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	2552	1086	1264	1721	303	598
Act Effct Green (s)	55.4	120.0	38.0	97.4	14.6	120.0
Actuated g/C Ratio	0.46	1.00	0.32	0.81	0.12	1.00
v/c Ratio	1.09	0.69	1.16	0.60	0.72	0.38
Control Delay	66.8	2.1	103.7	6.4	61.0	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.8	2.1	103.7	6.4	61.0	0.7
LOS	E	A	F	A	E	A
Approach Delay	47.5		47.6			
Approach LOS	D		D			
Queue Length 50th (ft)	~821	0	~606	124	117	0
Queue Length 95th (ft) m#842	m0	m#719	197	162	0	0
Internal Link Dist (ft)	1226		595			
Turn Bay Length (ft)	300					
Base Capacity (vph)	2346	1583	1087	2871	458	1583
Starvation Cap Reductn	0	0	0	94	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.09	0.69	1.16	0.62	0.66	0.38
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 66 (55%), Referenced to phase 2:WBT and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 1.16						
Intersection Signal Delay: 44.4						Intersection LOS: D
Intersection Capacity Utilization 93.9%						ICU Level of Service F
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.						

HCM Signalized Intersection Capacity Analysis
2: Old Milton Pkwy & SB Ramp

Future PM Sc-1 Improved
2/16/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
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	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.97	1.00
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	3433	3539	5085	1583	3433	3539	5085	1583	3433	3539
Flt Permitted	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	3539	5085	1583	3433	3539	5085	1583	3433	3539
Volume (vph)	0	2246	956	1150	1566	0	0	0	0	270	0	532
Peak-hour factor, PHF	0.88	0.88	0.88	0.91	0.91	0.91	0.92	0.92	0.92	0.89	0.89	0.89
Adj. Flow (vph)	0	2552	1086	1264	1721	0	0	0	0	303	0	598
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2552	1086	1264	1721	0	0	0	0	303	0	598
Turn Type		Free	Free	Prot						custom		Free
Protected Phases		6		5	2							
Permitted Phases		Free		Free						8		Free
Actuated Green, G (s)		55.4	120.0	38.0	97.4					14.6		120.0
Effective Green, g (s)		55.4	120.0	38.0	97.4					14.6		120.0
Actuated g/C Ratio		0.46	1.00	0.32	0.81					0.12		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)		2348	1583	1087	2872					418		1583
v/s Ratio Prot		c0.50		c0.37	0.49					0.09		0.38
v/s Ratio Perm			c0.69							0.72		0.38
v/c Ratio		1.09	0.69	1.16	0.60					0.72		0.38
Uniform Delay, d1		32.3	0.0	41.0	4.1					50.8		0.0
Progression Factor		0.89	1.00	0.56	1.33					1.00		1.00
Incremental Delay, d2		42.7	1.0	79.4	0.5					6.1		0.7
Delay (s)		64.9	1.0	102.2	6.0					56.9		0.7
Level of Service		E	A	F	A					E		A
Approach Delay (s)		45.9			46.8			0.0				19.6
Approach LOS		D			D			A				B
Intersection Summary												
HCM Average Control Delay				43.1				HCM Level of Service				D
HCM Volume to Capacity ratio				1.05								
Actuated Cycle Length (s)				120.0				Sum of lost time (s)				8.0
Intersection Capacity Utilization				93.9%				ICU Level of Service				F
Analysis Period (min)				15								
c Critical Lane Group												

Queues
4: Old Milton Pkwy & Amber Park Dr

Future PM Sc-1 Improved
2/16/2007

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	312	2070	84	94	1755	202	334	392	1022	306
Act Effct Green (s)	51.4	51.4	120.0	7.6	43.0	71.0	18.0	21.0	24.0	27.0
Actuated g/C Ratio	0.43	0.43	1.00	0.06	0.36	0.59	0.15	0.18	0.20	0.22
v/c Ratio	1.04	0.95	0.05	0.43	0.96	0.20	0.65	1.05	1.02	0.58
Control Delay	79.4	18.5	0.0	63.2	41.1	2.4	54.6	93.6	82.0	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.4	18.5	0.0	63.2	41.1	2.4	54.6	93.6	82.0	17.4
LOS	E	B	A	E	D	A	D	F	F	B
Approach Delay	25.5									
Approach LOS	C									
Queue Length 50th (ft)	~213	199	0	34	475	6	127	~250	~288	57
Queue Length 95th (ft) m#306	#665	m0	m59	#609	#609	35	177	#449	#388	153
Internal Link Dist (ft)	1280									
Turn Bay Length (ft)	300	250	250	150	100	100	295	295	127	127
Base Capacity (vph)	299	2178	1583	229	1822	1003	515	374	998	525
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	1.04	0.95	0.05	0.41	0.96	0.20	0.65	1.05	1.02	0.58

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 44 (37%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.05	
Intersection Signal Delay: 43.5	Intersection LOS: D
Intersection Capacity Utilization 103.5%	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.	

HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Future PM Sc-1 Improved
2/16/2007

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	3	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	0.91	1.00	0.97	0.91	1.00	0.97	1.00	0.97	1.00	0.94	1.00
Flt Protected	1.00	1.00	0.85	1.00	1.00	1.00	0.85	1.00	0.85	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	3433	5085	1583	3433	1587	3433	1587	4990	1588
Flt Permitted	0.11	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	210	5085	1583	3433	5085	1583	3433	1587	3433	1587	4990	1588
Volume (vph)	20	267	2008	81	91	1702	186	324	5	375	940	5
Peak-hour factor, PHF	0.92	0.92	0.97	0.97	0.97	0.97	0.92	0.97	0.92	0.97	0.92	0.92
Adj. Flow (vph)	22	290	2070	84	94	1755	202	334	5	387	1022	5
RTOR Reduction (vph)	0	0	0	0	0	0	72	0	97	0	0	168
Lane Group Flow (vph)	0	312	2070	84	94	1755	130	334	295	0	1022	138
Turn Type	pm+pt	pm+pt	Free	Free	Prot	pm+ov	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	1	1	6	5	2	3	7	4	3	8		
Permitted Phases	6	6	Free	Free	2							
Actuated Green, G (s)	51.4	51.4	120.0	7.6	43.0	67.0	18.0	21.0	24.0	27.0		
Effective Green, g (s)	51.4	51.4	120.0	7.6	43.0	67.0	18.0	21.0	24.0	27.0		
Actuated g/C Ratio	0.43	0.43	1.00	0.06	0.36	0.56	0.15	0.18	0.20	0.22		
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)	298	2178	1583	217	1822	937	515	278	998	357		
v/s Ratio Prot	0.14	c0.41	0.05	0.03	c0.35	0.03	0.10	c0.19	c0.20	0.09		
v/s Ratio Perm	c0.31	0.05	0.05	0.43	0.96	0.14	0.65	1.06	1.02	0.39		
v/c Ratio	1.05	0.95	0.05	0.43	0.96	0.14	0.65	1.06	1.02	0.39		
Uniform Delay, d1	46.8	33.1	0.0	54.1	37.7	12.7	48.0	49.5	48.0	39.5		
Progression Factor	0.49	0.30	1.00	1.07	0.73	0.71	1.00	1.00	1.00	1.00		
Incremental Delay, d2	53.6	7.3	0.0	1.2	12.8	0.1	2.8	71.6	34.7	3.1		
Delay (s)	76.7	17.3	0.0	58.9	40.4	9.1	50.8	121.1	82.7	42.6		
Level of Service	E	B	A	E	D	A	D	F	F	D		
Approach Delay (s)	24.2										73.5	E
Approach LOS	C										F	E
Intersection Summary												
HCM Average Control Delay	45.7										D	
HCM Volume to Capacity ratio	1.04											
Actuated Cycle Length (s)	120.0										16.0	
Intersection Capacity Utilization	103.5%										G	
Analysis Period (min)	15											
Critical Lane Group												



Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	277
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	301
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Queues
5: Old Milton Pkwy & Westside Pkwy

Future PM SC-1 Improved
2/16/2007

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	257	1525	129	554	1961	74	378	448	827	245	729	352
Act Effct Green (s)	39.0	39.0	39.0	20.0	46.0	46.0	47.9	28.6	120.0	40.4	24.0	24.0
Actuated g/C Ratio	0.32	0.32	0.32	0.17	0.38	0.38	0.40	0.24	1.00	0.34	0.20	0.20
v/c Ratio	1.01	0.92	0.22	0.97	1.01	1.01	1.01	0.53	0.52	0.69	1.03	0.76
Control Delay	94.5	49.4	11.2	45.9	28.6	1.6	85.9	40.3	2.3	35.9	88.8	32.4
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	94.5	49.4	11.2	45.9	28.6	1.6	85.9	40.3	2.3	35.9	88.8	32.4
LOS	F	D	B	D	C	A	F	D	A	D	F	C
Approach Delay	52.9			31.5			31.7			64.0		
Approach LOS	D			C			C			E		
Queue Length 50th (ft)	~160			129			3			128		
Queue Length 95th (ft)	#328			#509			65 m#221 m#286			m4 m#458 m193		
Internal Link Dist (ft)	495			1280			569			483		
Turn Bay Length (ft)	275			200			300			250		
Base Capacity (vph)	254			1653			577			572		
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	1.01			0.92			0.22			0.97		

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 51 (43%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 42.8	Intersection LOS: D
Intersection Capacity Utilization 100.6%	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.	

HCM Signalized Intersection Capacity Analysis
5: Old Milton Pkwy & Westside Pkwy

Future PM SC-1 Improved
2/16/2007

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
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	0.91	1.00	0.97	0.91	1.00	0.95	1.00	0.95	1.00	1.00	0.95
Flt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.15	1.00	1.00	1.00	0.95	1.00	1.00	0.14	1.00	1.00	0.39	1.00
Satd. Flow (perm)	287	5085	1583	3433	5085	1583	3433	5085	266	3539	1583	720
Volume (vph)	18	218	1403	119	510	1804	68	348	412	761	225	671
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)	20	237	1525	129	554	1961	74	378	448	827	245	729
RTOR Reduction (vph)	0	0	0	62	0	0	0	22	0	0	0	0
Lane Group Flow (vph)	0	257	1525	67	554	1961	52	378	448	827	245	729
Turn Type	pm+pt	pm+pt	Perm	Perm	Prot	Perm	pm+pt	Perm	pm+pt	Free	pm+pt	Free
Protected Phases	1	1	6	6	5	2	7	4	4	3	8	8
Permitted Phases	6	6	6	6	2	2	4	4	4	Free	8	8
Actuated Green, G (s)	39.0	39.0	39.0	39.0	20.0	46.0	46.0	49.0	28.6	120.0	40.4	24.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	20.0	46.0	46.0	49.0	28.6	120.0	40.4	24.0
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.17	0.38	0.38	0.41	0.24	1.00	0.34	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)	254	1653	514	572	1949	607	372	843	1583	386	708	708
v/s Ratio Prot	c0.11	0.30	0.04	0.16	c0.39	c0.18	0.13	0.13	0.09	0.21	0.09	0.21
v/s Ratio Perm	c0.22	0.04	0.13	0.97	1.01	0.03	c0.24	0.52	0.52	0.63	0.52	0.63
Uniform Delay, d1	55.7	39.0	28.5	49.7	37.0	23.6	35.7	39.9	0.0	30.8	48.0	48.0
Progression Factor	1.00	1.00	1.00	0.48	0.29	0.10	1.41	0.94	1.00	1.00	1.00	1.00
Incremental Delay, d2	59.5	10.1	0.5	18.9	15.7	0.1	43.5	1.7	0.9	3.4	41.6	41.6
Delay (s)	115.2	49.1	29.1	42.7	26.5	2.6	94.0	39.2	0.9	34.2	89.6	89.6
Level of Service	F	D	C	D	C	A	F	D	A	C	F	F
Approach Delay (s)	56.6			29.3			32.6			69.8		
Approach LOS	E			C			C			E		
Intersection Summary												
HCM Average Control Delay	44.2			HCM Level of Service			D					
HCM Volume to Capacity ratio	0.98											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	100.6%			ICU Level of Service			G					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: Old Milton Pkwy & Westside Pkwy

Future PM SC-1 Improved
2/16/2007

Movement	SBR
Lane Configurations	↗
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Volume (vph)	324
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	352
RTOR Reduction (vph)	149
Lane Group Flow (vph)	203
Turn Type	Perm
Protected Phases	
Permitted Phases	8
Actuated Green, G (s)	24.0
Effective Green, g (s)	24.0
Actuated g/C Ratio	0.20
Clearance Time (s)	4.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	317
v/s Ratio Prot	
v/s Ratio Perm	0.13
v/c Ratio	0.64
Uniform Delay, d1	44.0
Progression Factor	1.00
Incremental Delay, d2	9.6
Delay (s)	53.6
Level of Service	D
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Baseline
A & R Engineering Inc.

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HCM Unsignalized Intersection Capacity Analysis
6: Kimball Bridge Rd & Bailey Johnson Rd

Future PM SC-1 Improved
2/16/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↘	↘	↙	↘	↘	↙	↘	↘	↙	↘	↘
Sign Control	Free	0%	Free	0%	Free	0%	Free	0%	Free	0%	Free	0%
Grade												
Volume (veh/h)	1	403	107	194	463	1	109	0	237	1	1	2
Peak Hour Factor	0.25	0.94	0.84	0.85	0.89	0.25	0.86	0.92	0.87	0.25	0.25	0.50
Hourly flow rate (vph)	4	429	127	228	520	4	127	0	272	4	4	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None				None
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	524			429			1419	1417	429	1415	1415	522
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	524			429			1419	1417	429	1415	1415	522
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			80			0	100	56	93	96	99
cM capacity (veh/h)	1042			1131			93	109	626	55	109	554
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	433	127	228	524	127	272	12					
Volume Left	4	0	228	0	127	0	4					
Volume Right	0	127	0	4	0	272	4					
cSH	1042	1700	1131	1700	93	626	103					
Volume to Capacity	0.00	0.07	0.20	0.31	1.36	0.44	0.12					
Queue Length 95th (ft)	0	0	19	0	233	55	10					
Control Delay (s)	0.1	0.0	9.0	0.0	300.1	15.1	44.7					
Lane LOS	A	A	A	A	F	C	E					
Approach Delay (s)	0.1		2.7		105.6		44.7					
Approach LOS			F		F		E					
Intersection Summary												
Average Delay							26.0					
Intersection Capacity Utilization							68.4%				C	
Analysis Period (min)							15					

Baseline
A & R Engineering Inc.

Future 2015 SAT - Improved-Queues
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**Future Intersection Analysis
(Scenario 2)**

Future AM Intersection Analysis

Future 2010 AM

Queues
1: Old Milton Pkwy & NB Ramp

Future AM Sc-2
2/16/2007

	EBL	EBT	WBT	WBR	NBL	NBR	
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR	
Lane Group Flow (vph)	630	1809	2129	301	737	1099	
Act Effct Green (s)	42.0	87.0	41.0	41.0	25.0	120.0	
Actuated g/C Ratio	0.35	0.72	0.34	0.34	0.21	1.00	
v/c Ratio	1.02	0.70	0.97	0.41	1.03	0.69	
Control Delay	52.7	3.8	52.9	5.7	88.4	2.5	
Queue Delay	0.0	0.3	0.0	0.0	0.0	0.0	
Total Delay	52.7	4.1	52.9	5.7	88.4	2.5	
LOS	D	A	D	A	F	A	
Approach Delay	16.6 47.1						
Approach LOS	B D						
Queue Length 50th (ft)	~477	57	470	7	~315	0	
Queue Length 95th (ft) m#673	80	#560	68	#437	0		
Internal Link Dist (ft)	595 855						
Turn Bay Length (ft)	300						
Base Capacity (vph)	620	2566	2189	730	715	1583	
Starvation Cap Reductn	0	233	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	1.02	0.78	0.97	0.41	1.03	0.69	
Intersection Summary							
Cycle Length: 120							
Actuated Cycle Length: 120							
Offset: 94 (78%), Referenced to phase 2:WBT and 6:EBT, Start of Green							
Control Type: Actuated-Coordinated							
Maximum v/c Ratio: 1.03							
Intersection Signal Delay: 33.2	Intersection LOS: C						
Intersection Capacity Utilization 89.9%	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.							

HCM Signalized Intersection Capacity Analysis
1: Old Milton Pkwy & NB Ramp

Future AM Sc-2
2/16/2007

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		0.86	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		1.00			
Satd. Flow (prot)	1770	3539		6408	1583	3433			1583			
Flt Permitted	0.95	1.00		1.00	1.00	0.95	1.00		1.00			
Satd. Flow (perm)	1770	3539		6408	1583	3433			1583			
Volume (vph)	580	1664	0	0	1959	277	678	0	1011	0	0	0
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)	630	1809	0	0	2129	301	737	0	1099	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	190	0	0	0	0	0	0
Lane Group Flow (vph)	630	1809	0	0	2129	111	737	0	1099	0	0	0
Turn Type	Prot Permcustom Free											
Protected Phases	1	6			2							
Permitted Phases												
Actuated Green, G (s)	42.0	87.0		41.0	41.0	25.0		2	4			
Effective Green, g (s)	42.0	87.0		41.0	41.0	25.0						
Actuated g/C Ratio	0.35	0.72		0.34	0.34	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)	620	2566		2189	541	715			1583			
v/s Ratio Prot	c0.36	0.51		c0.33								
v/s Ratio Perm					0.07	c0.21			0.69			
v/c Ratio	1.02	0.70		0.97	0.21	1.03			0.69			
Uniform Delay, d1	39.0	9.3		38.9	28.0	47.5			0.0			
Progression Factor	0.55	0.31		1.00	1.00	1.00			1.00			
Incremental Delay, d2	29.0	0.8		13.8	0.9	41.8			2.5			
Delay (s)	50.3	3.7		52.7	28.8	89.3			2.5			
Level of Service	D	A		D	C	F			A			
Approach Delay (s)	15.7											
Approach LOS	B D D D											
Intersection Summary												
HCM Average Control Delay	34.0											
HCM Volume to Capacity ratio	1.00											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	89.9%											
Analysis Period (min)	15											
Critical Lane Group												

Queues
2: Old Milton Pkwy & SB Ramp

Future AM Sc-2
2/16/2007

	EBT	EBR	WBL	WBT	SBL	SBR	
Lane Group	EBT	EBR	WBL	WBT	SBL	SBR	
Lane Group Flow (vph)	1897	243	903	1961	543	1050	
Act Effct Green (s)	52.2	52.2	34.5	90.7	21.3	120.0	
Actuated g/C Ratio	0.44	0.44	0.29	0.76	0.18	1.00	
v/c Ratio	0.86	0.30	0.91	0.73	0.89	0.66	
Control Delay	14.8	1.3	59.8	5.5	65.9	2.2	
Queue Delay	0.0	0.0	0.0	0.4	0.0	0.0	
Total Delay	14.8	1.3	59.8	5.9	65.9	2.2	
LOS	B	A	E	A	E	A	
Approach Delay	13.2			22.9			
Approach LOS	B			C			
Queue Length 50th (ft)	119	0	325	130	212	0	
Queue Length 95th (ft)	215	m16	m332	m118	#302	0	
Internal Link Dist (ft)	1226			595			
Turn Bay Length (ft)	300						
Base Capacity (vph)	2211	820	1030	2674	629	1583	
Starvation Cap Reductn	0	0	0	259	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.86	0.30	0.88	0.81	0.86	0.66	
Intersection Summary							
Cycle Length: 120							
Actuated Cycle Length: 120							
Offset: 104 (87%). Referenced to phase 2:WBT and 6:EBT, Start of Green							
Control Type: Actuated-Coordinated							
Maximum v/c Ratio: 0.91							
Intersection Signal Delay: 20.0							Intersection LOS: C
Intersection Capacity Utilization 89.9%							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.							

HCM Signalized Intersection Capacity Analysis
2: Old Milton Pkwy & SB Ramp

Future AM Sc-2
2/16/2007

	EBT	EBR	WBL	WBT	SBL	SBR	
Movement	EBT	EBR	WBL	WBT	SBL	SBR	
Lane Configurations	↑↑↑	↑	↑↑	↑↑	↑↑	↑	
Ideal Flow (vphpl)	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	0.91	1.00	0.97	0.95	0.97	1.00	1.00
Fr.	1.00	0.85	1.00	1.00	1.00	0.85	1.00
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	5085	1583	3433	3539	3433	1583	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	5085	1583	3433	3539	3433	1583	1583
Volume (vph)	0	1745	224	831	1804	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1897	243	903	1961	0	0
RTOR Reduction (vph)	0	0	132	0	0	0	0
Lane Group Flow (vph)	0	1897	111	903	1961	0	0
Turn Type		Perm	Prot		custom		Free
Protected Phases	6	6	5	2		8	
Permitted Phases							
Actuated Green, G (s)	52.2	52.2	34.5	90.7		21.3	120.0
Effective Green, g (s)	52.2	52.2	34.5	90.7		21.3	120.0
Actuated g/C Ratio	0.44	0.44	0.29	0.76		0.18	1.00
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)	2212	689	987	2675		609	1583
v/s Ratio Prot	c0.37		c0.26	0.55			
v/s Ratio Perm		0.07				c0.16	0.66
v/c Ratio	0.86	0.16	0.91	0.73		0.89	0.66
Uniform Delay, d1	30.6	20.6	41.3	8.0		48.2	0.0
Progression Factor	0.37	0.23	1.35	0.59		1.00	1.00
Incremental Delay, d2	2.8	0.3	3.8	0.5		15.3	2.2
Delay (s)	14.1	5.0	59.5	5.2		63.5	2.2
Level of Service	B	A	E	A		E	A
Approach Delay (s)	13.0			22.3		23.1	
Approach LOS	B			C		C	
Intersection Summary							
HCM Average Control Delay		19.5					B
HCM Volume to Capacity ratio		0.88					
Actuated Cycle Length (s)		120.0					12.0
Intersection Capacity Utilization		89.9%					E
Analysis Period (min)		15					
c Critical Lane Group							

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	123	1887	198	308	1959	51	18	101	176	20
Act Effct Green (s)	63.3	54.0	54.0	82.3	69.0	69.0	29.7	29.7	29.7	29.7
Actuated g/C Ratio	0.53	0.45	0.45	0.69	0.58	0.58	0.25	0.25	0.25	0.25
v/c Ratio	0.62	0.82	0.25	0.73	0.67	0.06	0.05	0.22	0.58	0.05
Control Delay	33.5	13.8	1.0	31.2	12.3	3.7	36.6	18.8	49.7	22.5
Queue Delay	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.5	14.2	1.0	31.2	12.3	3.7	36.6	18.8	49.7	22.5
LOS	C	B	A	C	B	A	D	B	D	C
Approach Delay	14.1									
Approach LOS	B									
Queue Length 50th (ft)	49	163	1	147	205	2	11	25	121	5
Queue Length 95th (ft)	m101	188	11	259	302	m3	31	74	206	26
Internal Link Dist (ft)	187									
Turn Bay Length (ft)	265	2288	807	461	2924	925	343	463	301	428
Base Capacity (vph)	239	2288	807	461	2924	925	343	463	301	428
Starvation Cap Reductn	0	93	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	0.86	0.25	0.67	0.67	0.06	0.05	0.22	0.58	0.05

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 92 (77%), Referenced to phase 2:WBTl and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 15.8	Intersection LOS: B
Intersection Capacity Utilization 74.9%	ICU Level of Service D
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Configurations	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	
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	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	
Flt Protected	0.95	1.00	1.00	1.00	1.00	0.85	1.00	0.91	1.00	0.91	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1694	1770	1695	1695	
Flt Permitted	0.07	1.00	1.00	0.07	1.00	1.00	0.74	1.00	0.66	1.00	1.00	
Satd. Flow (perm)	138	5085	1583	128	5085	1583	1386	1694	1229	1695	1695	
Volume (vph)	113	1736	182	16	268	1802	47	17	37	56	162	
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)	123	1887	198	17	291	1959	51	18	40	61	176	
RTOR Reduction (vph)	0	0	95	0	0	0	15	0	44	0	9	
Lane Group Flow (vph)	123	1887	103	0	308	1959	36	18	57	0	176	
Turn Type	pm+pt	Perm	pm+pt	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	1	6	6	5	5	2	4	4	4	8	8	
Permitted Phases	6	6	6	2	2	2	2	2	2	2	2	
Actuated Green, G (s)	63.3	54.0	54.0	82.3	69.0	69.0	29.7	29.7	29.7	29.7	29.7	
Effective Green, g (s)	63.3	54.0	54.0	82.3	69.0	69.0	29.7	29.7	29.7	29.7	29.7	
Actuated g/C Ratio	0.53	0.45	0.45	0.69	0.57	0.57	0.25	0.25	0.25	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	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)	199	2288	712	420	2924	910	343	419	304	420	420	
v/s Ratio Prot	0.05	c0.37	0.07	c0.15	0.39	0.02	0.01	0.03	c0.14	0.01	0.01	
v/s Ratio Perm	0.28	0.62	0.82	0.15	0.73	0.67	0.04	0.05	0.14	0.58	0.03	
v/c Ratio	40.8	28.9	19.4	34.4	17.6	11.1	34.4	35.2	39.7	34.2	34.2	
Uniform Delay, d1	0.76	0.38	0.11	0.64	0.64	0.69	1.00	1.00	1.00	1.00	1.00	
Progression Factor	4.4	2.8	0.3	4.6	0.9	0.1	0.3	0.7	7.8	0.1	0.1	
Incremental Delay, d2	35.6	13.7	2.4	26.6	12.1	7.7	34.7	35.8	47.5	34.3	34.3	
Delay (s)	D	B	A	C	B	A	C	D	D	C	C	
Level of Service	13.9											
Approach Delay (s)	B											
Approach LOS	B											
Intersection Summary												
HCM Average Control Delay	15.8										HCM Level of Service	B
HCM Volume to Capacity ratio	0.71											
Actuated Cycle Length (s)	120.0										Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.9%										ICU Level of Service	D
Analysis Period (min)	15											
Critical Lane Group												

