

Traffic Impact Study

Proposed US 78 at Rosebud Road Multi-Use Development
City of Snellville, Georgia

March 27, 2023

MARC R. ACAMPORA, PE, LLC
TRAFFIC ENGINEERING



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study prepared for:

TPA Residential
1776 Peachtree Street, NW
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Introduction

This study assesses the traffic impact of a proposed multi-use development in the City of Snellville, Georgia. The site is located in the southwest quadrant of the intersection of US 78 and Rosebud Road, as shown in Figure 1. The site will be developed with 57,000 square feet of retail village, 300 multi-family residential units, and 25 residential townhomes. The project will have two accesses on US 78 and two accesses on Rosebud Road.

The purpose of this traffic impact study is to determine existing traffic operating conditions in the vicinity of the proposed development, project future traffic volumes, assess the impact of the subject development, then develop conclusions and recommendations to mitigate the project traffic impact and ensure safe and efficient existing and future traffic conditions in the vicinity of the project.



Figure 1 – Site Location Map

Existing Traffic Conditions

Existing traffic operating conditions in the vicinity of the proposed multi-use development were assessed. The following is a description of existing transportation facilities, traffic volumes, and intersection operations.

Description of Existing Roadways

US 78 an urban principal arterial (Georgia DOT designation) that provides east-west mobility. There are two through lanes in each direction and a center two way left turn lane (TWLTL). The terrain is gently rolling-to-rolling with a modest uphill grade west-to-east along the project frontage. The posted speed limit is 55 mph in this vicinity. There are exclusive left and right turn lanes at most major intersections and, near the site, the intersections of US 78 at Cooper Road and at Rosebud Road are signalized. In 2021 the Georgia DOT recorded an Annual Average Daily Traffic (AADT) volume of 38,400 vehicles per day (vpd) with 2% trucks on US 78 west of Brooks Drive (to the west of the site).

Rosebud Road is a two lane minor arterial (Gwinnett County designation) that begins to the north at Grayson Highway, intersects US 78, passes the subject site, then continues to the south to GA 20 where it changes name to Miller Bottom Road and continues south. The terrain is level to very gently rolling near the site the posted speed limit is 45 mph. In 2021 the Georgia DOT recorded an AADT volume of 13,100 vpd with 4% trucks on Rosebud Road south of Brushy Fork Road.

Pedestrian, Bicycle, and Transit Accessibility

There is no sidewalk along either project frontage. There is a short segment of sidewalk along the north side of US 78 across from the site and a short segment of sidewalk along the east side of Rosebud Road across from the site. The signalized intersection of US 78 at Rosebud Road has crosswalks and pedestrian signals on three approaches while the signalized intersection of US 78 at Cooper Road has crosswalks and pedestrian signals on all four approaches. There are no dedicated bicycle lanes in the vicinity of the site. There is no regularly scheduled mass transit service in the vicinity of the site.

Existing Traffic Volumes

Existing full turning movement peak hour traffic volume counts were collected at the following intersections in the vicinity of the site:

1. US 78 at Cooper Road / Cooper Springs Road
2. US 78 at Midway Station Retail Center Access / future project access
3. US 78 at Rosebud Road
4. Rosebud Road at Kroger Retail Center Access / future project access
5. Rosebud Road at Brushy Fork Road
6. Rosebud Road at Cooper Road

The counts were collected on Wednesday, March 15, 2023, from 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 6:00 p.m. Area schools were