Intersection Summary

HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Old Milton Pkwy & Alpha Ct

Future AM-SC-2
2/16/2007

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	11
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	12
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

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Queues
4: Old Milton Pkwy & Amber Park Dr

Future AM-SC-2
2/16/2007

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	246	2004	172	261	1700	34	22	39	72	37
Lane Group Flow (vph)	70.0	70.0	120.0	84.0	84.0	84.0	18.4	18.4	7.5	28.0
Act Effct Green (s)	0.58	0.58	1.00	0.70	0.70	0.70	0.15	0.15	0.06	0.23
Actuated g/C Ratio	2.20	0.68	0.11	1.23	0.48	0.03	0.05	0.10	0.33	0.09
v/c Ratio	575.7	4.2	0.1	159.0	0.5	0.0	46.0	0.6	57.9	10.3
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	575.7	4.2	0.1	159.0	0.6	0.0	46.0	0.6	57.9	10.3
Total Delay	575.7	4.2	0.1	159.0	0.6	0.0	46.0	0.6	57.9	10.3
LOS	F	A	A	F	A	A	D	A	E	B
Approach Delay	61.9		21.3					16.9		41.7
Approach LOS	E		C					B		D
Queue Length 50th (ft)	~312	58	0	~198	5	0	7	0	27	0
Queue Length 95th (ft)	m#453	m63	m0	#369	7	m0	20	0	52	26
Internal Link Dist (ft)	1280		172					295		125
Turn Bay Length (ft)	300		250		150	100				
Base Capacity (vph)	112	2966	1583	212	3560	1118	406	375	229	401
Starvation Cap Reductn	0	0	0	0	335	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	2.20	0.68	0.11	1.23	0.53	0.03	0.05	0.10	0.31	0.09
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 86 (72%), Referenced to phase 2:WBTl and 6:EBTl, Start of Green										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 2.20										
Intersection Signal Delay: 43.2										
Intersection Capacity Utilization 67.5%										
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.										
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: Old Milton Pkwy & Amber Park Dr

Future AM-SC-2
2/16/2007

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	3	3	3	3	3	3	3	3	3	3	3	3
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	1.00	0.91	1.00	0.97	1.00	0.97	1.00	0.97	1.00
Flt	1.00	1.00	0.85	1.00	1.00	0.85	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	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1583	3433	1583	3433	1583
Flt Permitted	0.10	1.00	1.00	0.05	1.00	1.00	0.73	1.00	0.73	1.00	0.95	1.00
Satd. Flow (perm)	189	5085	1583	102	5085	1583	2649	1583	2649	1583	3433	1583
Volume (vph)	1	225	1844	158	240	1564	31	20	0	36	66	0
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)	1	245	2004	172	261	1700	34	22	0	39	72	0
RTOR Reduction (vph)	0	0	0	0	0	0	10	0	33	0	0	28
Lane Group Flow (vph)	0	246	2004	172	261	1700	24	22	6	0	72	9
Turn Type	Perm	Perm	Free	pm+pt	Perm	Perm	Perm	Perm	Prot	Prot	Prot	Prot
Protected Phases	6	6	Free	2	5	2	2	4	4	3	8	8
Permitted Phases	6	6	Free	2	5	2	2	4	4	3	8	8
Actuated Green, G (s)	69.2	69.2	120.0	83.2	83.2	83.2	18.4	18.4	18.4	6.4	28.8	28.8
Effective Green, g (s)	69.2	69.2	120.0	83.2	83.2	83.2	18.4	18.4	18.4	6.4	28.8	28.8
Actuated g/C Ratio	0.58	0.58	1.00	0.69	0.69	0.69	0.15	0.15	0.15	0.05	0.24	0.24
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)	109	2932	1583	210	3526	1098	406	243	183	380	183	380
v/s Ratio Prot	0.39	0.39	0.11	0.76	0.10	0.33	0.01	0.00	0.00	c0.02	0.01	0.01
v/s Ratio Perm	2.26	0.68	0.11	1.24	0.48	0.02	0.05	0.02	0.05	0.39	0.02	0.02
Uniform Delay, d1	25.4	17.7	0.0	34.4	8.5	5.7	43.4	43.2	43.2	54.9	34.9	34.9
Progression Factor	0.34	0.19	1.00	0.65	0.02	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	586.4	1.0	0.1	135.7	0.4	0.0	0.3	0.2	0.2	1.4	0.1	0.1
Delay (s)	595.0	4.3	0.1	158.0	0.6	0.0	43.6	43.4	43.4	56.3	35.0	35.0
Level of Service	F	A	A	F	A	A	D	D	D	E	C	C
Approach Delay (s)	64.0	21.1	21.1	43.5	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1
Approach LOS	E	C	C	D	D	D	D	D	D	D	D	D

Intersection Summary			
HCM Average Control Delay	44.7	HCM Level of Service	
HCM Volume to Capacity ratio	1.55	D	
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	
Intersection Capacity Utilization	67.5%	ICU Level of Service	
Analysis Period (min)	15	C	
Critical Lane Group			

Baseline
A & R Engineering Inc.

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HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Future AM-SC-2
2/16/2007

Movement	SBR
Lane Configurations	1900
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Flt	1.00
Flt Protected	0.95
Satd. Flow (prot)	1770
Flt Permitted	0.10
Satd. Flow (perm)	189
Volume (vph)	34
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	37
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	Prot
Protected Phases	3
Permitted Phases	3
Actuated Green, G (s)	6.4
Effective Green, g (s)	6.4
Actuated g/C Ratio	0.05
Clearance Time (s)	4.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	183
v/s Ratio Prot	c0.02
v/s Ratio Perm	0.01
Uniform Delay, d1	54.9
Progression Factor	1.00
Incremental Delay, d2	1.4
Delay (s)	56.3
Level of Service	E
Approach Delay (s)	49.1
Approach LOS	D

Intersection Summary	
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Baseline
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Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBT
Lane Group	EBL	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBT
Lane Group Flow (vph)	323	1954	325	559	1322	11	138	543	340	102	224	190	
Act Effct Green (s)	63.0	63.0	63.0	63.0	87.0	87.0	87.0	25.0	25.0	120.0	25.0	25.0	25.0
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.72	0.72	0.72	0.21	0.21	1.00	0.21	0.21	0.21
v/c Ratio	1.68	0.73	0.36	1.56	0.36	0.01	0.65	0.74	0.21	1.32	0.30	0.47	
Control Delay	353.2	24.0	9.1	289.4	11.3	5.6	51.7	44.4	0.3	250.6	41.5	24.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	353.2	24.0	9.1	289.4	11.3	5.6	51.7	44.4	0.3	250.6	41.5	24.9	
LOS	F	C	A	F	B	A	D	D	A	F	D	C	
Approach Delay	63.0				93.4			30.7				76.7	
Approach LOS	E				F			C				E	
Queue Length 50th (ft)	~366	411	65	~559	205	1	99	208	0	~102	77	63	
Queue Length 95th (ft)	#407	471	126	m#785	m280	m4	#182	275	0	#218	115	138	
Internal Link Dist (ft)		495			1280			569				483	
Turn Bay Length (ft)	275	200	300	358	3687	1151	212	737	1583	77	737	404	
Base Capacity (vph)	192	2670	908	358	3687	1151	212	737	1583	77	737	404	
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	1.68	0.73	0.36	1.56	0.36	0.01	0.65	0.74	0.21	1.32	0.30	0.47	
Intersection Summary													
Cycle Length: 120													
Actuated Cycle Length: 120													
Offset: 72 (60%), Referenced to phase 2:WBT and 6:EBTL, Start of Green													
Control Type: Actuated-Coordinated													
Maximum v/c Ratio: 1.68													
Intersection Signal Delay: 68.3													
Intersection Capacity Utilization 95.6%													
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.													

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBT
Lane Configurations	EBL	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBT
Ideal Flow (vphpl)	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
Lane Util. Factor	1.00	0.91	1.00	0.85	1.00	0.91	1.00	0.85	1.00	0.95	1.00	0.85	1.00
Flt Protected	1.00	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	5085	1583	1770	5085	1583	1770
Flt Permitted	0.20	1.00	1.00	0.06	1.00	0.06	1.00	0.05	1.00	0.05	1.00	0.20	1.00
Satd. Flow (perm)	365	5085	1583	111	5085	1583	111	5085	1583	1019	3539	1583	371
Volume (vph)	17	281	1798	299	514	1216	10	127	500	313	94	206	
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)	18	305	1954	325	559	1322	11	138	543	340	102	224	
RTOR Reduction (vph)	0	0	0	76	0	0	0	3	0	0	0	0	
Lane Group Flow (vph)	0	323	1954	249	559	1322	8	138	543	340	102	224	
Turn Type	Perm	Perm	Perm	Perm	pm+pt	Perm	Perm	Perm	Perm	Free	Perm	Perm	
Protected Phases	6	6	6	6	5	2	2	4	4	4	4	8	
Permitted Phases	6	6	6	6	2	2	2	4	4	4	4	8	
Actuated Green, G (s)	63.0	63.0	63.0	63.0	87.0	87.0	87.0	25.0	25.0	120.0	25.0	25.0	
Effective Green, g (s)	63.0	63.0	63.0	63.0	87.0	87.0	87.0	25.0	25.0	120.0	25.0	25.0	
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.72	0.72	0.72	0.21	0.21	1.00	0.21	0.21	
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)	192	2670	831	357	3687	1148	212	737	1583	77	737	404	
v/s Ratio Prot	0.38	0.38	0.16	0.16	0.87	0.01	0.14	0.15	0.15	0.21	0.28	0.06	
v/s Ratio Perm	0.89	0.73	0.30	1.57	0.36	0.01	0.65	0.74	0.21	1.32	0.30	0.30	
Uniform Delay, d1	28.5	22.0	16.1	40.0	6.1	4.6	43.5	44.4	0.0	47.5	40.1	40.1	
Progression Factor	1.00	1.00	1.00	0.71	1.79	2.48	0.84	0.85	1.00	1.00	1.00	1.00	
Incremental Delay, d2	328.6	1.8	0.9	266.8	0.3	0.0	13.9	6.2	0.3	211.9	1.1	1.1	
Delay (s)	357.1	23.8	17.0	295.2	11.2	11.3	50.4	44.1	0.3	259.4	41.2	41.2	
Level of Service	F	C	B	F	F	B	B	D	D	A	F	D	
Approach Delay (s)	64.3				95.1			30.4				85.2	
Approach LOS	E				F			C				F	
Intersection Summary													
HCM Average Control Delay	70.0												
HCM Volume to Capacity ratio	1.58												
Actuated Cycle Length (s)	120.0												
Intersection Capacity Utilization	95.6%												
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
5: Old Milton Pkwy & Westside Pkwy

Future AM-SC-2
2/16/2007

Movement	SBR
Lane Configurations	↗
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Flt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Volume (vph)	175
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	190
RTOR Reduction (vph)	74
Lane Group Flow (vph)	116
Turn Type	Perm
Protected Phases	
Permitted Phases	8
Actuated Green, G (s)	25.0
Effective Green, g (s)	25.0
Actuated g/C Ratio	0.21
Clearance Time (s)	4.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	330
v/s Ratio Prot	
v/s Ratio Perm	0.07
v/c Ratio	0.35
Uniform Delay, d1	40.6
Progression Factor	1.00
Incremental Delay, d2	2.9
Delay (s)	43.5
Level of Service	D
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Baseline
A & R Engineering Inc.

Synchro 6 Report
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HCM Unsignalized Intersection Capacity Analysis
6: Kimball Bridge Rd & Northwinds Pkwy Ext

Future AM-SC-2
2/16/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↗	↘	↙	↗	↘	↙	↗	↘	↙	↗	↘
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)	0	204	81	330	229	106	12	66	133	94	10	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	222	88	359	249	115	13	72	145	102	11	5
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	364			222			1199	1303	222	1282	1246	307
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	364			222			1199	1303	222	1282	1246	307
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			73			89	39	82	0	91	99
cM capacity (veh/h)	1194			1347			120	118	818	49	128	733
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	222	88	359	364	85	145	118					
Volume Left	0	0	359	0	13	0	102					
Volume Right	0	88	0	115	0	145	5					
cSH	1194	1700	1347	1700	118	818	55					
Volume to Capacity	0.00	0.05	0.27	0.21	0.72	0.18	2.17					
Queue Length 95th (ft)	0	0	27	0	98	16	294					
Control Delay (s)	0.0	0.0	8.6	0.0	89.8	10.3	698.5					
Lane LOS			A		F	B	F					
Approach Delay (s)	0.0		4.3		39.7		698.5					
Approach LOS			E		F		F					
Intersection Summary												
Average Delay							68.8					
Intersection Capacity Utilization							52.0%					A
Analysis Period (min)							15					

Baseline
A & R Engineering Inc.

Synchro 6 Report
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HCM Unsignalized Intersection Capacity Analysis
7: Kimball Bridge Rd & Parkway 400 Driveway

Future AM-SC-2
2/16/2007



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Stop	Stop
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	78	256	216	35	22	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	85	278	235	38	24	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		905				
pX, platoon unblocked						
vC, conflicting volume	273				683	235
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	273				683	235
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				94	97
cM capacity (veh/h)	1290				388	804
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	85	278	235	38	51	
Volume Left	85	0	0	0	24	
Volume Right	0	0	0	38	27	
cSH	1290	1700	1700	1700	535	
Volume to Capacity	0.07	0.16	0.14	0.02	0.10	
Queue Length 95th (ft)	5	0	0	0	8	
Control Delay (s)	8.0	0.0	0.0	0.0	12.4	
Lane LOS	A				B	
Approach Delay (s)	1.9		0.0		12.4	
Approach LOS					B	
Intersection Summary						
Average Delay	1.9					
Intersection Capacity Utilization	29.0%					
Analysis Period (min)	15					
	ICU Level of Service A					

Baseline
A & R Engineering Inc.

Synchro 6 Report
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Queues
8: Kimball Bridge Rd & Westside Pkwy

Future AM-SC-2
2/16/2007



Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	6	105	135	7	842	100	240	948
Act Effct Green (s)	13.7	13.7	13.7	88.6	83.0	83.0	98.3	96.3
Actuated g/C Ratio	0.11	0.11	0.11	0.74	0.69	0.69	0.82	0.80
v/c Ratio	0.03	0.65	0.45	0.02	0.34	0.09	0.59	0.33
Control Delay	34.7	68.8	12.4	3.8	9.2	3.3	7.6	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	68.8	12.4	3.8	9.2	3.3	7.6	3.8
LOS	C	E	B	A	A	A	A	A
Approach Delay	34.7	37.1			8.5			4.6
Approach LOS	C	D			A			A
Queue Length 50th (ft)	2	79	0	1	121	5	28	23
Queue Length 95th (ft)	15	133	56	4	226	31	m52	m201
Internal Link Dist (ft)	158	825			595			569
Turn Bay Length (ft)			150	150		150	150	
Base Capacity (vph)	414	340	485	600	2447	1119	655	2840
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	0.01	0.31	0.28	0.01	0.34	0.09	0.37	0.33
Intersection Summary								
Cycle Length: 120								
Actuated Cycle Length: 120								
Offset: 115 (96%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.65								
Intersection Signal Delay: 9.5								
Intersection Capacity Utilization 55.7%								
Analysis Period (min) 15								
m Volume for 95th percentile queue is metered by upstream signal.								

Baseline
A & R Engineering Inc.

Synchro 6 Report
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HCM Signalized Intersection Capacity Analysis
 8: Kimball Bridge Rd & Westside Pkwy

Future AM-SC-2
 2/16/2007

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
Frt	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
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)	1723	1723	1723	1723	1723	1723	1723	1723	1723	1723	1723	1723
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)	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682
Volume (vph)	1	2	3	97	0	124	6	775	92	221	870	2
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)	1	2	3	105	0	135	7	842	100	240	946	2
RTOR Reduction (vph)	0	3	0	0	0	120	0	0	24	0	0	0
Lane Group Flow (vph)	0	3	0	0	105	15	7	842	76	240	946	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	8	8	4	4	4	4	1	6	5	5	2	2
Permitted Phases	8	8	4	4	4	4	1	6	6	6	2	2
Actuated Green, G (s)	13.7	13.7	13.7	13.7	13.7	13.7	84.2	83.0	83.0	98.3	98.3	93.1
Effective Green, g (s)	13.7	13.7	13.7	13.7	13.7	13.7	84.2	83.0	83.0	98.3	98.3	93.1
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11	0.11	0.70	0.69	0.69	0.82	0.82	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)	192	160	181	406	2448	1095	557	2745				
v/s Ratio Prot	0.00	0.07	0.01	0.01	0.05	0.04	0.04	0.27				
v/s Ratio Perm	0.02	0.66	0.09	0.02	0.34	0.07	0.43	0.35				
Uniform Delay, d1	47.2	50.9	47.5	5.4	7.5	6.0	3.3	4.1				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.49	0.92			
Incremental Delay, d2	0.0	9.3	0.2	0.0	0.4	0.1	0.2	0.1				
Delay (s)	47.2	60.2	47.7	5.4	7.9	6.1	5.1	3.9				
Level of Service	D	E	D	A	A	A	A	A	A	A	A	A
Approach Delay (s)	47.2			53.2			7.7				4.2	
Approach LOS	D			D			A				A	
Intersection Summary												
HCM Average Control Delay				10.6			HCM Level of Service			B		
HCM Volume to Capacity ratio				0.45								
Actuated Cycle Length (s)				120.0			Sum of lost time (s)			8.0		
Intersection Capacity Utilization				55.7%			ICU Level of Service			B		
Analysis Period (min)				15								
c Critical Lane Group												

Baseline
 A & R Engineering Inc.

Synchro 6 Report
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HCM Unsignalized Intersection Capacity Analysis
 9: Main Site Dr & Northwinds Pkwy Ext

Future AM-SC-2
 2/16/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	4	4	4	4	4	4
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	38	5	98	72	216	123
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	41	5	107	78	235	134
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						722
pX, platoon unblocked	0.99	0.99	0.99			
vC, conflicting volume	593	302	368			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	587	291	359			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	99	91			
cM capacity (veh/h)	423	737	1182			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	47	185	368			
Volume Left	41	107	0			
Volume Right	5	0	134			
cSH	445	1182	1700			
Volume to Capacity	0.10	0.09	0.22			
Queue Length 95th (ft)	9	7	0			
Control Delay (s)	14.0	5.1	0.0			
Lane LOS	B	A				
Approach Delay (s)	14.0	5.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			41.4%			A
Analysis Period (min)			15			

Baseline
 A & R Engineering Inc.

Synchro 6 Report
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Future 2010 AM Improved

Queues
1: Old Milton Pkwy & NB Ramp

Future AM Sc-2 Improved
2/16/2007

	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	630	1809	2129	301	737	1099
Act Effct Green (s)	28.0	82.3	50.3	50.3	29.7	120.0
Actuated g/C Ratio	0.23	0.69	0.42	0.42	0.25	1.00
v/c Ratio	0.79	0.75	0.79	0.36	0.87	0.69
Control Delay	30.4	2.6	33.6	4.0	54.5	2.5
Queue Delay	0.0	0.7	0.0	0.0	0.0	0.0
Total Delay	30.4	3.3	33.6	4.0	54.5	2.5
LOS	C	A	C	A	D	A
Approach Delay	10.3 29.9					
Approach LOS	B C					
Queue Length 50th (ft)	221	25	417	0	279	0
Queue Length 95th (ft)	m271	27	482	55	345	0
Internal Link Dist (ft)	595 855					
Turn Bay Length (ft)	300					
Base Capacity (vph)	801	2426	2684	838	944	1583
Starvation Cap Reductn	0	288	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	0.79	0.85	0.79	0.36	0.78	0.69
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 38 (32%), Referenced to phase 2:WBT and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.87						
Intersection Signal Delay: 21.0	Intersection LOS: C					
Intersection Capacity Utilization 81.7%	ICU Level of Service D					
Analysis Period (min) 15						
m Volume for 95th percentile queue is metered by upstream signal.						

HCM Signalized Intersection Capacity Analysis
1: Old Milton Pkwy & NB Ramp

Future AM Sc-2 Improved
2/16/2007

	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	0.95	0.86	1.00	0.97	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)	3433	3539	3539	6408	1583	3433	1583	3433	1583	3433	3539	3539
Flt Permitted	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (perm)	3433	3539	3539	6408	1583	3433	1583	3433	1583	3433	3539	3539
Volume (vph)	580	1664	0	0	1959	277	678	0	1011	0	0	0
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)	630	1809	0	0	2129	301	737	0	1099	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	175	0	0	0	0	0	0
Lane Group Flow (vph)	630	1809	0	0	2129	126	737	0	1099	0	0	0
Turn Type	Prot Permcustom Free											
Protected Phases	1	6			2		2	4				
Permitted Phases												
Actuated Green, G (s)	28.0	82.3			50.3	50.3	29.7	120.0				
Effective Green, g (s)	28.0	82.3			50.3	50.3	29.7	120.0				
Actuated g/C Ratio	0.23	0.69			0.42	0.42	0.25	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)	801	2427			2686	664	850	1583				
v/s Ratio Prot	0.18	c0.51			c0.33							
v/s Ratio Perm	0.79	0.75			0.79	0.19	0.87	0.69				
Uniform Delay, d1	43.2	12.1			30.3	22.0	43.3	0.0				
Progression Factor	0.61	0.13			1.00	1.00	1.00	1.00				
Incremental Delay, d2	2.4	1.0			2.5	0.6	9.3	2.5				
Delay (s)	28.8	2.5			32.8	22.6	52.5	2.5				
Level of Service	C	A			C	C	D	A				
Approach Delay (s)		9.3			31.5		22.6					0.0
Approach LOS		A			C		C					A
Intersection Summary												
HCM Average Control Delay	21.0 HCM Level of Service C											
HCM Volume to Capacity ratio	0.79											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	81.7% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group												

Queues
2: Old Milton Pkwy & SB Ramp

Future AM Sc-2 Improved
2/16/2007

Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	1897	243	903	1961	543	1050
Act Effct Green (s)	51.3	51.3	35.4	90.7	21.3	120.0
Actuated g/C Ratio	0.43	0.43	0.30	0.76	0.18	1.00
v/c Ratio	0.87	0.30	0.89	0.73	0.89	0.66
Control Delay	12.3	0.0	60.0	9.5	65.9	2.2
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	12.3	0.0	60.0	9.6	65.9	2.2
LOS	B	A	E	A	E	A
Approach Delay	11.0			25.5		
Approach LOS	B			C		
Queue Length 50th (ft)	271	2	329	148	212	0
Queue Length 95th (ft)	186	m3 m#448	228	#302	0	0
Internal Link Dist (ft)	1226			595		
Turn Bay Length (ft)	300					
Base Capacity (vph)	2174	811	1030	2674	629	1583
Starvation Cap Reductn	0	0	0	139	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.30	0.88	0.77	0.86	0.66
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 34 (28%), Referenced to phase 2:WBT and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.89						
Intersection Signal Delay: 20.4						Intersection LOS: C
Intersection Capacity Utilization 81.7%						ICU Level of Service D
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.						

HCM Signalized Intersection Capacity Analysis
2: Old Milton Pkwy & SB Ramp

Future AM Sc-2 Improved
2/16/2007

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	0.91	1.00	0.97	0.95	1.00	0.85	1.00	0.97	1.00	0.85	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)	5085	1583	3433	3539	3539	3433	3539	3433	3539	3433	3539	3433
Flt Permitted	1.00	1.00	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95
Satd. Flow (perm)	5085	1583	3433	3539	3539	3433	3539	3433	3539	3433	3539	3433
Volume (vph)	0	1745	224	831	1804	0	0	0	0	500	0	966
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)	0	1897	243	903	1961	0	0	0	0	543	0	1050
RTOR Reduction (vph)	0	0	134	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1897	109	903	1961	0	0	0	0	543	0	1050
Turn Type		Perm	Prot							custom		Free
Protected Phases		6	5	2								
Permitted Phases			6							8		
Actuated Green, G (s)		51.3	51.3	35.4	90.7					21.3		120.0
Effective Green, g (s)		51.3	51.3	35.4	90.7					21.3		120.0
Actuated g/C Ratio		0.43	0.43	0.30	0.76					0.18		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)		2174	677	1013	2675					609		1583
v/s Ratio Prot		c0.37		c0.26	0.55							
v/s Ratio Perm		0.87	0.16	0.89	0.73					c0.16		0.66
v/c Ratio		0.87	0.16	0.89	0.73					0.89		0.66
Uniform Delay, d1		31.4	21.1	40.5	8.0					48.2		0.0
Progression Factor		0.27	0.10	1.30	1.00					1.00		1.00
Incremental Delay, d2		3.4	0.3	6.0	1.0					15.3		2.2
Delay (s)		11.8	2.4	58.7	9.0					63.5		2.2
Level of Service		B	A	E	A					E		A
Approach Delay (s)		10.7		24.7				0.0		23.1		
Approach LOS		B		C				A		C		
Intersection Summary												
HCM Average Control Delay				19.8				HCM Level of Service		B		
HCM Volume to Capacity ratio				0.88								
Actuated Cycle Length (s)				120.0				Sum of lost time (s)		12.0		
Intersection Capacity Utilization				81.7%				ICU Level of Service		D		
Analysis Period (min)				15								
c Critical Lane Group												

Queues
4: Old Milton Pkwy & Amber Park Dr

Future AM Sc-2 Improved
2/16/2007

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	246	2004	172	261	1700	34	22	41	72	39
Act Effct Green (s)	75.2	57.0	120.0	75.2	57.0	57.0	23.2	23.2	7.5	32.8
Actuated g/C Ratio	0.63	0.48	1.00	0.63	0.48	0.48	0.19	0.19	0.06	0.27
v/c Ratio	0.75	0.83	0.11	0.79	0.70	0.04	0.04	0.12	0.33	0.08
Control Delay	41.5	7.8	0.1	46.1	7.3	0.7	44.6	15.9	57.9	12.5
Queue Delay	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay	41.5	7.9	0.1	46.1	7.5	0.7	44.6	15.9	57.9	12.5
LOS	D	A	A	D	A	A	D	B	E	B
Approach Delay	10.8									
Approach LOS	B									
Queue Length 50th (ft)	151	94	0	164	35	0	7	1	27	1
Queue Length 95th (ft)	m186	120	m0	254	56	m1	20	35	52	30
Internal Link Dist (ft)	1280									
Turn Bay Length (ft)	300	2415	1583	250	401	2415	763	512	340	229
Base Capacity (vph)	401	2415	1583	401	2415	763	512	340	229	464
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	37	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	0.61	0.84	0.11	0.65	0.74	0.04	0.04	0.12	0.31	0.08

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 4 (3%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 12.4	Intersection LOS: B
Intersection Capacity Utilization 67.5%	ICU Level of Service C
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Future AM Sc-2 Improved
2/16/2007

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	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	1.00	1.00	0.91	1.00	0.97	1.00	0.97	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86	1.00	0.86	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1583	3433	1583	3433	1583
Flt Permitted	0.07	1.00	1.00	1.00	0.07	1.00	0.73	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	133	5085	1583	133	5085	1583	2644	1583	2644	1583	2644	1583
Volume (vph)	1	225	1844	158	240	1564	31	20	2	36	66	66
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)	1	245	2004	172	261	1700	34	22	2	39	72	72
RTOR Reduction (vph)	0	0	0	0	0	0	0	12	0	31	0	0
Lane Group Flow (vph)	0	246	2004	172	261	1700	22	22	10	0	72	12
Turn Type	pm+pt	pm+pt	Free	pm+pt	Free	pm+pt	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	1	1	6	5	2	2	4	4	4	3	8	8
Permitted Phases	6	6	Free	2	2	2	4	4	4	3	8	8
Actuated Green, G (s)	74.4	56.2	120.0	74.4	56.2	56.2	23.2	23.2	23.2	6.4	33.6	33.6
Effective Green, g (s)	74.4	56.2	120.0	74.4	56.2	56.2	23.2	23.2	23.2	6.4	33.6	33.6
Actuated g/C Ratio	0.62	0.47	1.00	0.62	0.47	0.47	0.19	0.19	0.19	0.05	0.28	0.28
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)	331	2381	1583	331	2381	741	511	309	183	447	447	447
v/s Ratio Prot	0.11	0.39	0.11	0.37	0.11	0.01	0.01	0.01	0.02	0.01	0.01	0.01
v/s Ratio Perm	0.35	0.74	0.84	0.11	0.79	0.71	0.03	0.04	0.39	0.03	0.03	0.03
Uniform Delay, d1	35.5	28.0	0.0	40.2	25.5	17.2	39.4	39.3	54.9	31.3	31.3	31.3
Progression Factor	0.88	0.21	1.00	0.84	0.24	0.07	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.3	2.3	0.1	9.0	1.4	0.1	0.2	0.2	1.4	0.1	0.1	0.1
Delay (s)	35.9	8.1	0.1	42.8	7.5	1.3	39.5	39.5	56.3	31.5	31.5	31.5
Level of Service	D	A	A	D	A	A	D	D	E	C	C	C
Approach Delay (s)	10.3										47.6	47.6
Approach LOS	B										D	D
Intersection Summary												
HCM Average Control Delay	12.4										B	
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	120.0										12.0	
Intersection Capacity Utilization	67.5%										C	
Analysis Period (min)	15											
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Future AM Sc-2 Improved
2/16/2007

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	34
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	37
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Baseline
A & R Engineering Inc.

Synchro 6 Report
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Queues
6: Kimball Bridge Rd & Northwinds Pkwy Ext

Future AM Sc-2 Improved
2/16/2007

	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group	222	88	359	364	85	145	118
Lane Group Flow (vph)	81.6	81.6	97.3	97.3	14.7	14.7	14.7
Act Effct Green (s)	0.68	0.68	0.81	0.81	0.12	0.12	0.12
Actuated g/C Ratio	0.18	0.08	0.48	0.25	0.39	0.45	0.73
v/c Ratio	5.8	1.8	5.4	3.3	52.1	11.7	65.6
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	5.8	1.8	5.4	3.3	52.1	11.7	65.6
Total Delay	A	A	A	A	D	B	E
LOS	A	A	A	A	D	B	E
Approach Delay	4.7		4.3	26.6		65.6	
Approach LOS	A		A	C		E	
Queue Length 50th (ft)	39	0	51	45	62	0	87
Queue Length 95th (ft)	99	20	108	98	106	56	m124
Internal Link Dist (ft)	1231		742	552		1243	
Turn Bay Length (ft)	135	125					
Base Capacity (vph)	1267	1105	971	1447	491	540	361
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	0.18	0.08	0.37	0.25	0.17	0.27	0.33
Intersection Summary							
Cycle Length: 120							
Actuated Cycle Length: 120							
Offset: 55 (46%), Referenced to phase 2:WBTl and 6:EBTL, Start of Green							
Control Type: Actuated-Coordinated							
Maximum v/c Ratio: 0.73							
Intersection Signal Delay: 13.3							
Intersection Capacity Utilization 52.0%							
Analysis Period (min) 15							
m Volume for 95th percentile queue is metered by upstream signal.							

Baseline
A & R Engineering Inc.

Synchro 6 Report
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HCM Signalized Intersection Capacity Analysis
6: Kimball Bridge Rd & Northwinds Pkwy Ext

Future AM Sc-2 Improved
2/16/2007

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	0.85	1.00	0.95	1.00	0.95	1.00	0.85	1.00	0.95	1.00	0.99
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.99	1.00	1.00	0.96	1.00
Satd. Flow (prot)	1863	1583	1770	1774	1849	1583	1775	1849	1583	1775	1849	1775
Flt Permitted	1.00	1.00	0.58	1.00	0.96	1.00	0.84	0.96	1.00	0.84	0.96	1.00
Satd. Flow (perm)	1863	1583	1081	1774	1791	1583	1182	1791	1583	1182	1791	1583
Volume (vph)	0	204	81	330	229	106	12	66	133	94	10	5
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)	0	222	88	359	249	115	13	72	145	102	11	5
RTOR Reduction (vph)	0	0	28	0	8	0	0	0	0	127	0	2
Lane Group Flow (vph)	0	222	60	359	356	0	0	85	18	0	116	0
Turn Type	Perm	Perm	Perm	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	5	2	4	4	4	4	4	4	8	8
Permitted Phases	6	6	6	2	4	4	4	4	4	4	8	8
Actuated Green, G (s)	81.6	81.6	97.3	97.3	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
Effective Green, g (s)	81.6	81.6	97.3	97.3	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
Actuated g/C Ratio	0.68	0.68	0.81	0.81	0.12	0.12	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)	1267	1076	944	1438	219	194	145	219	194	145	145	145
v/s Ratio Prot	0.12	c0.04	0.20	c0.04	0.05	0.01	c0.10	0.05	0.01	c0.10	c0.10	c0.10
v/s Ratio Perm	0.18	0.06	0.38	0.25	0.39	0.09	0.80	0.39	0.09	0.80	0.80	0.80
Uniform Delay, d1	7.0	6.4	2.9	2.7	48.5	46.7	51.2	48.5	46.7	51.2	51.2	51.2
Progression Factor	0.65	0.75	1.00	1.00	1.00	1.00	0.88	1.00	1.00	1.00	0.88	0.88
Incremental Delay, d2	0.3	0.1	0.3	0.4	1.1	0.2	23.8	1.1	0.2	23.8	23.8	23.8
Delay (s)	4.8	4.9	3.1	3.1	49.6	46.9	69.1	49.6	46.9	69.1	69.1	69.1
Level of Service	A	A	A	A	D	D	E	D	D	E	E	E
Approach Delay (s)	4.9	4.9	3.1	3.1	47.9	47.9	69.1	47.9	47.9	69.1	69.1	69.1
Approach LOS	A	A	A	A	D	D	E	D	D	E	E	E
Intersection Summary												
HCM Average Control Delay	16.6				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	52.0%				ICU Level of Service				A			
Analysis Period (min)	15											
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: Old Milton Pkwy & Alpha Ct

Future AM-SC-2 Improved
2/16/2007

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	11
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	12
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Queues

5: Old Milton Pkwy & Westside Pkwy

Future AM-SC-2 Improved
2/16/2007

	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)	323	1954	325	559	1322	11	138	543	340	102	224	190
Act Effct Green (s)	51.0	51.0	51.0	23.0	52.7	52.7	31.0	22.2	120.0	29.0	21.2	21.2
Actuated g/C Ratio	0.42	0.42	0.42	0.19	0.44	0.44	0.26	0.18	1.00	0.24	0.18	0.18
v/c Ratio	0.81	0.90	0.41	0.85	0.59	0.02	0.46	0.83	0.21	0.57	0.36	0.44
Control Delay	42.8	39.4	9.6	35.7	8.2	1.2	31.3	51.9	0.3	46.7	45.4	9.4
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	42.8	39.4	9.6	35.7	8.2	1.2	31.3	51.9	0.3	46.7	45.4	9.4
LOS	D	D	A	D	A	A	C	D	A	D	D	A
Approach Delay	36.1			16.3			31.9			32.4		
Approach LOS	D			B			C			C		
Queue Length 50th (ft)	173	508	53	214	50	0	83	215	0	60	81	0
Queue Length 95th (ft)	274	582	124	#298	147	m1	74	#302	0	107	121	64
Internal Link Dist (ft)	495			1280			569			483		
Turn Bay Length (ft)	275	200	300	300	232	699	306	655	1583	180	624	436
Base Capacity (vph)	490	2161	795	658	232	699	306	655	1583	180	624	436
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	0.66	0.90	0.41	0.85	0.59	0.02	0.45	0.83	0.21	0.57	0.36	0.44

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: 0.90

Intersection Signal Delay: 28.8

Intersection LOS: C

Intersection Capacity Utilization 81.8%

ICU Level of Service D

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	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	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	0.97	0.91	1.00	0.95	1.00	0.95	1.00	0.95	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	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.13	1.00	1.00	0.95	1.00	0.95	1.00	0.50	1.00	1.00	0.19	1.00
Satd. Flow (perm)	251	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	17	281	1798	299	514	1216	10	127	500	313	94	206
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)	18	305	1954	325	559	1322	11	138	543	340	102	224
RTOR Reduction (vph)	0	0	0	122	0	0	4	0	0	0	0	0
Lane Group Flow (vph)	0	323	1954	203	559	1322	7	138	543	340	102	224
Turn Type	pm+pt	pm+pt	pm+pt	Perm	Prot	Perm	pm+pt	Perm	pm+pt	Free	pm+pt	Free
Protected Phases	1	1	6	6	5	2	7	4	4	Free	3	8
Permitted Phases	6	6	51.0	51.0	23.0	52.7	52.7	31.0	22.2	120.0	29.0	21.2
Actuated Green, G (s)	51.0	51.0	51.0	51.0	23.0	52.7	52.7	31.0	22.2	120.0	29.0	21.2
Effective Green, g (s)	51.0	51.0	51.0	51.0	23.0	52.7	52.7	31.0	22.2	120.0	29.0	21.2
Actuated g/C Ratio	0.42	0.42	0.42	0.42	0.19	0.44	0.44	0.26	0.18	1.00	0.24	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)	376	2161	673	658	2233	695	303	655	1583	177	625	625
v/s Ratio Prot	0.15	c0.38	0.13	0.13	c0.16	0.26	0.03	c0.15	c0.15	c0.04	0.06	0.06
v/s Ratio Perm	0.21	0.86	0.90	0.30	0.85	0.59	0.01	0.46	0.83	0.21	0.58	0.36
Uniform Delay, d1	32.2	32.2	22.7	22.7	46.8	25.5	19.0	35.9	47.1	0.0	37.5	43.4
Progression Factor	1.00	1.00	1.00	1.00	0.52	0.27	0.08	0.78	0.85	1.00	1.00	1.00
Incremental Delay, d2	17.4	6.8	1.1	7.9	0.9	0.0	1.0	11.1	0.3	4.5	1.6	1.6
Delay (s)	49.6	39.0	23.9	32.4	7.9	1.6	28.9	51.2	0.3	41.9	45.0	45.0
Level of Service	D	D	C	C	C	A	A	C	D	A	D	D
Approach Delay (s)			38.4			15.1		31.2			43.5	
Approach LOS			D			B		C			D	
Intersection Summary												
HCM Average Control Delay			30.3			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			81.8%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Movement	SBR
Lane Configurations	↩
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Flt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Volume (vph)	175
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	190
RTOR Reduction (vph)	156
Lane Group Flow (vph)	34
Turn Type	Perm
Protected Phases	
Permitted Phases	8
Actuated Green, G (s)	21.2
Effective Green, g (s)	21.2
Actuated g/C Ratio	0.18
Clearance Time (s)	4.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	280
v/s Ratio Prot	
v/s Ratio Perm	0.02
Uniform Delay, d1	41.6
Progression Factor	1.00
Incremental Delay, d2	0.9
Delay (s)	42.4
Level of Service	D
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Intersection Summary

Future PM Intersection Analysis

Future 2010 PM

Queues
1: Old Milton Pkwy & NB Ramp

Future PM Sc-2
2/16/2007

Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	1202	1549	2418	568	454	610
Act Effct Green (s)	57.0	96.0	35.0	35.0	16.0	120.0
Actuated g/C Ratio	0.48	0.80	0.29	0.29	0.13	1.00
v/c Ratio	1.43	0.55	1.29	0.87	0.99	0.39
Control Delay	210.6	2.0	172.2	36.7	92.1	0.7
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	210.6	2.1	172.2	36.7	92.1	0.7
LOS	F	A	F	D	F	A
Approach Delay	93.2 146.4					
Approach LOS	F F					
Queue Length 50th (ft)	~1238	74	~695	241	183	0
Queue Length 95th (ft)	m72 #1188	m72 #768	#456	#292	0	0
Internal Link Dist (ft)	595 855					
Turn Bay Length (ft)	300					
Base Capacity (vph)	841	2831	1869	651	458	1583
Starvation Cap Reductn	0	260	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	0.60	1.29	0.87	0.99	0.39
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 80 (67%), Referenced to phase 2:WBT and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 1.43						
Intersection Signal Delay: 108.2	Intersection LOS: F					
Intersection Capacity Utilization 115.2%	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.						
Queue shown is maximum after two cycles.						
m Volume for 95th percentile queue is metered by upstream signal.						

Baseline
A & R Engineering Inc.

Synchro 6 Report
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HCM Signalized Intersection Capacity Analysis
1: Old Milton Pkwy & NB Ramp

Future PM Sc-2
2/16/2007

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		0.86	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		6408	1583	3433	1583		1583			
Flt Permitted	0.95	1.00		1.00	1.00	0.95	1.00		1.00			
Satd. Flow (perm)	1770	3539		6408	1583	3433	1583		1583			
Volume (vph)	1106	1425	0	0	2225	523	418	0	561	0	0	0
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)	1202	1549	0	0	2418	568	454	0	610	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	189	0	0	0	0	0	0
Lane Group Flow (vph)	1202	1549	0	0	2418	379	454	0	610	0	0	0
Turn Type	Prot					Perm	custom		Free			
Protected Phases	1	6			2							
Permitted Phases						2	4		Free			
Actuated Green, G (s)	57.0	96.0			35.0	35.0	16.0		120.0			
Effective Green, g (s)	57.0	96.0			35.0	35.0	16.0		120.0			
Actuated g/C Ratio	0.48	0.80			0.29	0.29	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)	841	2831			1869	462	458		1583			
v/s Ratio Prot	c0.68	0.44			c0.38							
v/s Ratio Perm						0.24	c0.13		0.39			
v/c Ratio	1.43	0.55			1.29	0.82	0.99		0.39			
Uniform Delay, d1	31.5	4.3			42.5	39.6	51.9		0.0			
Progression Factor	0.27	0.44			1.00	1.00	1.00		1.00			
Incremental Delay, d2	193.8	0.1			136.3	15.0	39.6		0.7			
Delay (s)	202.3	2.0			178.8	54.6	91.5		0.7			
Level of Service	F	A			F	D	F		A			
Approach Delay (s)	89.5											
Approach LOS	F											
Intersection Summary												
HCM Average Control Delay	110.5											
HCM Volume to Capacity ratio	1.32											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	115.2%											
Analysis Period (min)	15											
Critical Lane Group												

Baseline
A & R Engineering Inc.

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Queues
2: Old Milton Pkwy & SB Ramp

Future PM Sc-2
2/16/2007

	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group						
Lane Group Flow (vph)	2441	1039	1250	1702	293	578
Act Effct Green (s)	55.0	55.0	38.6	97.6	14.4	120.0
Actuated g/C Ratio	0.46	0.46	0.32	0.81	0.12	1.00
v/c Ratio	1.05	1.15	1.13	0.59	0.71	0.37
Control Delay	35.2	80.9	96.8	5.7	60.5	0.7
Queue Delay	0.0	0.0	0.0	13.5	0.0	0.0
Total Delay	35.2	80.9	96.8	19.2	60.5	0.7
LOS	D	F	F	B	E	A
Approach Delay	48.8			52.0		
Approach LOS	D			D		
Queue Length 50th (ft)	~737	~786	~561	165	112	0
Queue Length 95th (ft)	m215	m78	m260	m49	159	0
Internal Link Dist (ft)	1226			595		
Turn Bay Length (ft)	300					
Base Capacity (vph)	2331	905	1103	2877	458	1583
Starvation Cap Reductn	0	0	0	1187	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	1.15	1.13	1.01	0.64	0.37
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 111 (93%). Referenced to phase 2:WBT and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 1.15						
Intersection Signal Delay: 46.8						Intersection LOS: D
Intersection Capacity Utilization 115.2%						ICU Level of Service H
Analysis Period (min) 15						
~ Volume exceeds capacity, queue is theoretically infinite.						
Queue shown is maximum after two cycles.						
m Volume for 95th percentile queue is metered by upstream signal.						

HCM Signalized Intersection Capacity Analysis
2: Old Milton Pkwy & SB Ramp

Future PM Sc-2
2/16/2007

	EBT	EBR	WBL	WBT	SBL	SBR
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	0.91	1.00	0.97	0.95	0.97	1.00
Flt Protected	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	3433	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	3539	3433	1583
Volume (vph)	0	2246	956	1150	1566	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2441	1039	1250	1702	0
RTOR Reduction (vph)	0	0	180	0	0	0
Lane Group Flow (vph)	0	2441	859	1250	1702	0
Turn Type		Perm	Prot		custom	Free
Protected Phases	6	6	5	2		
Permitted Phases						8
Actuated Green, G (s)	55.0	55.0	38.6	97.6	14.4	120.0
Effective Green, g (s)	55.0	55.0	38.6	97.6	14.4	120.0
Actuated g/C Ratio	0.46	0.46	0.32	0.81	0.12	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)	2331	726	1104	2878	412	1583
v/s Ratio Prot	0.48		c0.36	0.48		
v/s Ratio Perm		c0.54			c0.09	0.37
v/c Ratio	1.05	1.18	1.13	0.59	0.71	0.37
Uniform Delay, d1	32.5	32.5	40.7	4.0	50.8	0.0
Progression Factor	0.31	0.36	0.93	1.30	1.00	1.00
Incremental Delay, d2	22.7	84.0	60.7	0.1	5.7	0.7
Delay (s)	32.6	95.5	98.5	5.3	56.5	0.7
Level of Service	C	F	F	A	E	A
Approach Delay (s)	51.4			44.8		19.4
Approach LOS	D			D		B
Intersection Summary						
HCM Average Control Delay		44.9				D
HCM Volume to Capacity ratio		1.10				
Actuated Cycle Length (s)		120.0				12.0
Intersection Capacity Utilization		115.2%				H
Analysis Period (min)		15				
c Critical Lane Group						

Queues
3: Old Milton Pkwy & Alpha Ct

Future PM-SC-2
2/16/2007

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)	160	2603	50	101	1895	209	123	276	570	175
Act Effct Green (s)	55.0	47.0	47.0	55.0	47.0	47.0	53.0	53.0	53.0	53.0
Actuated g/C Ratio	0.46	0.39	0.39	0.46	0.39	0.39	0.44	0.44	0.44	0.44
v/c Ratio	0.89	1.31	0.08	0.56	0.95	0.31	0.25	0.35	1.39	0.22
Control Delay	58.1	163.6	6.8	30.0	29.7	6.0	22.7	11.1	218.1	6.6
Queue Delay	0.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.1	172.5	6.8	30.0	29.7	6.0	22.7	11.1	218.1	6.6
LOS	E	F	A	C	C	A	C	B	F	A
Approach Delay	163.1				27.4			14.7		168.4
Approach LOS	F				C			B		F
Queue Length 50th (ft)	73	~942	2	23	358	2	59	59	~588	18
Queue Length 95th (ft) m#123 m#941	m6	m6	m76	#616	37	m104	121	#809	61	
Internal Link Dist (ft)	187			1226			382		123	
Turn Bay Length (ft)	265			310		150	150			
Base Capacity (vph)	180	1992	637	180	1992	683	500	789	411	803
Starvation Cap Reductn	0	30	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	0.89	1.33	0.08	0.56	0.95	0.31	0.25	0.35	1.39	0.22
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: 1.39										
Intersection Signal Delay: 105.6										
Intersection Capacity Utilization 109.4%										
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
A & R Engineering Inc.

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HCM Signalized Intersection Capacity Analysis
3: Old Milton Pkwy & Alpha Ct

Future PM-SC-2
2/16/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
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	0.91	1.00	1.00	0.91	1.00	1.00	0.86	1.00	1.00	0.89
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	5085	1583	1770	5085	1583	1770	1598	1770	1650	1598
Flt Permitted	0.09	1.00	1.00	0.09	1.00	1.00	0.61	1.00	0.50	1.00	0.50
Satd. Flow (perm)	159	5085	1583	159	5085	1583	1132	1598	930	1650	1598
Volume (vph)	147	2395	46	5	88	1743	192	113	13	241	524
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)	160	2603	50	5	96	1895	209	123	14	262	570
RTOR Reduction (vph)	0	0	17	0	0	0	63	0	83	0	74
Lane Group Flow (vph)	160	2603	33	0	101	1895	146	123	193	0	570
Turn Type	pm+pt	Perm	pm+pt	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	1	6	6	5	5	2	4	4	4	8	8
Permitted Phases	6	6	6	2	2	2	2	4	4	8	8
Actuated Green, G (s)	55.0	47.0	47.0	55.0	47.0	47.0	53.0	53.0	53.0	53.0	53.0
Effective Green, g (s)	55.0	47.0	47.0	55.0	47.0	47.0	53.0	53.0	53.0	53.0	53.0
Actuated g/C Ratio	0.46	0.39	0.39	0.46	0.39	0.39	0.44	0.44	0.44	0.44	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
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)	180	1992	620	180	1992	620	500	706	411	729	729
v/s Ratio Prot	c0.06	c0.51	0.02	0.04	0.37	0.09	0.11	0.12	0.12	0.06	0.06
v/s Ratio Perm	0.35	0.89	1.31	0.05	0.56	0.95	0.24	0.25	0.27	c0.61	c0.61
Uniform Delay, d1	51.6	36.5	22.7	55.4	35.4	24.5	21.0	21.3	33.5	19.9	19.9
Progression Factor	0.69	0.80	0.53	0.52	0.52	0.41	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	22.0	139.9	0.1	3.4	10.3	0.8	1.2	1.0	188.6	0.4	0.4
Delay (s)	57.5	161.9	12.0	32.1	28.8	10.7	22.2	22.3	222.1	20.3	20.3
Level of Service	E	F	B	C	C	B	C	C	C	F	C
Approach Delay (s)	153.3				27.2		22.2			174.7	
Approach LOS	F				C		C			F	
Intersection Summary											
HCM Average Control Delay											F
HCM Volume to Capacity ratio											1.32
Actuated Cycle Length (s)											120.0
Intersection Capacity Utilization											109.4%
Analysis Period (min)											15
c Critical Lane Group											

Baseline
A & R Engineering Inc.

Synchro 6 Report
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Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	122
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	133
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	312	2121	37	48	1911	202	203	258	452	301
Act Effct Green (s)	66.6	66.6	120.0	75.0	75.0	75.0	22.0	22.0	11.0	37.0
Actuated g/C Ratio	0.56	0.56	1.00	0.62	0.62	0.62	0.18	0.18	0.09	0.31
v/c Ratio	3.63	0.75	0.02	0.31	0.60	0.19	1.25	0.68	1.43	0.60
Control Delay	1220.7	6.6	0.0	21.1	2.5	0.2	195.5	35.8	252.2	39.3
Queue Delay	0.0	5.5	0.0	0.0	0.1	0.0	0.0	0.5	0.0	0.0
Total Delay	1220.7	12.1	0.0	21.1	2.6	0.2	195.5	36.2	252.2	39.3
LOS	F	B	A	C	A	A	F	D	F	D
Approach Delay	164.6			2.8			106.4			167.1
Approach LOS	F			A			F			F
Queue Length 50th (ft)	~435			0			1			~101
Queue Length 95th (ft)	m#558			m0			m52			m0
Internal Link Dist (ft)	1280			172			295			284
Turn Bay Length (ft)	300			250			150			100
Base Capacity (vph)	86			181			3178			1050
Starvation Cap Reductn	0			0			333			0
Spillback Cap Reductn	0			644			0			0
Storage Cap Reductn	0			0			0			0
Reduced v/c Ratio	3.63			0.97			0.02			0.27
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 12 (10%), Referenced to phase 2:WBT and 6:EBT, Start of Green										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 3.63										
Intersection Signal Delay: 100.5										
Intersection Capacity Utilization 89.7%										
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.										
Volume for 95th percentile queue is metered by upstream signal.										

HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Future PM-SC-2
2/16/2007

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	3	3	3	3	3	3	3	3	3	3	3	3
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	1.00	0.91	1.00	0.97	1.00	0.97	1.00	0.97	1.00
Flt	1.00	1.00	0.85	1.00	1.00	0.85	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	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1583	3433	1583	3433	1583
Flt Permitted	0.08	1.00	1.00	0.06	1.00	0.06	1.00	0.24	1.00	0.95	1.00	0.95
Satd. Flow (perm)	149	5085	1583	107	5085	1583	884	1583	3433	1583	3433	1583
Volume (vph)	20	267	1951	34	44	1758	186	187	0	237	416	0
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)	22	290	2121	37	48	1911	202	203	0	258	452	0
RTOR Reduction (vph)	0	0	0	0	0	0	61	0	90	0	0	11
Lane Group Flow (vph)	0	312	2121	37	48	1911	141	203	168	0	452	290
Turn Type	Perm	Perm	Free	pm+pt	Perm	Perm	Perm	Perm	Prot			
Protected Phases	6	6	Free	2	5	2	2	4	4	3	8	
Permitted Phases	6	6	Free	2	5	2	2	4	4	3	8	
Actuated Green, G (s)	65.8	65.8	120.0	75.0	75.0	75.0	75.0	22.0	22.0	11.0	37.0	
Effective Green, g (s)	65.8	65.8	120.0	75.0	75.0	75.0	75.0	22.0	22.0	11.0	37.0	
Actuated g/C Ratio	0.55	0.55	1.00	0.62	0.62	0.62	0.62	0.18	0.18	0.09	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	
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)	82	2788	1583	139	3178	989	162	290	315	488		
v/s Ratio Prot		0.42	0.01	c0.38	0.01	c0.38	0.09	c0.23	0.11	c0.13	0.18	
v/s Ratio Perm	c2.10	0.76	0.02	0.35	0.60	0.14	1.25	0.58	1.43	0.59		
Uniform Delay, d1	27.1	21.0	0.0	17.3	13.5	9.3	49.0	44.8	54.5	35.1		
Progression Factor	0.42	0.24	1.00	2.13	0.15	0.01	1.00	1.00	1.00	1.00		
Incremental Delay, d2	1284.4	1.5	0.0	0.7	0.4	0.1	154.5	8.2	213.0	5.2		
Delay (s)	1295.8	6.6	0.0	37.7	2.5	0.3	203.5	53.0	267.5	40.4		
Level of Service	F	A	A	D	A	A	F	D	F	D		
Approach Delay (s)		169.3			3.0			119.2			176.7	
Approach LOS		F			A			F			F	
Intersection Summary												
HCM Average Control Delay		104.9			HCM Level of Service							
HCM Volume to Capacity ratio		2.87			F							
Actuated Cycle Length (s)		120.0			Sum of lost time (s)							
Intersection Capacity Utilization		89.7%			ICU Level of Service							
Analysis Period (min)		15			E							
c Critical Lane Group												

Baseline
A & R Engineering Inc.

Synchro 6 Report
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HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Future PM-SC-2
2/16/2007

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	277
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	301
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Baseline
A & R Engineering Inc.

Synchro 6 Report
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Queues
5: Old Milton Pkwy & Westside Pkwy

Future PM-SC-2
2/16/2007

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	257	1521	134	501	1730	74	411	435	718	245	704	352
Act Effct Green (s)	51.0	51.0	51.0	68.0	68.0	68.0	44.0	44.0	120.0	44.0	44.0	44.0
Actuated g/C Ratio	0.42	0.42	0.42	0.57	0.57	0.57	0.37	0.37	1.00	0.37	0.37	0.37
v/c Ratio	4.15	0.70	0.19	1.92	0.60	0.08	2.43	0.34	0.45	0.86	0.54	0.60
Control Delay	1465.6	30.5	11.6	449.9	19.6	7.5	678.8	28.9	1.0	63.4	32.0	34.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1465.6	30.5	11.6	449.9	19.6	7.5	678.8	28.9	1.0	63.4	32.0	34.3
LOS	F	C	B	F	B	A	F	C	A	E	C	C
Approach Delay	222.1			112.7			186.8			38.5		
Approach LOS	F			F			F			D		
Queue Length 50th (ft)	~323	347	30	~533	252	8	~533	81	0	174	224	209
Queue Length 95th (ft)	#493	404	71	m#692	m279	m21	#726	173	0	#329	285	312
Internal Link Dist (ft)	495			1280			569			483		
Turn Bay Length (ft)	275	200	300	712	261	2882	922	169	1298	1583	286	1298
Base Capacity (vph)	62	2161	712	261	2882	922	169	1298	1583	286	1298	591
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	4.15	0.70	0.19	1.92	0.60	0.08	2.43	0.34	0.45	0.86	0.54	0.60

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 4.15

Intersection Signal Delay: 145.0

Intersection Capacity Utilization 104.8%

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.

HCM Signalized Intersection Capacity Analysis
5: Old Milton Pkwy & Westside Pkwy

Future PM-SC-2
2/16/2007

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
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	0.91	1.00	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95
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	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.08	1.00	1.00	1.00	0.08	1.00	1.00	0.25	1.00	1.00	0.42	1.00
Satd. Flow (perm)	146	5085	1583	151	5085	1583	460	3539	1583	780	3539	1583
Volume (vph)	18	218	1399	123	461	1592	68	378	400	661	225	648
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)	20	237	1521	134	501	1730	74	411	435	718	245	704
RTOR Reduction (vph)	0	0	0	39	0	0	25	0	0	0	0	0
Lane Group Flow (vph)	0	257	1521	95	501	1730	49	411	435	718	245	704
Turn Type	Perm	Perm	Perm	Perm	pm+pt	Perm	Perm	Perm	Free	Perm	Free	Perm
Protected Phases	6	6	6	6	5	2	2	4	4	4	4	8
Permitted Phases	6	6	6	6	2	2	2	4	4	4	4	8
Actuated Green, G (s)	51.0	51.0	51.0	51.0	68.0	68.0	68.0	44.0	44.0	120.0	44.0	44.0
Effective Green, g (s)	51.0	51.0	51.0	51.0	68.0	68.0	68.0	44.0	44.0	120.0	44.0	44.0
Actuated g/C Ratio	0.42	0.42	0.42	0.42	0.57	0.57	0.57	0.37	0.37	1.00	0.37	0.37
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)	62	2161	673	261	2882	897	169	1298	1583	286	1298	591
v/s Ratio Prot	0.30	0.30	0.06	0.88	0.21	0.34	0.12	0.12	0.12	0.45	0.31	0.20
v/s Ratio Perm	c1.76	4.15	0.70	0.14	1.92	0.60	0.03	c0.89	0.34	0.45	0.86	0.54
v/c Ratio	34.5	28.3	21.1	39.4	17.1	11.6	38.0	27.4	0.0	35.1	30.0	30.0
Uniform Delay, d1	1.00	1.00	1.00	1.00	0.91	1.10	1.71	0.91	1.02	1.00	1.00	1.00
Progression Factor	1.00	1.00	1.00	1.00	0.91	1.10	1.71	0.91	1.02	1.00	1.00	1.00
Incremental Delay, d2	1452.6	2.0	0.4	423.9	0.7	0.1	658.1	0.5	0.7	26.6	1.6	1.6
Delay (s)	1487.1	30.3	21.5	459.7	19.4	19.9	692.8	28.7	0.7	61.7	31.7	31.7
Level of Service	F	C	C	C	F	B	B	F	C	A	E	C
Approach Delay (s)	225.5			115.1			190.4			38.2		
Approach LOS	F			F			F			D		
Intersection Summary												
HCM Average Control Delay	147.4			HCM Level of Service			F					
HCM Volume to Capacity ratio	3.07											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	104.8%			ICU Level of Service			G					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: Old Milton Pkwy & Westside Pkwy

Future PM-SC-2
2/16/2007

Movement	SBR
Lane Configurations	↗
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Flt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Volume (vph)	324
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	352
RTOR Reduction (vph)	10
Lane Group Flow (vph)	342
Turn Type	Perm
Protected Phases	
Permitted Phases	8
Actuated Green, G (s)	44.0
Effective Green, g (s)	44.0
Actuated g/C Ratio	0.37
Clearance Time (s)	4.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	580
v/s Ratio Prot	
v/s Ratio Perm	0.22
v/c Ratio	0.59
Uniform Delay, d1	30.7
Progression Factor	1.00
Incremental Delay, d2	4.4
Delay (s)	35.1
Level of Service	D
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM Unsignalized Intersection Capacity Analysis
6: Kimball Bridge Rd & Northwinds Pkwy Ext

Future PM-SC-2
2/16/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↘	↘	↙	↘	↘	↙	↘	↘	↙	↘	↘
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)	1	289	39	194	340	124	93	16	237	115	69	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	314	42	211	370	135	101	17	258	125	75	26
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	504			314			1171	1242	314	1184	1175	437
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCu, unblocked vol	504			314			1171	1242	314	1184	1175	437
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			83			0	88	65	0	53	96
cM capacity (veh/h)	1060			1246			90	145	726	85	159	620
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	315	42	211	504	118	258	226					
Volume Left	1	0	211	0	101	0	125					
Volume Right	0	42	0	135	0	258	26					
cSH	1060	1700	1246	1700	95	726	114					
Volume to Capacity	0.00	0.02	0.17	0.30	1.24	0.35	1.99					
Queue Length 95th (ft)	0	0	15	0	207	40	465					
Control Delay (s)	0.0	0.0	8.5	0.0	252.6	12.7	537.1					
Lane LOS	A	A	A	F	B	F	F					
Approach Delay (s)	0.0		2.5		88.3		537.1					
Approach LOS			F		F		F					
Intersection Summary												
Average Delay					93.4							
Intersection Capacity Utilization					68.8%					C		
Analysis Period (min)					15							

HCM Unsignalized Intersection Capacity Analysis
7: Kimball Bridge Rd & Parkway 400 Driveway

Future PM-SC-2
2/16/2007



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Stop	Stop
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	27	250	467	21	34	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	272	508	23	37	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		905				
pX, platoon unblocked						
vC, conflicting volume	530				838	508
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	530				838	508
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				89	90
cM capacity (veh/h)	1037				327	565
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	29	272	508	23	91	
Volume Left	29	0	0	0	37	
Volume Right	0	0	0	23	54	
cSH	1037	1700	1700	1700	436	
Volume to Capacity	0.03	0.16	0.30	0.01	0.21	
Queue Length 95th (ft)	2	0	0	0	19	
Control Delay (s)	8.6	0.0	0.0	0.0	15.4	
Lane LOS	A				C	
Approach Delay (s)	0.8		0.0		15.4	
Approach LOS					C	
Intersection Summary						
Average Delay	1.8					
Intersection Capacity Utilization	36.2%					
Analysis Period (min)	15					
	ICU Level of Service A					

Baseline
A & R Engineering Inc.

Synchro 6 Report
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Queues
8: Kimball Bridge Rd & Westside Pkwy

Future PM-SC-2
2/16/2007



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	41	194	355	8	1385	77	187
Act Effct Green (s)	21.5	21.5	21.5	74.6	74.6	74.6	87.9
Actuated g/C Ratio	0.18	0.18	0.18	0.62	0.62	0.62	0.73
v/c Ratio	0.15	0.79	0.67	0.02	0.63	0.08	0.47
Control Delay	33.1	68.7	15.3	13.7	17.8	6.7	40.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	33.1	68.7	15.3	13.7	17.8	6.7	40.1
LOS	C	E	B	B	B	A	D
Approach Delay	33.1	34.2		17.2			7.6
Approach LOS	C	C		B			A
Queue Length 50th (ft)	21	145	40	2	327	9	70
Queue Length 95th (ft)	50	215	132	11	543	38	m85
Internal Link Dist (ft)	158	825		595			569
Turn Bay Length (ft)			150	150		150	150
Base Capacity (vph)	357	330	606	367	2200	1001	364
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	0.11	0.59	0.59	0.02	0.63	0.08	0.51
Intersection Summary							
Cycle Length: 120							
Actuated Cycle Length: 120							
Offset: 87 (73%), Referenced to phase 2:SBTL and 6:NBT, Start of Green							
Control Type: Actuated-Coordinated							
Maximum v/c Ratio: 0.79							
Intersection Signal Delay: 16.2							Intersection LOS: B
Intersection Capacity Utilization 69.1%							ICU Level of Service C
Analysis Period (min) 15							
m Volume for 95th percentile queue is metered by upstream signal.							

Baseline
A & R Engineering Inc.

Synchro 6 Report
Page 16

HCM Signalized Intersection Capacity Analysis
 8: Kimball Bridge Rd & Westside Pkwy

Future PM-SC-2
 2/16/2007

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
Frt	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	0.97	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)	1754	1754	1754	1754	1754	1754	1754	1754	1754	1754	1754	1754
Flt Permitted	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Satd. Flow (perm)	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309	1309
Volume (vph)	23	6	8	177	2	327	7	1274	71	172	1107	7
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)	25	7	9	192	2	355	8	1385	77	187	1203	8
RTOR Reduction (vph)	0	7	0	0	0	242	0	0	17	0	0	0
Lane Group Flow (vph)	0	34	0	194	113	8	1385	60	187	1211	0	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	8	8	4	4	4	4	1	6	5	2	2	2
Permitted Phases	8	8	4	4	4	4	1	6	5	2	2	2
Actuated Green, G (s)	21.5	21.5	21.5	21.5	21.5	21.5	74.6	74.6	74.6	84.7	84.7	84.7
Effective Green, g (s)	21.5	21.5	21.5	21.5	21.5	21.5	74.6	74.6	74.6	84.7	84.7	84.7
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.62	0.62	0.62	0.71	0.71	0.71
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)	235	247	284	289	2200	984	302	2496				
v/s Ratio Prot	0.03	0.14	0.07	0.02	0.02	0.04	0.39	0.06	0.34			
v/s Ratio Perm	0.14	0.79	0.40	0.03	0.03	0.06	0.62	0.49				
Uniform Delay, d1	41.5	47.0	43.5	8.8	14.1	8.9	14.0	7.9				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.96	0.29		
Incremental Delay, d2	0.3	15.0	0.9	0.0	1.4	0.1	1.0	0.2				
Delay (s)	41.8	62.1	44.4	8.8	15.5	9.0	28.5	2.5				
Level of Service	D	E	D	A	B	A	C	A				
Approach Delay (s)	41.8	50.7				15.1						
Approach LOS	D	D				B						
Intersection Summary												
HCM Average Control Delay			17.4			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				12.0		
Intersection Capacity Utilization			69.1%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

Baseline
 A & R Engineering Inc.

Synchro 6 Report
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HCM Unsignalized Intersection Capacity Analysis
 9: Main Site Dr & Northwinds Pkwy Ext

Future PM-SC-2
 2/16/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	4	4	4	4	4	4
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	251	30	24	115	142	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	273	33	26	125	154	35
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						722
pX, platoon unblocked						
vC, conflicting volume	349	172	189			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	349	172	189			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	57	96	98			
cM capacity (veh/h)	636	872	1385			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	305	151	189			
Volume Left	273	26	0			
Volume Right	33	0	35			
cSH	655	1385	1700			
Volume to Capacity	0.47	0.02	0.11			
Queue Length 95th (ft)	62	1	0			
Control Delay (s)	15.2	1.4	0.0			
Lane LOS	C	A				
Approach Delay (s)	15.2	1.4	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			7.5			
Intersection Capacity Utilization			42.5%			A
Analysis Period (min)			15			

Baseline
 A & R Engineering Inc.

Synchro 6 Report
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Future 2010 PM Improved

Queues
1: Old Milton Pkwy & NB Ramp

Future PM Sc-2 Improved
2/16/2007

	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group	EBL	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	1202	1549	2418	568	454	610
Act Effct Green (s)	44.0	96.0	48.0	48.0	16.0	120.0
Actuated g/C Ratio	0.37	0.80	0.40	0.40	0.13	1.00
v/c Ratio	0.95	0.55	0.94	0.70	0.99	0.39
Control Delay	22.1	3.9	43.7	18.6	92.1	0.7
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	22.1	3.9	43.7	18.6	92.1	0.7
LOS	C	A	D	B	F	A
Approach Delay	11.9 38.9					
Approach LOS	B D					
Queue Length 50th (ft)	308	141	517	172	183	0
Queue Length 95th (ft)	m285	m136	#578	312	#292	0
Internal Link Dist (ft)	595 855					
Turn Bay Length (ft)	300					
Base Capacity (vph)	1259	2831	2563	813	458	1583
Starvation Cap Reductn	0	270	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	0.60	0.94	0.70	0.99	0.39
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 105 (88%), Referenced to phase 2:WBT and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.99						
Intersection Signal Delay: 28.1						
Intersection Capacity Utilization 109.7%						
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.					

HCM Signalized Intersection Capacity Analysis
1: Old Milton Pkwy & NB Ramp

Future PM Sc-2 Improved
2/16/2007

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	0.97	0.95		0.86	1.00	0.97			1.00			
Flt Protected	1.00	1.00		1.00	0.85	1.00			0.85			
Satd. Flow (prot)	3433	3539		6408	1583	3433			1583			
Flt Permitted	0.95	1.00		1.00	1.00	0.95			1.00			
Satd. Flow (perm)	3433	3539		6408	1583	3433			1583			
Volume (vph)	1106	1425	0	0	2225	523	418	0	561	0	0	0
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)	1202	1549		0	2418	568	454	0	610	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	180	0	0	0	0	0	0
Lane Group Flow (vph)	1202	1549	0	0	2418	388	454	0	610	0	0	0
Turn Type	Prot											
Protected Phases	1	6			2				Free			
Permitted Phases	2 4											
Actuated Green, G (s)	44.0	96.0			48.0	48.0	16.0		120.0			
Effective Green, g (s)	44.0	96.0			48.0	48.0	16.0		120.0			
Actuated g/C Ratio	0.37	0.80			0.40	0.40	0.13		1.00			
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)	1259	2831			2563	633	458		1583			
v/s Ratio Prot	c0.35	0.44			c0.38							
v/s Ratio Perm						0.25	c0.13		0.39			
v/c Ratio	0.95	0.55			0.94	0.61	0.99		0.39			
Uniform Delay, d1	37.0	4.3			34.7	28.6	51.9		0.0			
Progression Factor	0.49	0.87			1.00	1.00	1.00		1.00			
Incremental Delay, d2	2.2	0.1			8.7	4.4	39.6		0.7			
Delay (s)	20.6	3.8			43.4	33.0	91.5		0.7			
Level of Service	C	A			D	C	F		A			
Approach Delay (s)	11.1						41.4			39.5		
Approach LOS	B						D			A		
Intersection Summary												
HCM Average Control Delay	28.9						HCM Level of Service			C		
HCM Volume to Capacity ratio	0.96											
Actuated Cycle Length (s)	120.0						Sum of lost time (s)			12.0		
Intersection Capacity Utilization	109.7%						ICU Level of Service			H		
Analysis Period (min)	15											
Critical Lane Group												

Queues
2: Old Milton Pkwy & SB Ramp

Future PM Sc-2 Improved
2/16/2007

Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	2441	1039	1250	1702	293	578
Act Effct Green (s)	55.0	55.0	38.6	97.6	14.4	120.0
Actuated g/C Ratio	0.46	0.46	0.32	0.81	0.12	1.00
v/c Ratio	1.05	1.15	1.13	0.59	0.71	0.37
Control Delay	43.6	83.7	99.1	2.2	60.5	0.7
Queue Delay	0.0	0.0	0.0	2.1	0.0	0.0
Total Delay	43.6	83.7	99.1	4.3	60.5	0.7
LOS	D	F	F	A	E	A
Approach Delay	55.6 44.5					
Approach LOS	E D					
Queue Length 50th (ft)	~752 ~218 ~573 29 112 0					
Queue Length 95th (ft)	m#641 m#906 m#638 m30 159 0					
Internal Link Dist (ft)	1226 595					
Turn Bay Length (ft)	300					
Base Capacity (vph)	2331	905	1103	2877	458	1583
Starvation Cap Reductn	0	0	0	983	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	1.15	1.13	0.90	0.64	0.37
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 22 (18%), Referenced to phase 2:WBT and 6:EBT, Start of Green						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 1.15						
Intersection Signal Delay: 46.9						
Intersection Capacity Utilization 109.7%						
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.						

HCM Signalized Intersection Capacity Analysis
2: Old Milton Pkwy & SB Ramp

Future PM Sc-2 Improved
2/16/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
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	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.97	1.00
Flt Protected	1.00	1.00	0.85	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.85	1.00
Satd. Flow (prot)	5085	1583	3433	3539	3539	3539	3433	3539	3433	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	5085	1583	3433	3539	3539	3539	3433	3539	3433	3539	3433	1583
Volume (vph)	0	2246	956	1150	1566	0	0	0	0	270	0	532
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)	0	2441	1039	1250	1702	0	0	0	0	293	0	578
RTOR Reduction (vph)	0	0	180	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2441	859	1250	1702	0	0	0	0	293	0	578
Turn Type		Perm	Prot							custom		Free
Protected Phases		6	5	2								Free
Permitted Phases			6							8		
Actuated Green, G (s)		55.0	55.0	38.6	97.6					14.4		120.0
Effective Green, g (s)		55.0	55.0	38.6	97.6					14.4		120.0
Actuated g/C Ratio		0.46	0.46	0.32	0.81					0.12		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)		2331	726	1104	2878					412		1583
v/s Ratio Prot		0.48		c0.36	0.48					c0.09		0.37
v/s Ratio Perm		c0.54										
v/c Ratio		1.05	1.18	1.13	0.59					0.71		0.37
Uniform Delay, d1		32.5	32.5	40.7	4.0					50.8		0.0
Progression Factor		0.60	0.54	0.88	0.43					1.00		1.00
Incremental Delay, d2		22.7	84.0	64.3	0.3					5.7		0.7
Delay (s)		42.2	101.6	100.3	2.1					56.5		0.7
Level of Service		D	F	F	A					E		A
Approach Delay (s)		59.9		43.7				0.0			19.4	
Approach LOS		E		D				A			B	
Intersection Summary												
HCM Average Control Delay	48.5						HCM Level of Service					
HCM Volume to Capacity ratio	1.10						D					
Actuated Cycle Length (s)	120.0						Sum of lost time (s)					
Intersection Capacity Utilization	109.7%						ICU Level of Service					
Analysis Period (min)	15						H					
Critical Lane Group												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	312	2121	37	48	1911	202	203	258	452	301
Act Effct Green (s)	70.0	60.4	120.0	55.5	48.0	48.0	22.0	22.0	16.0	42.0
Actuated g/C Ratio	0.58	0.50	1.00	0.46	0.40	0.40	0.18	0.18	0.13	0.35
v/c Ratio	0.95	0.83	0.02	0.28	0.94	0.29	1.13	0.67	0.99	0.43
Control Delay	68.2	12.3	0.0	10.8	36.2	11.1	152.6	34.2	91.1	11.0
Queue Delay	0.0	0.2	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0
Total Delay	68.2	12.5	0.0	10.8	38.0	11.1	152.6	34.2	91.1	11.0
LOS	E	B	A	B	D	B	F	C	F	B
Approach Delay	19.3									
Approach LOS	B									
Queue Length 50th (ft)	206	208	0	5	399	29	~94	103	182	47
Queue Length 95th (ft)	m#357	m154	m0	m6	m#540	m57	#173	198	#291	122
Internal Link Dist (ft)	1280									
Turn Bay Length (ft)	300		250	180	2034	694	179	385	458	693
Base Capacity (vph)	327	2560	1583	180	2034	694	179	385	458	693
Starvation Cap Reductn	0	0	0	0	51	0	0	0	0	0
Spillback Cap Reductn	0	66	0	0	0	0	0	1	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.85	0.02	0.27	0.96	0.29	1.13	0.67	0.99	0.43

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 1 (1%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.13	
Intersection Signal Delay: 35.5	Intersection LOS: D
Intersection Capacity Utilization 89.7%	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.	



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		5	4	4	5	4	4	5	4	4	5	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	0.91	1.00	1.00	1.00	0.91	1.00	0.97	1.00	0.97	1.00	0.97
Flt Protected	1.00	1.00	0.85	1.00	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1583	3433	1583	3433	1583
Flt Permitted	0.08	1.00	1.00	0.08	1.00	0.08	1.00	0.27	1.00	0.95	1.00	0.95
Satd. Flow (perm)	146	5085	1583	158	5085	1583	979	1583	3433	1583	3433	1583
Volume (vph)	20	267	1951	34	44	1758	186	187	0	237	416	0
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)	22	290	2121	37	48	1911	202	203	0	258	452	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	61	0	95	0	0
Lane Group Flow (vph)	0	312	2121	37	48	1911	141	203	163	0	452	163
Turn Type	pm+pt	pm+pt	Free	pm+pt	Free	pm+pt	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	1	1	6	5	2	2	4	4	4	3	8	8
Permitted Phases	6	6	Free	2	2	2	4	4	4	4	4	4
Actuated Green, G (s)	70.0	59.6	120.0	53.6	47.2	47.2	22.0	22.0	22.0	16.0	42.0	42.0
Effective Green, g (s)	70.0	59.6	120.0	53.6	47.2	47.2	22.0	22.0	22.0	16.0	42.0	42.0
Actuated g/C Ratio	0.58	0.50	1.00	0.45	0.39	0.39	0.18	0.18	0.18	0.13	0.35	0.35
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	2526	1583	157	2000	623	179	290	458	554	458	554
v/s Ratio Prot	c0.14	0.42	0.02	0.02	c0.38	0.09	c0.21	0.10	c0.13	0.10	c0.13	0.10
v/s Ratio Perm	0.39	0.92	0.84	0.02	0.31	0.96	0.23	1.13	0.56	0.99	0.29	0.29
Uniform Delay, d1	44.3	26.1	0.0	50.6	35.4	24.2	49.0	44.6	51.9	28.3	51.9	28.3
Progression Factor	0.78	0.38	1.00	0.37	0.80	0.86	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	22.7	2.6	0.0	0.8	9.6	0.6	107.9	7.7	38.3	1.3	90.2	29.6
Delay (s)	57.4	12.4	0.0	19.3	38.1	21.4	156.9	52.3	90.2	29.6	90.2	29.6
Level of Service	E	B	A	B	D	C	F	D	F	C	F	C
Approach Delay (s)	17.9											
Approach LOS	B											
Intersection Summary												
HCM Average Control Delay	37.2 HCM Level of Service											
HCM Volume to Capacity ratio	0.96											
Actuated Cycle Length (s)	120.0 Sum of lost time (s)											
Intersection Capacity Utilization	89.7% ICU Level of Service											
Analysis Period (min)	15											
Critical Lane Group												

Intersection Summary

HCM Average Control Delay	37.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Future PM Sc-2 Improved
2/16/2007



Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	277
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	301
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

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Queues
6: Kimball Bridge Rd & Northwinds Pkwy Ext

Future PM Sc-2 Improved
2/16/2007



Lane Group	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	315	42	211	505	118	258	226
Act Effct Green (s)	73.7	73.7	87.9	87.9	24.1	24.1	24.1
Actuated g/C Ratio	0.61	0.61	0.73	0.73	0.20	0.20	0.20
v/c Ratio	0.28	0.04	0.36	0.38	0.50	0.49	0.80
Control Delay	8.2	1.7	7.7	7.6	48.0	7.5	61.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.2	1.7	7.7	7.6	48.0	7.5	61.5
LOS	A	A	A	A	D	A	E
Approach Delay	7.5		7.6	20.3		61.5	
Approach LOS	A		A	C		E	
Queue Length 50th (ft)	75	0	44	122	81	0	158
Queue Length 95th (ft)	135	m8	93	233	129	63	234
Internal Link Dist (ft)	1231		742	552		1243	
Turn Bay Length (ft)	135	125					
Base Capacity (vph)	1143	987	727	1318	404	711	479
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	0.28	0.04	0.29	0.38	0.29	0.36	0.47

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 43 (36%), Referenced to phase 2:WBTl and 6:EBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 17.7
 Intersection Capacity Utilization 68.8%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Baseline
A & R Engineering Inc.

Synchro 6 Report
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HCM Signalized Intersection Capacity Analysis
6: Kimball Bridge Rd & Northwinds Pkwy Ext

Future PM Sc-2 Improved
2/16/2007

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
Frt	1.00	0.85	1.00	1.00	0.96	1.00	0.85	1.00	0.85	1.00	0.98	1.00
Flt Protected	1.00	1.00	0.95	1.00	1.00	0.96	1.00	0.96	1.00	0.96	1.00	0.97
Satd. Flow (prot)	1862	1583	1770	1788	1788	1788	1788	1788	1583	1784	1784	1784
Flt Permitted	1.00	1.00	0.50	1.00	1.00	0.60	1.00	0.60	1.00	0.68	1.00	0.68
Satd. Flow (perm)	1862	1583	926	1788	1788	1118	1583	1118	1583	1242	1583	1242
Volume (vph)	1	289	39	194	340	124	93	16	237	115	69	24
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)	1	314	42	211	370	135	101	17	258	125	75	26
RTOR Reduction (vph)	0	0	15	0	7	0	0	0	206	0	5	0
Lane Group Flow (vph)	0	315	27	211	498	0	0	118	52	0	221	0
Turn Type	Perm	Perm	Perm	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	6	6	5	2	4	4	4	4	4	4	8	8
Permitted Phases	6	6	6	2	4	4	4	4	4	4	8	8
Actuated Green, G (s)	73.7	73.7	87.9	87.9	87.9	24.1	24.1	24.1	24.1	24.1	24.1	24.1
Effective Green, g (s)	73.7	73.7	87.9	87.9	87.9	24.1	24.1	24.1	24.1	24.1	24.1	24.1
Actuated g/C Ratio	0.61	0.61	0.73	0.73	0.73	0.20	0.20	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	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)	1144	972	750	1310	1310	225	318	225	318	249	249	249
v/s Ratio Prot			0.02	c0.28								
v/s Ratio Perm	0.17	0.02	0.18			0.11	0.03	0.11	0.03	c0.18		
v/c Ratio	0.28	0.03	0.28	0.38		0.52	0.16	0.52	0.16	0.89		
Uniform Delay, d1	10.7	9.1	5.4	5.9		42.8	39.6	42.8	39.6	46.6		
Progression Factor	0.60	0.33	1.00	1.00		1.00	1.00	1.00	1.00	0.96		
Incremental Delay, d2	0.6	0.1	0.2	0.8		2.2	0.2	2.2	0.2	29.2		
Delay (s)	7.0	3.1	5.6	6.8		45.0	39.9	45.0	39.9	73.9		
Level of Service	A	A	A	A		D	D	D	D	E		
Approach Delay (s)	6.5		6.4			41.5		41.5		73.9		
Approach LOS	A		A			D		D		E		
Intersection Summary												
HCM Average Control Delay		23.4				HCM Level of Service				C		
HCM Volume to Capacity ratio		0.49										
Actuated Cycle Length (s)		120.0				Sum of lost time (s)				8.0		
Intersection Capacity Utilization		68.8%				ICU Level of Service				C		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: Old Milton Pkwy & Alpha Ct

Future PM-SC-2 Improved
2/16/2007

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	122
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	133
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Baseline
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Queues

5: Old Milton Pkwy & Westside Pkwy

Future PM-SC-2 Improved
2/16/2007

	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)	257	1521	134	501	1730	74	411	435	718	245	704	352
Act Effct Green (s)	38.0	38.0	38.0	18.0	42.0	42.0	52.0	28.0	120.0	44.0	24.0	24.0
Actuated g/C Ratio	0.32	0.32	0.32	0.15	0.35	0.35	0.43	0.23	1.00	0.37	0.20	0.20
v/c Ratio	0.96	0.94	0.24	0.97	0.97	0.13	0.99	0.53	0.45	0.60	0.99	0.73
Control Delay	80.0	52.9	11.5	53.3	28.9	4.7	73.0	45.2	1.0	40.9	80.6	27.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.0	52.9	11.5	53.3	28.9	4.7	73.0	45.2	1.0	40.9	80.6	27.3
LOS	F	D	B	D	C	A	E	D	A	D	F	C
Approach Delay	53.6			33.4			32.2			58.7		
Approach LOS	D			C			C			E		
Queue Length 50th (ft)	159	419	21	180	279	2	269	103	0	122	288	103
Queue Length 95th (ft)	#316	#519	68 m#225 m#431	m5	#345	202	#345	202	0	186	#420	218
Internal Link Dist (ft)	495			1280			569			483		
Turn Bay Length (ft)	275	200	300	300	150	250	250	250	250	250	250	250
Base Capacity (vph)	269	1610	566	515	1780	579	416	826	1583	408	708	485
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	0.96	0.94	0.24	0.97	0.97	0.13	0.99	0.53	0.45	0.60	0.99	0.73

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 32 (27%), Referenced to phase 2:WBT and 6:EBTL, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.99
Intersection Signal Delay: 43.3
Intersection Capacity Utilization 98.2%
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.

Baseline
A & R Engineering Inc.

Synchro 6 Report
Page 6

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	3	3	3	3	3	3	3	3	3	3	3	3
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	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.95	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	5085	1583	3433	3433	5085	1583	1770	3539	1583	1770	3539
Flt Permitted	0.17	1.00	1.00	0.95	1.00	0.95	1.00	0.14	1.00	1.00	0.30	1.00
Satd. Flow (perm)	310	5085	1583	3433	3433	5085	1583	266	3539	1583	565	3539
Volume (vph)	18	218	1399	123	461	1592	68	378	400	661	225	648
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)	20	237	1521	134	501	1730	74	411	435	718	245	704
RTOR Reduction (vph)	0	0	0	65	0	0	25	0	0	0	0	0
Lane Group Flow (vph)	0	257	1521	69	501	1730	49	411	435	718	245	704
Turn Type	pm+pt	pm+pt	pm+pt	Perm	Prot	Perm	Prot	Perm	pm+pt	Free	pm+pt	Free
Protected Phases	1	1	6	6	5	2	2	7	4	3	8	8
Permitted Phases	6	6	38.0	38.0	18.0	42.0	42.0	52.0	28.0	120.0	44.0	24.0
Actuated Green, G (s)	38.0	38.0	38.0	38.0	18.0	42.0	42.0	52.0	28.0	120.0	44.0	24.0
Effective Green, g (s)	38.0	38.0	38.0	38.0	18.0	42.0	42.0	52.0	28.0	120.0	44.0	24.0
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.15	0.35	0.35	0.43	0.23	1.00	0.37	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)	269	1610	501	515	1780	554	416	826	1583	408	708	708
v/s Ratio Prot	0.11	c0.30	0.15	0.15	c0.34	c0.20	0.12	0.45	0.10	0.20	0.20	0.20
v/s Ratio Perm	c0.19	0.04	0.04	0.04	0.03	c0.23	0.03	0.45	0.12	0.12	0.12	0.12
v/c Ratio	0.96	0.94	0.14	0.97	0.97	0.09	0.99	0.53	0.45	0.60	0.99	0.99
Uniform Delay, d1	54.8	40.0	29.3	50.8	38.4	26.2	43.2	40.2	0.0	37.0	47.9	47.9
Progression Factor	1.00	1.00	1.00	0.61	0.49	0.31	0.80	1.07	1.00	1.00	1.00	1.00
Incremental Delay, d2	42.4	12.7	0.6	19.5	8.8	0.1	35.3	1.9	0.7	2.5	32.5	32.5
Delay (s)	97.1	52.6	29.9	50.7	27.6	8.2	69.9	44.8	0.7	39.5	80.4	80.4
Level of Service	F	D	C	D	C	A	E	D	A	D	F	F
Approach Delay (s)	57.0	E	C	C	32.0	C	31.2	C	64.7	E	E	E
Approach LOS	E	E	C	C	C	C	C	C	C	C	E	E
Intersection Summary												
HCM Average Control Delay	44.6	HCM Level of Service										
HCM Volume to Capacity ratio	0.94	D										
Actuated Cycle Length (s)	120.0	Sum of lost time (s)										
Intersection Capacity Utilization	98.2%	ICU Level of Service										
Analysis Period (min)	15	F										
Critical Lane Group												

Movement	SBR
Lane Configurations	3
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Flt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Volume (vph)	324
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	352
RTOR Reduction (vph)	168
Lane Group Flow (vph)	184
Turn Type	Perm
Protected Phases	8
Permitted Phases	8
Actuated Green, G (s)	24.0
Effective Green, g (s)	24.0
Actuated g/C Ratio	0.20
Clearance Time (s)	4.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	317
v/s Ratio Prot	0.12
v/s Ratio Perm	0.58
v/c Ratio	0.58
Uniform Delay, d1	43.4
Progression Factor	1.00
Incremental Delay, d2	7.6
Delay (s)	51.0
Level of Service	D
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Intersection Summary

**Future Site Access Analysis
(Scenario 1)**

Future 2010 AM Site Access Analysis

Queues
4: Old Milton Pkwy & Amber Park Dr

Future AM Sc-1 improved
2/16/2007

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	246	1752	352	439	1681	34	41	60	248	39
Act Effct Green (s)	56.7	56.7	120.0	19.9	52.6	67.0	8.1	17.0	10.4	21.1
Actuated g/C Ratio	0.47	0.47	1.00	0.17	0.44	0.56	0.07	0.14	0.09	0.18
v/c Ratio	0.58	0.73	0.22	0.77	0.75	0.04	0.18	0.22	0.58	0.12
Control Delay	12.8	4.7	0.0	48.4	23.4	1.5	54.0	14.3	58.2	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.8	4.7	0.0	48.4	23.4	1.5	54.0	14.3	58.2	15.6
LOS	B	A	A	D	C	A	D	B	E	B
Approach Delay	4.9									
Approach LOS	A									
Queue Length 50th (ft)	76	71	0	156	415	1	15	1	66	1
Queue Length 95th (ft)	m71	m62	m0	210	423	m2	34	41	95	33
Internal Link Dist (ft)	1280									
Turn Bay Length (ft)	300	250	250	658	2231	883	257	275	457	312
Base Capacity (vph)	424	2404	1583	658	2231	883	257	275	457	312
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	0.58	0.73	0.22	0.67	0.75	0.04	0.16	0.22	0.54	0.13

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 48 (40%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 18.4	Intersection LOS: B
Intersection Capacity Utilization 66.0%	ICU Level of Service C
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Future AM Sc-1 improved
2/16/2007

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	3	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	0.91	1.00	0.97	0.91	1.00	0.97	1.00	0.97	1.00	0.94	1.00
Flt Protected	0.95	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86	1.00	0.86	1.00
Satd. Flow (prot)	1770	5085	1583	3433	5085	1583	3433	1583	3433	1583	4990	1598
Flt Permitted	0.12	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	233	5085	1583	3433	5085	1583	3433	1583	3433	1583	4990	1598
Volume (vph)	1	225	1699	341	426	1631	31	40	2	56	228	2
Peak-hour factor, PHF	0.92	0.92	0.97	0.97	0.97	0.97	0.92	0.97	0.92	0.97	0.92	0.92
Adj. Flow (vph)	1	245	1752	352	439	1681	34	41	2	58	248	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	12	0	50	0	30
Lane Group Flow (vph)	0	246	1752	352	439	1681	22	41	10	0	248	9
Turn Type	pm+pt	pm+pt	Free	Free	Prot	pm+ov	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	1	1	6	5	2	3	7	4	3	8		
Permitted Phases	6	6	Free	Free	2							
Actuated Green, G (s)	56.0	56.0	120.0	19.9	51.9	63.0	7.0	17.0	11.1	21.1		
Effective Green, g (s)	56.0	56.0	120.0	19.9	51.9	63.0	7.0	17.0	11.1	21.1		
Actuated g/C Ratio	0.47	0.47	1.00	0.17	0.43	0.52	0.06	0.14	0.09	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)	416	2373	1583	569	2199	884	200	226	462	281		
v/s Ratio Prot	0.12	c0.34		0.13	c0.33	0.00	0.01	0.01	c0.05	0.01		
v/s Ratio Perm	0.16		c0.22			0.01						
v/c Ratio	0.59	0.74	0.22	0.77	0.76	0.02	0.20	0.05	0.54	0.03		
Uniform Delay, d1	31.6	26.0	0.0	47.9	28.9	13.7	53.8	44.5	52.0	41.0		
Progression Factor	0.33	0.17	1.00	0.87	0.76	0.27	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.2	0.2	0.0	4.4	1.8	0.0	0.5	0.4	1.2	0.2		
Delay (s)	10.6	4.7	0.0	46.3	23.7	3.7	54.4	44.9	53.2	41.2		
Level of Service	B	A	A	D	C	A	D	D	D	D		
Approach Delay (s)	4.6										51.6	D
Approach LOS	A										D	D
Intersection Summary												
HCM Average Control Delay	18.6										B	
HCM Volume to Capacity ratio	0.60											
Actuated Cycle Length (s)	120.0										4.0	
Intersection Capacity Utilization	66.0%										C	
Analysis Period (min)	15											
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Future AM SC-1 Improved
2/16/2007



Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	34
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	37
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Baseline
A & R Engineering Inc.

Future 2015 SAT - Improved-Queues
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HCM Unsignalized Intersection Capacity Analysis
7: Kimball Bridge Rd & Parkway 400 Driveway

Future AM SC-1 Improved
2/16/2007



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	76	345	285	132	37	25
Peak Hour Factor	0.81	0.91	0.88	0.72	0.66	0.61
Hourly flow rate (vph)	94	379	324	183	56	41
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						6
Median type					None	
Median storage (veh)						
Upstream signal (ft)		905				
pX, platoon unblocked						
VC, conflicting volume	507				891	324
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	507				891	324
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				80	94
cM capacity (veh/h)	1058				285	717
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	94	379	324	183	97	
Volume Left	94	0	0	0	56	
Volume Right	0	0	0	183	41	
cSH	1058	1700	1700	1700	494	
Volume to Capacity	0.09	0.22	0.19	0.11	0.20	
Queue Length 95th (ft)	7	0	0	0	18	
Control Delay (s)	8.7	0.0	0.0	0.0	16.3	
Lane LOS	A				C	
Approach Delay (s)	1.7		0.0		16.3	
Approach LOS					C	
Intersection Summary						
Average Delay				2.2		
Intersection Capacity Utilization				32.5%		A
Analysis Period (min)				15		

Baseline
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Future 2015 SAT - Improved-Queues
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Future 2010 PM Site Access Analysis

Queues
4: Old Milton Pkwy & Amber Park Dr

Future PM Sc-1 Improved
2/16/2007

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	312	2070	84	94	1755	202	334	392	1022	306
Act Effct Green (s)	51.4	51.4	120.0	7.6	43.0	71.0	18.0	21.0	24.0	27.0
Actuated g/C Ratio	0.43	0.43	1.00	0.06	0.36	0.59	0.15	0.18	0.20	0.22
v/c Ratio	1.04	0.95	0.05	0.43	0.96	0.20	0.65	1.05	1.02	0.58
Control Delay	79.4	18.5	0.0	63.2	41.1	2.4	54.6	93.6	82.0	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.4	18.5	0.0	63.2	41.1	2.4	54.6	93.6	82.0	17.4
LOS	E	B	A	E	D	A	D	F	F	B
Approach Delay	25.5									
Approach LOS	C									
Queue Length 50th (ft)	~213	199	0	34	475	6	127	~250	~288	57
Queue Length 95th (ft) m#306	#665	m0	m59	#609	#609	35	177	#449	#388	153
Internal Link Dist (ft)	1280									
Turn Bay Length (ft)	300	250	250	150	100	100	374	998	525	525
Base Capacity (vph)	299	2178	1583	229	1822	1003	515	374	998	525
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	1.04	0.95	0.05	0.41	0.96	0.20	0.65	1.05	1.02	0.58
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 44 (37%), Referenced to phase 2:WBT and 6:EBTL, Start of Green										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 1.05										
Intersection Signal Delay: 43.5										
Intersection Capacity Utilization 103.5%										
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: Old Milton Pkwy & Amber Park Dr

Future PM Sc-1 Improved
2/16/2007

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Configurations	3	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	0.91	1.00	0.97	0.91	1.00	0.97	1.00	0.97	1.00	0.94	1.00	
Flt Protected	0.95	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	3433	3433	5085	1583	3433	1587	4990	1588	1588	
Flt Permitted	0.11	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	210	5085	1583	3433	3433	5085	1583	3433	1587	4990	1588	1588	
Volume (vph)	20	267	2008	81	91	1702	186	324	5	375	940	5	
Peak-hour factor, PHF	0.92	0.92	0.97	0.97	0.97	0.97	0.92	0.97	0.92	0.97	0.92	0.92	
Adj. Flow (vph)	22	290	2070	84	94	1755	202	334	5	387	1022	5	
RTOR Reduction (vph)	0	0	0	0	0	0	0	72	0	97	0	168	
Lane Group Flow (vph)	0	312	2070	84	94	1755	130	334	295	0	1022	138	
Turn Type	pm+pt	pm+pt	Free	Free	Prot	Prot	pm+ov	Prot	Prot	Prot	Prot	Prot	
Protected Phases	1	1	6	5	2	3	7	4	3	8			
Permitted Phases	6	6	Free	Free	2								
Actuated Green, G (s)	51.4	51.4	120.0	7.6	43.0	67.0	18.0	21.0	24.0	27.0			
Effective Green, g (s)	51.4	51.4	120.0	7.6	43.0	67.0	18.0	21.0	24.0	27.0			
Actuated g/C Ratio	0.43	0.43	1.00	0.06	0.36	0.56	0.15	0.18	0.20	0.22			
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)	298	2178	1583	217	1822	937	515	278	998	357			
v/s Ratio Prot	0.14	c0.41	0.05	0.03	c0.35	0.03	0.10	c0.19	c0.20	0.09			
v/s Ratio Perm	c0.31	0.05	0.05	0.43	0.96	0.14	0.65	1.06	1.02	0.39			
v/c Ratio	1.05	0.95	0.05	0.43	0.96	0.14	0.65	1.06	1.02	0.39			
Uniform Delay, d1	46.8	33.1	0.0	54.1	37.7	12.7	48.0	49.5	48.0	39.5			
Progression Factor	0.49	0.30	1.00	1.07	0.73	0.71	1.00	1.00	1.00	1.00			
Incremental Delay, d2	53.6	7.3	0.0	1.2	12.8	0.1	2.8	71.6	34.7	3.1			
Delay (s)	76.7	17.3	0.0	58.9	40.4	9.1	50.8	121.1	82.7	42.6			
Level of Service	E	B	A	E	D	A	D	F	F	D			
Approach Delay (s)	24.2										88.8	73.5	
Approach LOS	C										D	E	
Intersection Summary													
HCM Average Control Delay	45.7										HCM Level of Service		D
HCM Volume to Capacity ratio	1.04												
Actuated Cycle Length (s)	120.0										Sum of lost time (s)		16.0
Intersection Capacity Utilization	103.5%										ICU Level of Service		G
Analysis Period (min)	15												
Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Future PM SC-1 Improved
2/16/2007



Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Fr	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	277
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	301
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Baseline
A & R Engineering Inc.

Future 2015 SAT - Improved-Queues
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HCM Unsignalized Intersection Capacity Analysis
7: Kimball Bridge Rd & Parkway 400 Driveway

Future PM SC-1 Improved
2/16/2007



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	27	330	560	45	136	49
Peak Hour Factor	0.79	0.90	0.94	0.71	0.80	0.82
Hourly flow rate (vph)	34	367	596	63	170	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						6
Median type					None	
Median storage (veh)						
Upstream signal (ft)		905				
pX, platoon unblocked						
VC, conflicting volume		659			1031	596
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol		659			1031	596
tC, single (s)		4.1			6.4	6.2
tC, 2 stage (s)						
tF (s)		2.2			3.5	3.3
p0 queue free %		96			32	88
cM capacity (veh/h)		929			249	504
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	34	367	596	63	230	
Volume Left	34	0	0	0	170	
Volume Right	0	0	0	63	60	
cSH	929	1700	1700	1700	336	
Volume to Capacity	0.04	0.22	0.35	0.04	0.68	
Queue Length 95th (ft)	3	0	0	0	119	
Control Delay (s)	9.0	0.0	0.0	0.0	37.3	
Lane LOS	A				E	
Approach Delay (s)	0.8		0.0		37.3	
Approach LOS					E	
Intersection Summary						
Average Delay				6.9		
Intersection Capacity Utilization				43.7%		A
Analysis Period (min)				15		

Baseline
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Future 2015 SAT - Improved-Queues
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**Future Site Access Analysis
(Scenario 2)**

Future 2010 AM Site Access Analysis

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	246	2004	172	261	1700	34	22	41	72	39
Act Effct Green (s)	75.2	57.0	120.0	75.2	57.0	57.0	23.2	23.2	7.5	32.8
Actuated g/C Ratio	0.63	0.48	1.00	0.63	0.48	0.48	0.19	0.19	0.06	0.27
v/c Ratio	0.75	0.83	0.11	0.79	0.70	0.04	0.04	0.12	0.33	0.08
Control Delay	41.5	7.8	0.1	46.1	7.3	0.7	44.6	15.9	57.9	12.5
Queue Delay	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay	41.5	7.9	0.1	46.1	7.5	0.7	44.6	15.9	57.9	12.5
LOS	D	A	A	D	A	A	D	B	E	B
Approach Delay	10.8			12.4			25.9			42.0
Approach LOS	B			B			C			D
Queue Length 50th (ft)	151	94	0	164	35	0	7	1	27	1
Queue Length 95th (ft)	m186	120	m0	254	56	m1	20	35	52	30
Internal Link Dist (ft)	1280			172			295			125
Turn Bay Length (ft)	300	2415	1583	250	401	2415	763	512	340	229
Base Capacity (vph)	401	2415	1583	401	2415	763	512	340	229	464
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	37	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	0.61	0.84	0.11	0.65	0.74	0.04	0.04	0.12	0.31	0.08

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 4 (3%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 12.4	Intersection LOS: B
Intersection Capacity Utilization 67.5%	ICU Level of Service C
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	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	1.00	1.00	0.91	1.00	0.97	1.00	0.97	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86	1.00	0.86	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1583	3433	1583	3433	1583
Flt Permitted	0.07	1.00	1.00	0.07	1.00	0.07	1.00	0.73	1.00	0.95	1.00	1.00
Satd. Flow (perm)	133	5085	1583	133	5085	1583	2644	1583	2644	1583	2644	1583
Volume (vph)	1	225	1844	158	240	1564	31	20	2	36	66	66
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)	1	245	2004	172	261	1700	34	22	2	39	72	72
RTOR Reduction (vph)	0	0	0	0	0	0	0	12	0	31	0	0
Lane Group Flow (vph)	0	246	2004	172	261	1700	22	22	10	0	72	12
Turn Type	pm+pt	pm+pt	pm+pt	Free	pm+pt	Perm	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	1	1	6	5	2	2	4	4	4	3	8	8
Permitted Phases	6	6	Free	Free	2	2	4	4	4	4	3	8
Actuated Green, G (s)	74.4	56.2	120.0	74.4	56.2	56.2	23.2	23.2	23.2	6.4	33.6	33.6
Effective Green, g (s)	74.4	56.2	120.0	74.4	56.2	56.2	23.2	23.2	23.2	6.4	33.6	33.6
Actuated g/C Ratio	0.62	0.47	1.00	0.62	0.47	0.47	0.19	0.19	0.19	0.05	0.28	0.28
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)	331	2381	1583	331	2381	741	511	309	183	447	447	447
v/s Ratio Prot	0.11	0.39	0.11	0.37	0.12	0.33	0.01	0.01	0.02	0.01	0.01	0.01
v/s Ratio Perm	0.35	0.74	0.84	0.11	0.79	0.71	0.03	0.04	0.39	0.03	0.03	0.03
v/s Ratio	0.74	0.84	0.11	0.79	0.71	0.03	0.04	0.03	0.39	0.03	0.03	0.03
Uniform Delay, d1	35.5	28.0	0.0	40.2	25.5	17.2	39.4	39.3	54.9	31.3	31.3	31.3
Progression Factor	0.88	0.21	1.00	0.84	0.24	0.07	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.3	2.3	0.1	9.0	1.4	0.1	0.2	0.2	1.4	0.1	0.1	0.1
Delay (s)	35.9	8.1	0.1	42.8	7.5	1.3	39.5	39.5	56.3	31.5	31.5	31.5
Level of Service	D	A	A	D	A	A	D	D	E	C	C	C
Approach Delay (s)	10.3			12.0			39.5			47.6		D
Approach LOS	B			B			D			D		D
Intersection Summary												
HCM Average Control Delay	12.4			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			12.0			C		
Intersection Capacity Utilization	67.5%			ICU Level of Service								
Analysis Period (min)	15											
Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

Future AM-SC-2 Improved
2/16/2007

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	34
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	37
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM Unsignalized Intersection Capacity Analysis
7: Kimball Bridge Rd & Parkway 400 Driveway

Future AM-SC-2 Improved
2/16/2007

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	78	256	216	35	22	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	85	278	235	38	24	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		905				
pX, platoon unblocked						
vC, conflicting volume	273				683	235
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	273				683	235
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				94	97
cM capacity (veh/h)	1290				388	804
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	85	278	235	38	51	
Volume Left	85	0	0	0	24	
Volume Right	0	0	0	38	27	
cSH	1290	1700	1700	1700	535	
Volume to Capacity	0.07	0.16	0.14	0.02	0.10	
Queue Length 95th (ft)	5	0	0	0	8	
Control Delay (s)	8.0	0.0	0.0	0.0	12.4	
Lane LOS	A				B	
Approach Delay (s)	1.9		0.0		12.4	
Approach LOS					B	
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			29.0%			
Analysis Period (min)			15			
ICU Level of Service					A	

HCM Unsignalized Intersection Capacity Analysis
9: Main Site Dr & Northwinds Pkwy Ext

Future AM-SC-2 Improved
2/16/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			4	Free	Free
Sign Control	Stop				0%	0%
Grade	0%					
Volume (veh/h)	38	5	98	72	216	123
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	41	5	107	78	235	134
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						722
pX, platoon unblocked	0.98	0.98	0.98			
VC, conflicting volume	593	302	368			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	587	291	359			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	99	91			
cM capacity (veh/h)	423	737	1182			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	47	185	368			
Volume Left	41	107	0			
Volume Right	5	0	134			
cSH	445	1182	1700			
Volume to Capacity	0.10	0.09	0.22			
Queue Length 95th (ft)	9	7	0			
Control Delay (s)	14.0	5.1	0.0			
Lane LOS	B	A				
Approach Delay (s)	14.0	5.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			41.4%			A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
10: North RIRO Dr & Northwinds Pkwy Ext

Future AM-SC-2 Improved
2/16/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				Free	Free	Free
Sign Control	Yield			0%	0%	0%
Grade	0%					
Volume (veh/h)	0	5	0	110	335	123
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	0	120	364	134
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						462
pX, platoon unblocked	0.92	0.92	0.92			
VC, conflicting volume	551	431	364			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	511	381	308			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	480	612	1151			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	5	120	498			
Volume Left	0	0	0			
Volume Right	5	0	134			
cSH	612	1700	1700			
Volume to Capacity	0.01	0.07	0.29			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	10.9	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	10.9	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			35.1%			A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 11: South RIRO Dr & Northwinds Pkwy Ext

Future AM-SC-2 Improved
 2/16/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Yield	Free	Free	Free	Free	Free
Sign Control	Yield	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	9	0	170	97	123
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	10	0	185	105	134
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						1012
pX, platoon unblocked						
vC, conflicting volume	357	172	105			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	357	172	105			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	641	871	1486			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	10	185	239			
Volume Left	0	0	0			
Volume Right	10	0	134			
cSH	871	1700	1700			
Volume to Capacity	0.01	0.11	0.14			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	9.2	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.2	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		0.2				
Intersection Capacity Utilization		22.6%				A
Analysis Period (min)		15				

Future 2010 PM Site Access Analysis

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	312	2121	37	48	1911	202	203	258	452	301
Act Effct Green (s)	70.0	60.4	120.0	55.5	48.0	48.0	22.0	22.0	16.0	42.0
Actuated g/C Ratio	0.58	0.50	1.00	0.46	0.40	0.40	0.18	0.18	0.13	0.35
v/c Ratio	0.95	0.83	0.02	0.28	0.94	0.29	1.13	0.67	0.99	0.43
Control Delay	68.2	12.3	0.0	10.8	36.2	11.1	152.6	34.2	91.1	11.0
Queue Delay	0.0	0.2	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0
Total Delay	68.2	12.5	0.0	10.8	38.0	11.1	152.6	34.2	91.1	11.0
LOS	E	B	A	B	D	B	F	C	F	B
Approach Delay	19.3			34.9			86.3			59.0
Approach LOS	B			C			F			E
Queue Length 50th (ft)	206	208	0	5	399	29	~84	103	182	47
Queue Length 95th (ft)	m154	m154	m0	m6	m540	m57	#173	198	#291	122
Internal Link Dist (ft)	1280			172			295			125
Turn Bay Length (ft)	300	250	150	100	100	100	100	100	100	100
Base Capacity (vph)	327	2560	1583	180	2034	694	179	385	458	693
Starvation Cap Reductn	0	0	0	0	51	0	0	0	0	0
Spillback Cap Reductn	0	66	0	0	0	0	0	1	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.85	0.02	0.27	0.96	0.29	1.13	0.67	0.99	0.43

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 1 (1%), Referenced to phase 2:WBT and 6:EBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.13	
Intersection Signal Delay: 35.5	Intersection LOS: D
Intersection Capacity Utilization 89.7%	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.	



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
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	0.91	1.00	1.00	0.91	1.00	0.97	1.00	0.97	1.00	0.97	1.00
Flt Protected	0.95	1.00	1.00	0.85	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.85
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1583	3433	1583	3433	1583
Flt Permitted	0.08	1.00	1.00	0.08	1.00	0.08	1.00	0.27	1.00	0.95	1.00	0.95
Satd. Flow (perm)	146	5085	1583	158	5085	1583	979	1583	3433	1583	3433	1583
Volume (vph)	20	267	1951	34	44	1758	186	187	0	237	416	0
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)	22	290	2121	37	48	1911	202	203	0	258	452	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	61	0	95	0	0
Lane Group Flow (vph)	0	312	2121	37	48	1911	141	203	163	0	452	163
Turn Type	pm+pt	pm+pt	pm+pt	Free	pm+pt	Perm	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	1	1	6	5	2	2	4	4	4	3	8	8
Permitted Phases	6	6	Free	Free	2	2	2	2	2	2	2	2
Actuated Green, G (s)	70.0	59.6	120.0	53.6	47.2	47.2	22.0	22.0	22.0	16.0	42.0	42.0
Effective Green, g (s)	70.0	59.6	120.0	53.6	47.2	47.2	22.0	22.0	22.0	16.0	42.0	42.0
Actuated g/C Ratio	0.58	0.50	1.00	0.45	0.39	0.39	0.18	0.18	0.18	0.13	0.35	0.35
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	2526	1583	157	2000	623	179	290	290	458	554	554
v/s Ratio Prot	c0.14	0.42	0.02	0.02	c0.38	0.09	c0.21	0.10	0.10	c0.13	0.10	0.10
v/s Ratio Perm	0.39	0.92	0.84	0.02	0.31	0.96	0.23	1.13	0.56	0.99	0.29	0.29
Uniform Delay, d1	44.3	26.1	0.0	50.6	35.4	24.2	49.0	44.6	51.9	28.3	51.9	28.3
Progression Factor	0.78	0.38	1.00	0.37	0.80	0.86	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	22.7	2.6	0.0	0.8	9.6	0.6	107.9	7.7	38.3	1.3	38.3	1.3
Delay (s)	57.4	12.4	0.0	19.3	38.1	21.4	156.9	52.3	90.2	29.6	90.2	29.6
Level of Service	E	B	A	B	D	C	F	D	F	C	F	C
Approach Delay (s)	17.9			36.1			98.4			65.9		E
Approach LOS	B			D			F			F		E

Intersection Summary

HCM Average Control Delay	37.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Old Milton Pkwy & Amber Park Dr

HCM Unsignalized Intersection Capacity Analysis
7: Kimball Bridge Rd & Parkway 400 Driveway

Future PM-SC-2 Improved

2/16/2007

2/16/2007



Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Flt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	277
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	301
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	27	250	467	21	34	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	272	508	23	37	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)		905				
pX, platoon unblocked						
vC, conflicting volume	530				838	508
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	530				838	508
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				89	90
cM capacity (veh/h)	1037				327	565
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	29	272	508	23	91	
Volume Left	29	0	0	0	37	
Volume Right	0	0	0	23	54	
cSH	1037	1700	1700	1700	436	
Volume to Capacity	0.03	0.16	0.30	0.01	0.21	
Queue Length 95th (ft)	2	0	0	0	19	
Control Delay (s)	8.6	0.0	0.0	0.0	15.4	
Lane LOS	A				C	
Approach Delay (s)	0.8		0.0		15.4	
Approach LOS					C	
Intersection Summary						
Average Delay				1.8		
Intersection Capacity Utilization				36.2%		
ICU Level of Service					A	
Analysis Period (min)				15		

HCM Unsignalized Intersection Capacity Analysis
9: Main Site Dr & Northwinds Pkwy Ext

Future PM-SC-2 Improved
2/16/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			4	Free	Free
Sign Control	Stop				0%	0%
Grade	0%					
Volume (veh/h)	251	30	24	115	142	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	273	33	26	125	154	35
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						722
pX, platoon unblocked						
vC, conflicting volume	349	172	189			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	349	172	189			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	57	96	98			
cM capacity (veh/h)	636	872	1385			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	305	151	189			
Volume Left	273	26	0			
Volume Right	33	0	35			
cSH	655	1385	1700			
Volume to Capacity	0.47	0.02	0.11			
Queue Length 95th (ft)	62	1	0			
Control Delay (s)	15.2	1.4	0.0			
Lane LOS	C	A				
Approach Delay (s)	15.2	1.4	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			7.5			
Intersection Capacity Utilization			42.5%			A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
10: North RIRO Dr & Northwinds Pkwy Ext

Future PM-SC-2 Improved
2/16/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				Free	Free	Free
Sign Control	Yield			0%	0%	0%
Grade	0%					
Volume (veh/h)	0	30	0	366	142	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	33	0	398	154	35
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)						462
pX, platoon unblocked						
vC, conflicting volume	570	172	154			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	567	166	148			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	100			
cM capacity (veh/h)	482	872	1423			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	33	398	189			
Volume Left	0	0	0			
Volume Right	33	0	35			
cSH	872	1700	1700			
Volume to Capacity	0.04	0.23	0.11			
Queue Length 95th (ft)	3	0	0			
Control Delay (s)	9.3	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.3	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			22.6%			A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 11: South RIRO Dr & Northwinds Pkwy Ext

Future PM-SC-2 Improved
 2/16/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Yield	Yield	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%
Grade	0	63	0	139	141	32
Volume (veh/h)	0.92	0.92	0.92	0.92	0.92	0.92
Peak Hour Factor	0	68	0	151	153	35
Hourly flow rate (vph)						
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (ft)						1012
pX, platoon unblocked						
vC, conflicting volume	322	171	153			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	322	171	153			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	92	100			
cM capacity (veh/h)	672	873	1427			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	68	151	188			
Volume Left	0	0	0			
Volume Right	68	0	35			
cSH	873	1700	1700			
Volume to Capacity	0.08	0.09	0.11			
Queue Length 95th (ft)	6	0	0			
Control Delay (s)	9.5	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.5	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			19.9%			A
Analysis Period (min)			15			

Traffic Volume Worksheets

07-004 Parkway 400 DRI
Traffic Volumes
Future Conditions

A&R Engineering
February-07

Old Milton Parkway at GA 400 Northbound Ramp

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	53	0	953	1006	0	0	0	0	475	1580	0	2055
Adjustment for Westside Parkway to Webb Bridge Roac	0	0	0	0	0	0	0	0	0	-71	0	-71
Growth Factor (%):	2	2	2		2	2	2		2	2	2	
Additional Trips due to Offices At Prospect Park DRI	292	0	0	292	0	0	0	0	20	11	0	31
Additional Trips due to Prospect Park	171	0	0	171	0	0	0	0	48	39	0	87
Base Condition:	519	0	1011	1531	0	0	0	0	572	1651	0	2223
Total New Trips - Scenario 1	159	0	0	159	0	0	0	0	8	13	0	21
Total New Trips - Scenario 2	159	0	0	159	0	0	0	0	8	13	0	21
Future Traffic Volumes - Scenario 1	678	0	1011	1690	0	0	0	0	580	1664	0	2244
Future Traffic Volumes - Scenario 2	678	0	1011	1690	0	0	0	0	580	1664	0	2244

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	44	0	529	573	0	0	0	0	757	1137	0	1894
Adjustment for Westside Parkway to Webb Bridge Roac	0	0	0	0	0	0	0	0	0	-81	0	-81
Growth Factor (%):	2	2	2		2	2	2		2	2	2	
Additional Trips due to Offices At Prospect Park DRI	113	0	0	113	0	0	0	0	99	42	0	141
Additional Trips due to Prospect Park	218	0	0	218	0	0	0	0	150	174	0	324
Base Condition:	378	0	561	939	0	0	0	0	1052	1337	0	2389
Total New Trips - Scenario 1	40	0	0	40	0	0	0	0	54	88	0	142
Total New Trips - Scenario 2	40	0	0	40	0	0	0	0	54	88	0	142
Future Traffic Volumes - Scenario 1	418	0	561	979	0	0	0	0	1106	1425	0	2531
Future Traffic Volumes - Scenario 2	418	0	561	979	0	0	0	0	1106	1425	0	2531

07-004 Parkway 400 DRI
Traffic Volumes
Future Conditions

A&R Engineering
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Old Milton Parkway at GA 400 Southbound 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	471	0	648	1119	0	1584	41	1625
Adjustment for Westside Parkway to Webb Bridge Roac	0	0	0	0	0	0	0	0	0	-71	0	-71
Growth Factor (%):	2	2	2		2	2	2		2	2	2	
Additional Trips due to Offices At Prospect Park DRI	0	0	0	0	0	0	100	100	0	31	73	104
Additional Trips due to Prospect Park	0	0	0	0	0	0	120	120	0	87	85	172
Base Condition:	0	0	0	0	500	0	908	1407	0	1724	202	1925
Total New Trips - Scenario 1	0	0	0	0	0	0	58	58	0	21	22	43
Total New Trips - Scenario 2	0	0	0	0	0	0	58	58	0	21	22	43
Future Traffic Volumes - Scenario 1	0	0	0	0	500	0	966	1465	0	1745	224	1968
Future Traffic Volumes - Scenario 2	0	0	0	0	500	0	966	1465	0	1745	224	1968

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	254	0	375	629	0	1625	197	1822
Adjustment for Westside Parkway to Webb Bridge Roac	0	0	0	0	0	0	0	0	0	-81	0	-81
Growth Factor (%):	2	2	2		2	2	2		2	2	2	
Additional Trips due to Offices At Prospect Park DRI	0	0	0	0	0	0	29	29	0	141	297	438
Additional Trips due to Prospect Park	0	0	0	0	0	0	90	90	0	324	301	625
Base Condition:	0	0	0	0	270	0	517	786	0	2104	807	2911
Total New Trips - Scenario 1	0	0	0	0	0	0	15	15	0	142	149	291
Total New Trips - Scenario 2	0	0	0	0	0	0	15	15	0	142	149	291
Future Traffic Volumes - Scenario 1	0	0	0	0	270	0	532	801	0	2246	956	3202
Future Traffic Volumes - Scenario 2	0	0	0	0	270	0	532	801	0	2246	956	3202

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A.M. Peak Hour

P.M. Peak Hour

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07-004 Parkway 400 DRI
Traffic Volumes
Future Conditions

A&R Engineering
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Old Milton Parkway at Amber Park 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	12	12	0	0	0	0	1	0	1557	1607
Existing diverted for Kimball Bridge Rd to Northwinds Pkwy	0	0	12	12	0	0	0	0	1	0	1524	1574
Adjustment for Westside Parkway to Webb Bridge Road	0	0	0	0	0	0	0	0	0	0	-71	-71
Growth Factor (%):	2	2	2		2	2	2		2	2	2	
Additional Trips due to Offices At Prospect Park DRI	0	0	0	0	0	0	5	5	0	103	59	162
Adjustments for Kimball Bridge Rd to Northwinds Pkwy E	0	0	0	0	0	0	5	5	0	103	57	160
Additional Trips due to Prospect Park	0	0	0	0	66	0	29	95	0	122	63	185
Base Condition:	0	0	13	13	66	0	34	100	1	225	1699	1977
Base Condition: (for Scenario 2)	0	0	13	13	66	0	34	100	1	225	1662	1940
Total New Trips - Scenario 1	40	0	43	83	0	0	0	0	0	0	289	289
Total New Trips - Scenario 2	20	0	23	43	0	0	0	0	0	0	182	288
Future Traffic Volumes - Scenario 1	40	0	56	96	228	0	34	262	1	225	1699	2266
Future Traffic Volumes - Scenario 2	20	0	36	56	66	0	34	100	1	225	1844	2228

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	50	0	79	129	0	0	0	0	19	0	1720	1747
Existing diverted for Kimball Bridge Rd to Northwinds Pkwy	50	0	79	129	0	0	0	0	19	0	1623	1650
Adjustment for Westside Parkway to Webb Bridge Road	0	0	0	0	0	0	0	0	0	0	-81	-81
Growth Factor (%):	2	2	2		2	2	2		2	2	2	
Additional Trips due to Offices At Prospect Park DRI	0	0	0	0	0	0	34	34	0	60	181	241
Adjustments for Kimball Bridge Rd to Northwinds Pkwy E	0	0	0	0	0	0	34	34	0	60	180	240
Additional Trips due to Prospect Park	0	0	0	0	416	0	243	659	0	207	88	295
Base Condition:	53	0	84	137	416	0	277	693	20	267	2008	2304
Base Condition: (for Scenario 2)	53	0	84	137	416	0	277	693	20	267	1905	2201
Total New Trips - Scenario 1	271	0	291	562	0	0	0	0	0	0	73	73
Total New Trips - Scenario 2	134	0	153	287	0	0	0	0	0	0	46	72
Future Traffic Volumes - Scenario 1	324	0	375	699	940	0	277	1217	20	267	2008	2377
Future Traffic Volumes - Scenario 2	187	0	237	424	416	0	277	693	20	267	1951	2273

07-004 Parkway 400 DRI
Traffic Volumes
Future Conditions

A&R Engineering
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Old Milton Parkway at Westside Parkway

A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing:	114	0	222	336	0	0	0	0	0	523	1154	0
Existing diverted for Kimball Bridge Rd to Northwinds Pkwy	114	0	189	303	0	0	0	0	0	447	1154	0
Adjustment for Westside Parkway to Webb Bridge Road	0	40	0	40	0	69	123	192	0	94	-71	0
Growth Factor (%):	2	2	2	2	2	2	2	2	2	2	2	2
Additional Trips due to Offices At Prospect Park DRI	0	298	15	313	22	39	23	84	0	151	125	0
Adjustments for Kimball Bridge Rd to Northwinds Pkwy E	0	263	13	276	22	35	23	80	0	151	125	0
Additional Trips due to Prospect Park	2	195	27	224	0	98	21	119	0	30	158	0
Base Condition:	123	535	278	936	22	210	175	407	17	281	1655	283
Base Condition: (for Scenario 2)	123	500	241	864	22	206	175	402	17	281	1655	283
Total New Trips - Scenario 1	0	0	58	58	72	0	0	72	0	0	159	0
Total New Trips - Scenario 2	4	0	72	76	72	0	0	72	0	0	143	16
Future Traffic Volumes - Scenario 1	123	535	336	994	94	210	175	479	17	281	1814	283
Future Traffic Volumes - Scenario 2	127	500	313	940	94	206	175	474	17	281	1798	299

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing:	328	0	661	989	0	0	0	0	0	315	1196	0
Existing diverted for Kimball Bridge Rd to Northwinds Pkwy	328	0	564	892	0	0	0	0	0	276	1196	0
Adjustment for Westside Parkway to Webb Bridge Road	0	33	0	33	0	37	128	165	0	97	-81	0
Growth Factor (%):	2	2	2	2	2	2	2	2	2	2	2	2
Additional Trips due to Offices At Prospect Park DRI	0	92	16	108	163	216	110	489	0	37	62	0
Adjustments for Kimball Bridge Rd to Northwinds Pkwy E	0	80	15	95	163	193	110	466	0	37	62	0
Additional Trips due to Prospect Park	0	285	29	314	44	416	78	538	0	78	216	0
Base Condition:	348	412	746	1507	207	671	324	1202	18	218	1363	119
Base Condition: (for Scenario 2)	348	400	643	1391	207	648	324	1179	18	218	1363	119
Total New Trips - Scenario 1	0	0	15	15	18	0	0	18	0	0	40	0
Total New Trips - Scenario 2	30	0	18	48	18	0	0	18	0	0	36	4
Future Traffic Volumes - Scenario 1	348	412	761	1522	225	671	324	1220	18	218	1403	119
Future Traffic Volumes - Scenario 2	378	400	661	1439	225	648	324	1197	18	218	1399	123

07-004 Parkway 400 DRI
Traffic Volumes
Future Conditions

A&R Engineering
February-07

Kimball Bridge Road at Northwinds Parkway
A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	5	1	125	131	1	0	2	3	0	254	76	330
Existing diverted for Kimball Bridge Rd to Northwinds Pkwy	5	1	125	131	78	0	2	80	0	178	76	254
Adjustment for Westside Parkway to Webb Bridge Road	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	2	2	2	2	2	2	2	2	2	2	2	2
Additional Trips due to Offices At Prospect Park DRI	0	0	0	0	0	0	0	0	0	12	0	12
Adjustments for Kimball Bridge Rd to Northwinds Pkwy E	0	0	0	0	7	0	0	7	0	5	0	5
Additional Trips due to Prospect Park	0	0	0	0	0	0	0	0	0	11	0	11
Base Condition:	5	1	133	139	1	0	2	3	0	293	81	373
Base Condition: (for Scenario 2)	5	1	133	139	89	0	2	92	0	204	81	285
Total New Trips - Scenario 1	72	0	0	72	0	0	0	0	0	5	10	15
Total New Trips - Scenario 2	7	65	0	72	5	10	3	18	0	0	0	0
Future Traffic Volumes - Scenario 1	77	1	133	211	1	0	2	3	0	298	91	388
Future Traffic Volumes - Scenario 2	12	66	133	211	94	10	5	110	0	204	81	285

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	86	0	223	309	1	1	2	4	1	243	37	281
Existing diverted for Kimball Bridge Rd to Northwinds Pkwy	86	0	223	309	40	1	2	43	1	204	37	242
Adjustment for Westside Parkway to Webb Bridge Road	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	2	2	2	2	2	2	2	2	2	2	2	2
Additional Trips due to Offices At Prospect Park DRI	0	0	0	0	0	0	0	0	0	65	0	65
Adjustments for Kimball Bridge Rd to Northwinds Pkwy E	0	0	0	0	39	0	0	39	0	26	0	26
Additional Trips due to Prospect Park	0	0	0	0	0	0	0	0	0	46	0	46
Base Condition:	91	0	237	328	1	1	2	4	1	369	39	409
Base Condition: (for Scenario 2)	91	0	237	328	81	1	2	84	1	289	39	329
Total New Trips - Scenario 1	18	0	0	18	0	0	0	0	0	34	68	102
Total New Trips - Scenario 2	2	16	0	18	34	68	22	124	0	0	0	0
Future Traffic Volumes - Scenario 1	109	0	237	346	1	1	2	4	1	403	107	511
Future Traffic Volumes - Scenario 2	93	16	237	346	115	69	24	208	1	289	39	329

07-004 Parkway 400 DRI
Traffic Volumes
Future Conditions

A&R Engineering
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Kimball Bridge Road at 400 Parkway Driveway
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	21	0	22	43	58	303	0	361
Existing diverted for Kimball Bridge Rd to Northwinds Pl	0	0	0	0	21	0	22	43	58	227	0	285
Adjustment for Westside Parkway to Webb Bridge Road	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	2	2	2		2	2	2		2	2	2	
Additional Trips due to Offices At Prospect Park DRI	0	0	0	0	0	0	0	0	0	12	0	12
Adjustments for Kimball Bridge Rd to Northwinds Pky E	0	0	0	0	0	0	0	0	0	5	0	5
Additional Trips due to Prospect Park	0	0	0	0	0	0	0	0	0	11	0	11
Base Condition:	0	0	0	0	22	0	23	46	62	345	0	406
Base Condition: (for Scenario 2)	0	0	0	0	22	0	23	46	62	256	0	318
Total New Trips - Scenario 1	0	0	0	0	15	0	2	17	14	0	0	14
Total New Trips - Scenario 2	0	0	0	0	0	0	2	2	16	0	0	16
Future Traffic Volumes - Scenario 1	0	0	0	0	37	0	25	63	76	345	0	420
Future Traffic Volumes - Scenario 2	0	0	0	0	22	0	25	48	78	256	0	334

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	32	0	33	65	22	206	0	228
Existing diverted for Kimball Bridge Rd to Northwinds Pl	0	0	0	0	32	0	33	65	22	167	0	189
Adjustment for Westside Parkway to Webb Bridge Road	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	2	2	2		2	2	2		2	2	2	
Additional Trips due to Offices At Prospect Park DRI	0	0	0	0	0	0	0	0	0	65	0	65
Adjustments for Kimball Bridge Rd to Northwinds Pky E	0	0	0	0	0	0	0	0	0	26	0	26
Additional Trips due to Prospect Park	0	0	0	0	0	0	0	0	0	46	0	46
Base Condition:	0	0	0	0	34	0	35	69	23	330	0	353
Base Condition: (for Scenario 2)	0	0	0	0	34	0	35	69	23	250	0	273
Total New Trips - Scenario 1	0	0	0	0	102	0	14	116	4	0	0	4
Total New Trips - Scenario 2	0	0	0	0	0	0	15	15	4	0	0	4
Future Traffic Volumes - Scenario 1	0	0	0	0	136	0	49	185	27	330	0	357
Future Traffic Volumes - Scenario 2	0	0	0	0	34	0	50	84	27	250	0	277

07-004 Parkway 400 DRI
Traffic Volumes
Future Conditions

A&R Engineering
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Kimball Bridge Road at Westside Parkway
A.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	6	224	87	317	255	607	2	864	1	2	3	6
Existing diverted for Kimball Bridge Rd to Northwinds Pkwy	6	224	87	317	179	607	2	788	1	2	3	6
Adjustment for Westside Parkway to Webb Bridge Road	0	40	0	40	0	69	0	69	0	0	0	0
Growth Factor (%):	2	2	2	2	2	2	2	2	2	2	2	2
Additional Trips due to Offices At Prospect Park DRI	0	251	0	251	12	50	0	62	0	0	0	0
Adjustments for Kimball Bridge Rd to Northwinds Pkwy	0	251	0	251	5	50	0	55	0	0	0	0
Additional Trips due to Prospect Park	0	172	0	172	11	94	0	105	0	0	0	0
Base Condition:	6	703	92	802	294	861	2	1157	1	2	3	6
Base Condition: (for Scenario 2)	6	703	92	802	205	861	2	1069	1	2	3	6
Total New Trips - Scenario 1	0	58	14	72	0	8	0	8	0	0	0	0
Total New Trips - Scenario 2	0	72	0	72	16	9	0	25	0	0	0	0
Future Traffic Volumes - Scenario 1	6	761	106	874	294	869	2	1165	1	2	3	6
Future Traffic Volumes - Scenario 2	6	775	92	874	221	870	2	1094	1	2	3	6

P.M. Peak Hour

Condition	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	7	819	67	893	129	311	7	447	22	6	8	36
Existing diverted for Kimball Bridge Rd to Northwinds Pkwy	7	819	67	893	90	311	7	408	22	6	8	36
Adjustment for Westside Parkway to Webb Bridge Road	0	33	0	33	0	37	0	37	0	0	0	0
Growth Factor (%):	2	2	2	2	2	2	2	2	2	2	2	2
Additional Trips due to Offices At Prospect Park DRI	0	87	0	87	65	263	0	328	0	0	0	0
Adjustments for Kimball Bridge Rd to Northwinds Pkwy	0	87	0	87	26	263	0	289	0	0	0	0
Additional Trips due to Prospect Park	0	265	0	265	46	414	0	460	0	0	0	0
Base Condition:	7	1256	71	1335	248	1046	7	1302	23	6	8	38
Base Condition: (for Scenario 2)	7	1256	71	1335	168	1046	7	1222	23	6	8	38
Total New Trips - Scenario 1	0	15	4	19	0	54	0	54	0	0	0	0
Total New Trips - Scenario 2	0	18	0	18	4	61	0	65	0	0	0	0
Future Traffic Volumes - Scenario 1	7	1271	75	1354	248	1100	7	1356	23	6	8	38
Future Traffic Volumes - Scenario 2	7	1274	71	1353	172	1107	7	1287	23	6	8	38

07-004 Parkway 400 DRI
Traffic Volumes
Future Conditions

A&R Engineering
February-07

Northwinds Parkway Extension at Main Site Driveway

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
Existing diverted for Kimball Bridge Rd to Northwinds Pl	0	33	0	33	0	77	0	77	0	0	0	0
Adjustment for Westside Parkway to Webb Bridge Road	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	2	2	2		2	2	2		2	2	2	
Additional Trips due to Offices At Prospect Park DRI	0	0	0	0	0	0	0	0	0	0	0	0
Adjustments for Kimball Bridge Rd to Northwinds Pky E	0	37	0	37	0	7	0	7	0	0	0	0
Additional Trips due to Prospect Park	0	0	0	0	0	0	0	0	0	0	0	0
Base Condition:	0	0	0	0	0	0	0	0	0	0	0	0
Base Condition: (for Scenario 2)	0	72	0	72	0	88	0	88	0	0	0	0
Total New Trips - Scenario 1	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - Scenario 2	98	0	0	98	0	128	123	251	38	0	5	43
Future Traffic Volumes - Scenario 1	0	0	0	0	0	0	0	0	0	0	0	0
Future Traffic Volumes - Scenario 2	98	72	0	170	0	216	123	339	38	0	5	43

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
Existing diverted for Kimball Bridge Rd to Northwinds Pl	0	97	0	97	0	39	0	39	0	0	0	0
Adjustment for Westside Parkway to Webb Bridge Road	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	2	2	2		2	2	2		2	2	2	
Additional Trips due to Offices At Prospect Park DRI	0	0	0	0	0	0	0	0	0	0	0	0
Adjustments for Kimball Bridge Rd to Northwinds Pky E	0	13	0	13	0	39	0	39	0	0	0	0
Additional Trips due to Prospect Park	0	0	0	0	0	0	0	0	0	0	0	0
Base Condition:	0	0	0	0	0	0	0	0	0	0	0	0
Base Condition: (for Scenario 2)	0	115	0	115	0	80	0	80	0	0	0	0
Total New Trips - Scenario 1	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - Scenario 2	24	0	0	24	0	62	32	94	251	0	30	281
Future Traffic Volumes - Scenario 1	0	0	0	0	0	0	0	0	0	0	0	0
Future Traffic Volumes - Scenario 2	24	115	0	139	0	142	32	174	251	0	30	281

07-004 Parkway 400 DRI
Traffic Volumes
Future Conditions

A&R Engineering
February-07

Northwinds Parkway Extension at North Right-in/ Right-out Driveway

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
Existing diverted for Kimball Bridge Rd to Northwinds Pl	0	33	0	33	0	77	0	77	0	0	0	0
Adjustment for Westside Parkway to Webb Bridge Road	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	2	2	2		2	2	2		2	2	2	
Additional Trips due to Offices At Prospect Park DRI	0	0	0	0	0	0	0	0	0	0	0	0
Adjustments for Kimball Bridge Rd to Northwinds Pky E	0	37	0	37	0	7	0	7	0	0	0	0
Additional Trips due to Prospect Park	0	0	0	0	0	0	0	0	0	0	0	0
Base Condition:	0	0	0	0	0	0	0	0	0	0	0	0
Base Condition: (for Scenario 2)	0	72	0	72	0	88	0	88	0	0	0	0
Total New Trips - Scenario 1	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - Scenario 2	0	38	0	38	0	247	123	370	0	0	5	5
Future Traffic Volumes - Scenario 1	0	0	0	0	0	0	0	0	0	0	0	0
Future Traffic Volumes - Scenario 2	0	110	0	110	0	335	123	458	0	0	5	5

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
Existing diverted for Kimball Bridge Rd to Northwinds Pl	0	97	0	97	0	39	0	39	0	0	0	0
Adjustment for Westside Parkway to Webb Bridge Road	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	2	2	2		2	2	2		2	2	2	
Additional Trips due to Offices At Prospect Park DRI	0	0	0	0	0	0	0	0	0	0	0	0
Adjustments for Kimball Bridge Rd to Northwinds Pky E	0	13	0	13	0	39	0	39	0	0	0	0
Additional Trips due to Prospect Park	0	0	0	0	0	0	0	0	0	0	0	0
Base Condition:	0	0	0	0	0	0	0	0	0	0	0	0
Base Condition: (for Scenario 2)	0	115	0	115	0	80	0	80	0	0	0	0
Total New Trips - Scenario 1	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - Scenario 2	0	251	0	251	0	62	32	94	0	0	30	30
Future Traffic Volumes - Scenario 1	0	0	0	0	0	0	0	0	0	0	0	0
Future Traffic Volumes - Scenario 2	0	366	0	366	0	142	32	174	0	0	30	30

07-004 Parkway 400 DRI
Traffic Volumes
Future Conditions

A&R Engineering
February-07

Northwinds Parkway Extension at South Right-in / Right-out Driveway

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
Existing diverted for Kimball Bridge Rd to Northwinds Pkwy	0	33	0	33	0	77	0	77	0	0	0	0
Adjustment for Westside Parkway to Webb Bridge Road	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	2	2	2		2	2	2		2	2	2	
Additional Trips due to Offices At Prospect Park DRI	0	0	0	0	0	0	0	0	0	0	0	0
Adjustments for Kimball Bridge Rd to Northwinds Pkwy E	0	37	0	37	0	7	0	7	0	0	0	0
Additional Trips due to Prospect Park	0	0	0	0	0	0	0	0	0	0	0	0
Base Condition:	0	0	0	0	0	0	0	0	0	0	0	0
Base Condition: (for Scenario 2)	0	72	0	72	0	88	0	88	0	0	0	0
Total New Trips - Scenario 1	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - Scenario 2	0	98	0	98	0	9	123	132	0	0	0	0
Future Traffic Volumes - Scenario 1	0	0	0	0	0	0	0	0	0	0	0	0
Future Traffic Volumes - Scenario 2	0	170	0	170	0	97	123	220	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	0	0	0	0	0	0	0	0	0	0	0
Existing diverted for Kimball Bridge Rd to Northwinds Pkwy	0	97	0	97	0	39	0	39	0	0	0	0
Adjustment for Westside Parkway to Webb Bridge Road	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor (%):	2	2	2		2	2	2		2	2	2	
Additional Trips due to Offices At Prospect Park DRI	0	0	0	0	0	0	0	0	0	0	0	0
Adjustments for Kimball Bridge Rd to Northwinds Pkwy E	0	13	0	13	0	39	0	39	0	0	0	0
Additional Trips due to Prospect Park	0	0	0	0	0	0	0	0	0	0	0	0
Base Condition:	0	0	0	0	0	0	0	0	0	0	0	0
Base Condition: (for Scenario 2)	0	115	0	115	0	80	0	80	0	0	0	0
Total New Trips - Scenario 1	0	0	0	0	0	0	0	0	0	0	0	0
Total New Trips - Scenario 2	0	24	0	24	0	61	32	93	0	0	63	63
Future Traffic Volumes - Scenario 1	0	0	0	0	0	0	0	0	0	0	0	0
Future Traffic Volumes - Scenario 2	0	139	0	139	0	141	32	173	0	0	63	63

Planned and Programmed Improvements

Short Title

WESTSIDE PARKWAY: SEGMENT 3 FROM SR 120 (OLD MILTON PARKWAY) TO SOUTH OF CUMMING STREET [SEE ALSO FN-173]

GDOT Project No.

0007530

Federal ID No.

CSHPP-0007-00(530)

Status

Programmed

Detailed Description and Justification

FN-224 is a new roadway capacity project that will provide gap closure along the Westside Parkway corridor and provide a local alternative to SR 400 for short trips in the immediate area.

Service Type

Roadway Capacity

Sponsor

City of Alpharetta

Jurisdiction

Fulton (North)

Existing Thru Lane

0 (applicable for road projects only)

Planned Thru Lane

4 (applicable for road projects only)

Corridor Length

1.7 miles (not applicable for all project types)

Network Year

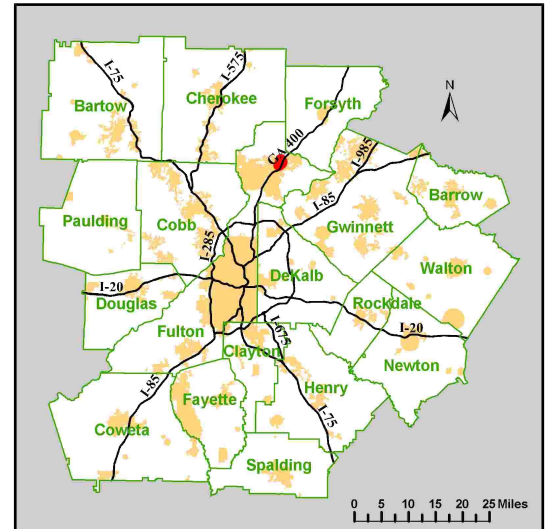
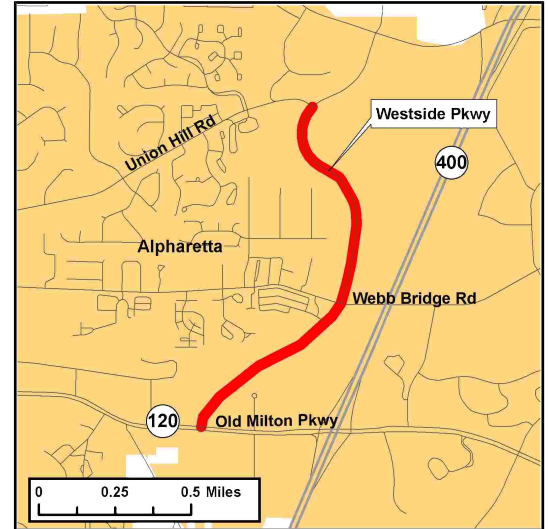
2010 (required if modeled for conformity)

Completion Date

2010

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	2005	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
ROW	Local Jurisdiction/Municipality Funds	2006	\$5,600,000	\$0,000	\$0,000	\$0,000	\$5,600,000
CST	High Priority Projects from TEA-21	2008	\$6,900,000	\$4,800,000	\$0,000	\$0,000	\$2,100,000
				\$4,800,000	\$0,000	\$0,000	\$7,700,000

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 TitleSR 400 HOV LANES FROM I-285 TO MCFARLAND ROAD
IN FORSYTH COUNTY**GDOT Project No.**

0001757

Federal ID No.

MSL-0001-00(757)

Status

Programmed

Detailed Description and Justification

Addition of 1 HOV lane in both directions for 8 miles from I-285 to McFarland Road. 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

Multi-County

Existing Thru Lane

0 (applicable for road projects only)

Planned Thru Lane

2/4 (applicable for road projects only)

Corridor Length

8.1 miles (not applicable for all project types)

Network Year

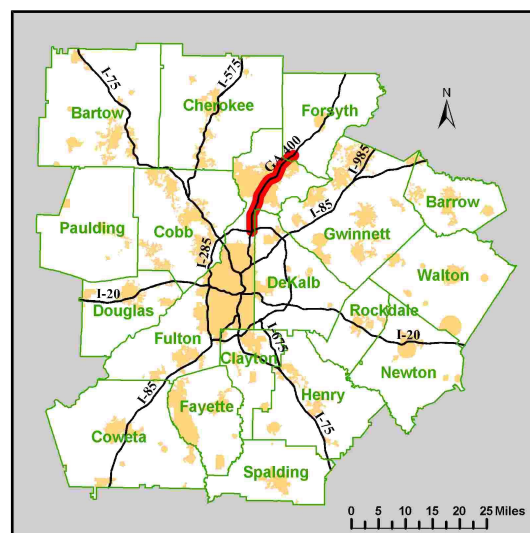
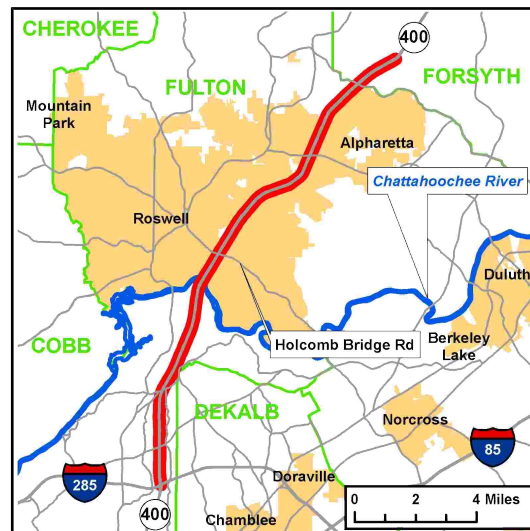
2015 (required if modeled for conformity)

Completion Date

2015

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	2005	\$0,000	\$0,000	\$0,000	\$0,000	\$0,000
PE	Interstate Maintenance	2007	\$11,619,000	\$10,457,100	\$1,161,900	\$0,000	\$0,000
PE	High Priority Projects from TEA-21	2007	\$1,000,000	\$800,000	\$200,000	\$0,000	\$0,000
ROW	GRV BONDS (GARVEE Bond Program)	2009	\$30,000,000	\$0,000	\$0,000	\$30,000,000	\$0,000
CST	National Highway System	LR 2012-2020	\$205,000,000	\$164,000,000	\$41,000,000	\$0,000	\$0,000
				\$175,257,100	\$42,361,900	\$30,000,000	\$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 400 AT SR 120 (OLD MILTON PARKWAY)

GDOT Project No.

0006058

Federal ID No.

CSNHS-0006-00(058)

Status

Programmed

Detailed Description and Justification

This project is the improvement of the interchange of SR 400 and SR 120/Old Milton Parkway. The project will be .40 miles in length.

Service Type

Interchange Capacity

Sponsor

GDOT

Jurisdiction

Fulton (North)

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

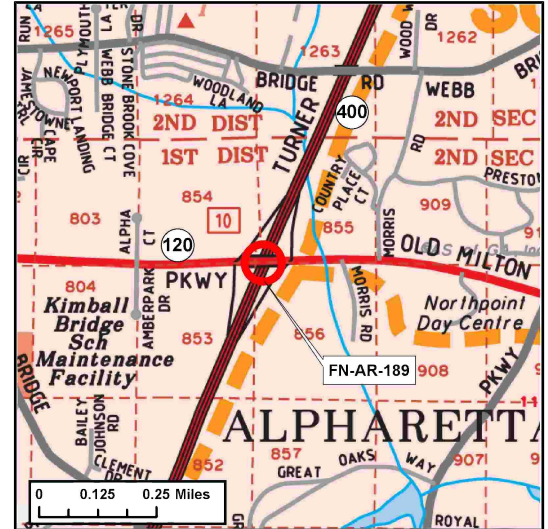
2020 (required if modeled for conformity)

Completion Date

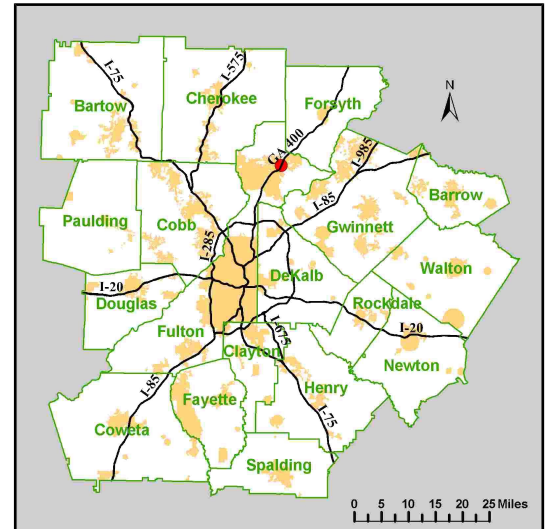
2020

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	High Priority Projects from TEA-21	2007	\$250,000	\$200,000	\$50,000	\$0,000	\$0,000
ROW	National Highway System	LR 2012-2020	\$750,000	\$600,000	\$150,000	\$0,000	\$0,000
CST	National Highway System	LR 2012-2020	\$12,400,000	\$9,920,000	\$2,480,000	\$0,000	\$0,000
				\$10,720,000	\$2,680,000	\$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.



Marta Information



Metropolitan Atlanta Rapid Transit Authority

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PRESS CENTER

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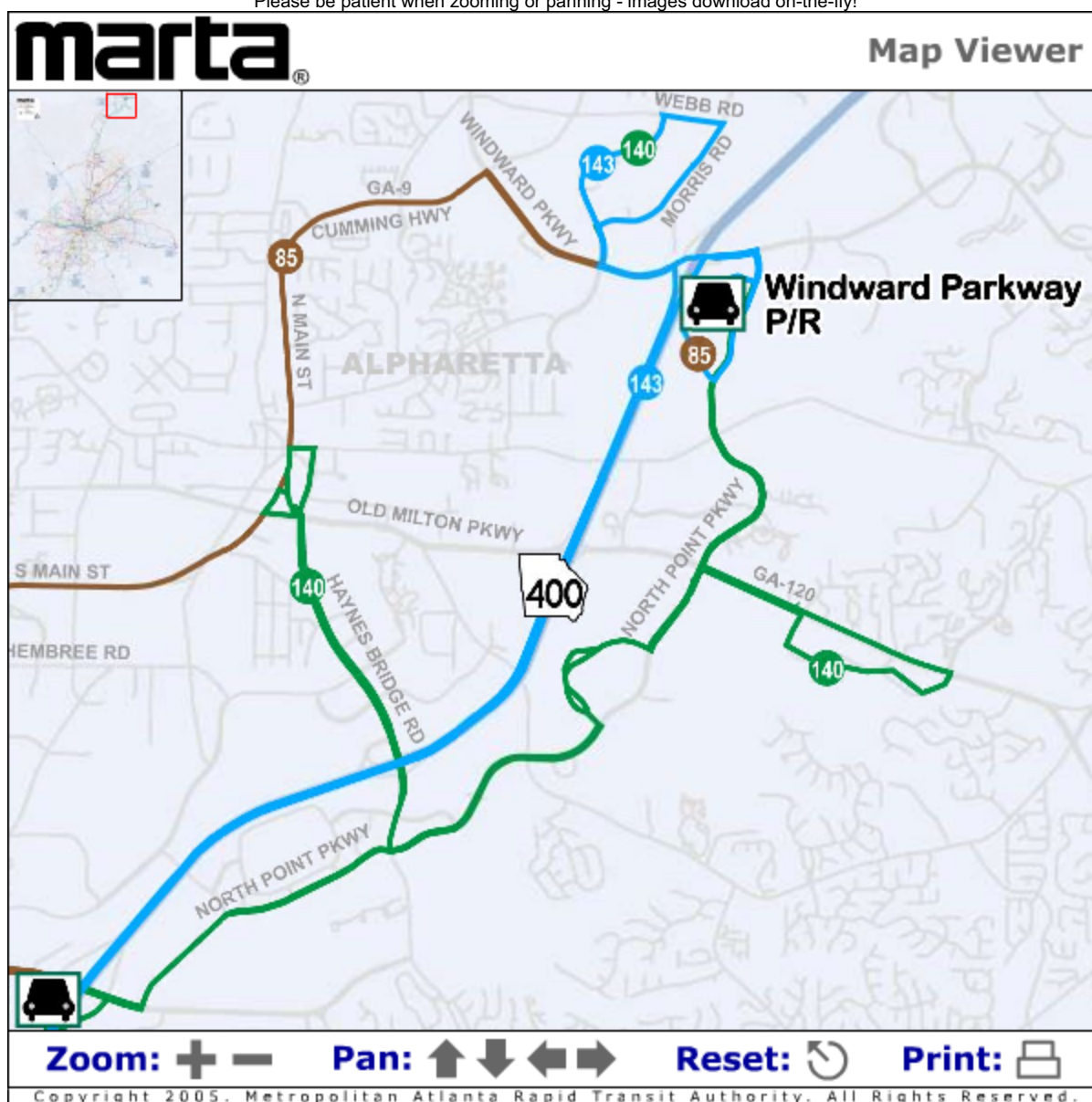
CONTACT

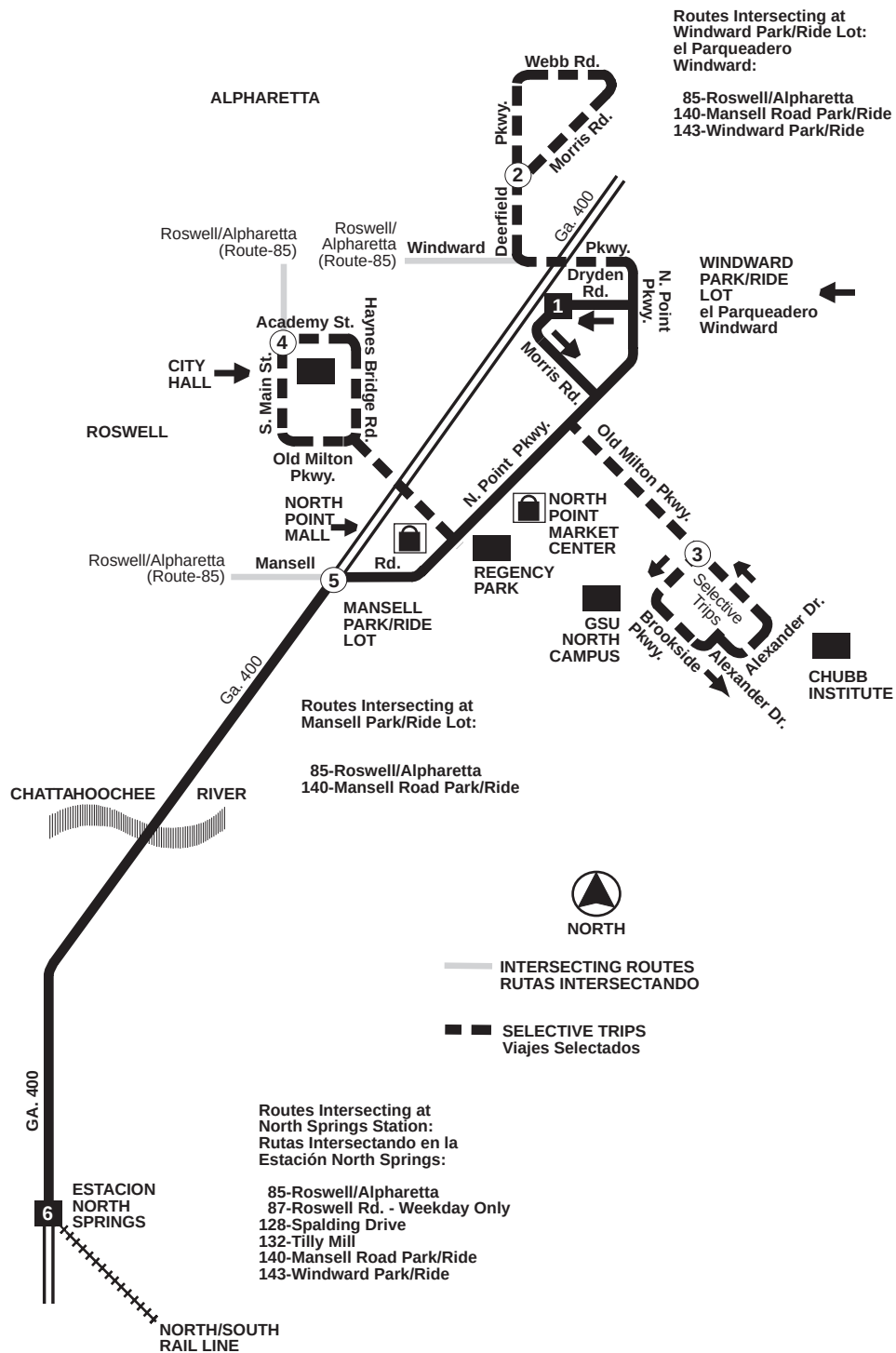
Map Viewer

Map Viewer

- [How To Use This Map](#)
- [Other Helpful Maps](#)

Please be patient when zooming or panning - images download on-the-fly!

The use of this Map Viewer requires [Macromedia Flash Player version 7 or later](#).





Route 140 - Mansell Road Park / Ride - Description

Effective July 23, 2005

[Return to Route 140 home page](#)

Void links have been placed on all headings in this description, use the tab key to navigate between sections.

140 TO WINDWARD PK/RD LOT VIA GA. STATE UNIV.

1. Continue onto ramp to Ga. 400 N/B
2. Right onto Exit 8 - Mansell Rd.
3. Left onto Mansell Rd. at light.
4. Directly under Ga.400 overpass
5. Move into extreme left lane.
6. Look for extra left turn
7. indent in median.
8. Park & Ride to the left.
9. Left onto into Mansell P&R(local side)
10. Loop through P/R
11. Right onto Mansell Rd.
12. Left onto North Pt. Parkway
13. Left onto Great Oak Way
14. Left onto N.Point Way
15. Right onto Old Milton Pkwy.
16. At light, Right onto Brookside Pkwy
17. At Last Bus Shelter on Right
18. Hand Corner at Radiant
19. System Complex - Take a
20. Right onto Alexander Drive
21. Left onto Old Milton Pkwy.
22. Right onto North Pt. Parkway
23. Left onto Dryden Rd.
24. To Windward Pk/Rd
25. End of Line.

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140 TO MANSELL RD PARK/RIDE VIA GA. 400 NORTHBOUND

1. Ramp To Georgia
2. Hwy. 400 Northbound
3. Continue Georgia 400
4. Right onto Exit 8 - Mansell Rd.
5. Move into extreme left lane.

6. Left onto Mansell Rd. at light.
7. Stay in left lane.
8. Continue onto under 400 overpass.
9. 1st light after overpass
10. Turn left onto entrance to
11. Ga. 400 Southbound.
12. Merge extreme left
13. into bus area adjacent to
14. Pk/Rd lot. Pick up passengers

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140 TO WINDWARD PK/RD LOT VIA MANSELL PARK/RIDE:

1. Continue onto ramp to Ga. 400 N/B
2. Right onto Exit 8 - Mansell Rd.
3. Merge into extreme left lane.
4. Left onto Mansell Rd. at light.
5. Directly under 400 overpass
6. Move into extreme left lane
7. Look for extra turn lane
8. indent in median.
9. Park & Ride to left.
10. Left onto into Mansell P&R(local side)
11. Loop through P/R
12. Right onto Mansell Rd.
13. Left onto North Pt. Pkwy
14. Left onto Great Oaks Pkwy.
15. Left onto North Pt. Pkwy.
16. Left onto Dryden Rd.
17. Continue onto Windward Pk/Rd. Lot
18. End of Line.

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140 TO S.MAIN ST. & ACADEMY ST VIA:MANSELL RD. PARK/RIDE

1. Continue ramp to Ga. 400 NB
2. Right onto Exit 8 - Mansell Rd.
3. Left onto Mansell Rd. at light.
4. Directly under 400 overpass
5. move into extreme left lane.
6. Look for extra left turn
7. indent in median.
8. (Park/Ride to the left).
9. Left onto Into Mansell Park & Ride
10. Continue Driveway
11. Right onto Mansell Rd.
12. Left onto North Point Pkwy.
13. Left onto Haynes Bridge Rd.
14. Left onto Old Milton Pkwy.
15. Right onto S. Main St.
16. Right onto 1St. Street On Right
17. (UNMARKED STREET AT KFC)
18. Left onto Norcross St.

19. After Making Loop In Circle
20. END OF LINE AT PUBLIX

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140 TO NORTH SPRINGS STATION VIA DEERFIELD PKWY & MORRIS RD

1. AND MANSELL PARK/RIDE:
2. Continue onto Dryden Rd.
3. Left onto Morris Rd.
4. Left onto North Pt. Pkwy.
5. Left onto Windward Pkwy.
6. Right onto Deerfield Pkwy.
7. Right onto Webb Rd.
8. Right onto Morris Rd.
9. Continue onto Deerfield Pkwy.
10. Left onto Windward Pkwy.
11. Right onto North Point Pkwy.
12. Right onto Great Oaks Way
13. Right onto North Point Way
14. Right onto Mansell Rd.
15. Move into left lane.
16. Continue onto under Ga. 400 overpass.
17. Stay in left lane.
18. 1st light after overpass
19. Left onto onto entrance to 400 SB.
20. Merge left into bus area
21. adjacent to P/R lot.
22. Pick up passengers.
23. Continue onto Ga. 400 S/B
24. Right onto Exit 5C - North Springs Stn.

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140 TO N. SPRINGS STATION VIA GA. STATE UNIV.

1. Continue onto Dryden Rd.
2. Left onto Morris Rd.
3. Right onto North Pt. Pkwy.
4. Left onto Old Milton Pkwy.
5. At light, Right onto Brookside Pkwy.
6. At Last Bus Shelter on Right
7. Hand Corner at Radiant
8. System Complex - Take a
9. Right onto Alexander Drive
10. Left onto Old Milton Pkwy.
11. Left onto North Pt. Pkwy.
12. Right onto Great Oaks Way
13. Right onto N.Point Pkwy.
14. Right onto Mansell Rd.
15. Move into left lane.
16. Continue onto under Ga. 400 overpass.
17. 1st light after overpass
18. Left onto entrance Ga. 400 SB
19. Merge extreme left into

20. Bus area.
21. Continue onto Ga. 400 S/B
22. Right onto Exit 5C - North Springs Stn

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140 TO N. SPRINGS STATION VIA GA. 400 SB

1. Continue Georgia 400
2. Southbound
3. Right onto Exit 5C - North Springs Stn

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140 TO N. SPRINGS STATION VIA:MANSELL RD. PARK/RIDE

1. Continue
2. Norcross St.
3. Right onto S. Main St.
4. Right onto Academy St.
5. Right onto Haynes Bridge Rd.
6. Right onto North Point Pkwy.
7. Right onto Mansell Rd.
8. Move into left lane.
9. Continue onto under Ga. 400 overpass
10. 1st light after overpass
11. Left onto entrance to Ga. 400 SB.
12. Merge left into bus area
13. adjacent to P/R lot.
14. Pick up passengers.
15. Continue onto ramp to Ga. 400 SB.
16. Continue onto Ga 400 SB
17. Right onto Exit 5C -N. Springs Station

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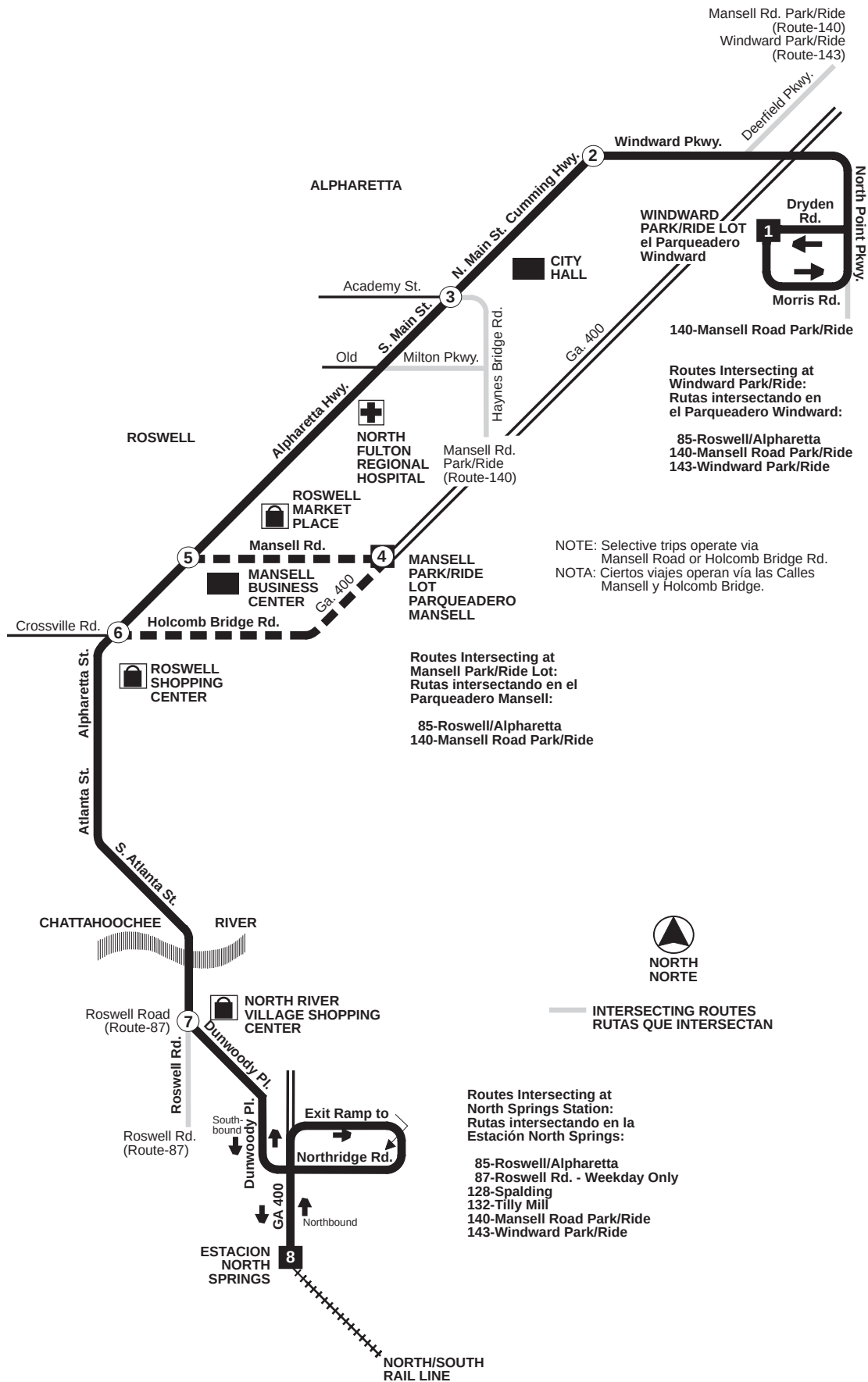
140 TO NORTH SPRINGS STATION VIA MANSELL P/R:

1. Continue onto Dryden Rd.
2. Left onto Morris Rd.
3. Right onto North Pt. Pkwy.
4. Right onto Great Oaks Way
5. Right onto North Point Pkwy.
6. Right onto Mansell Rd.
7. Move into left lane.
8. Continue onto under 400 overpass.
9. Stay in left lane.
10. 1st light after overpass
11. Left onto entrance to Ga. 400 SB.
12. Merge left into bus area
13. adjacent to P/R lot.
14. PICK UP PASSENGERS
15. Cont Ga. 400 S/B
16. Right onto Exit 5C - North Springs Stn.

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Route 85 - Roswell / Alpharetta - Description

Effective July 23, 2005

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Void links have been placed on all headings in this description, use the tab key to navigate between sections.

85 TO MANSELL P & R VIA:HOLCOMB BRIDGE ROAD

1. cont. ramp to Ga. 400 N/B
2. Right onto Exit 6 - Northridge Dr.
3. Right onto Northridge Dr.
4. Right onto Dunwoody Pl.
5. Right onto Roswell Rd.
6. cont. S. Atlanta St.
7. cont. N. Atlanta St.
8. cont. Alpharetta Hwy.
9. Right onto Holcomb Bridge Rd.
10. Left onto onto Ga. 400 Northbound.
11. Right onto Exit 8 - Mansell Rd.
12. Left onto Mansell Rd. at light.
13. Directly under 400 overpass
14. Move into extrme left lane
15. (Park & Ride to left.)
16. 1st light after overpass
17. Take left onto entrance to
18. Ga. 400 Southbound.
19. Merge left into bus area
20. adjacent to P/R lot.
21. Pick up passengers.

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85 TO MANSELL ROAD PARK/RIDE VIA MANSELL ROAD:

1. Ramp To Georgia
2. Hwy. 400 Northbound
3. Continue Georgia 400
4. Right onto Exit 6 - Northridge Dr.
5. Right onto Northridge Dr.
6. Right onto Dunwoody Place
7. Right onto Roswell Rd.
8. Continue onto S. Atlanta St.
9. Continue onto N. Atlanta St.

10. Continue onto Alpharetta Hwy.
11. Right onto Mansell Rd.
12. Take right into entrance to
13. GA 400 Southbound
14. Merge left into bus area
15. Adjacent to Park/Ride lot
16. Pick up passengers

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85 TO WINDWARD P/R LOT VIA:ROSWELL RD/ALPHARETTA HWY

1. & WINDWARD PKWY:
2. cont. ramp to Ga. 400 N/B
3. Right onto Exit 6 - Northridge Dr.
4. Right onto Northridge Dr.
5. Right onto Dunwoody Pl.
6. Right onto Roswell Rd.
7. cont. S. Atlanta St.
8. cont. N. Atlanta St.
9. cont. Alpharetta Hwy.
10. cont. S. Main
11. Continue onto N. Main St.
12. Continue onto State Hwy 9
13. Right onto Windward Pkwy.
14. Right onto North Point Pkwy.
15. Right onto Dryden Rd.
16. Continue onto Windward P/R Lot
17. End of Line.

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85 TO N. SPRINGS STATION VIA HOLCOMB BRIDGE RD.

1. Continue onto Ramp to Ga. 400 SB
2. Right onto Exit 7 - Holcomb Bridge Rd.
3. Right onto Holcomb Bridge Rd.
4. Left onto Alpharetta Hwy.
5. cont. N. Atlanta St.
6. cont. S. Atlanta St.
7. cont. Roswell Rd.
8. Left onto Dunwoody Pl.
9. cont. across Northridge Dr.
10. cont. ramp to Ga. 400 S/B
11. Right onto Exit 5C - North Springs Stn.

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85 TO N. SPRINGS STATION VIA MANSELL ROAD:

1. Right onto Mansell Rd.
2. Be in extreme left lane
3. at the Ga. 400 overpass.
4. 1st light after overpass -

5. Immediate - left.
6. U-turn into bus loop.
7. Do not cont. up ramp to 400.
8. cont. Mansell Rd.
9. Left onto Alpharetta Hwy.
10. cont. N. Atlanta St.
11. cont. S. Atlanta St.
12. cont. Roswell Rd.
13. Left onto Dunwoody Pl.
14. cont.across Northridge Dr.
15. cont ramp to Ga. 400 S/B
16. Right onto Exit 5C - North Springs Stn.

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85 TO NORTH SPRINGS STATION VIA WINDWARD PKWY &

1. ALPHARETTA HWY & ROSWELL RD
2. Continue onto Dryden Rd.
3. Left onto Morris Rd.
4. Left onto North Point Pkwy.
5. Left onto Windward Pkwy.
6. Left onto State Hwy 9.
7. Continue onto N.Main St.
8. Continue onto S. Main St.
9. Continue onto Alpharetta Hwy.
10. Continue onto N. Atlanta St.
11. Continue onto S. Atlanta St.
12. Continue onto Roswell Rd.
13. Left onto Dunwoody Pl.
14. Continue onto across Northridge
15. Continue onto Ramp to Ga-400 S/B
16. Right onto Exit 5C - North Springs Stn.

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Proposed Facility Site Plan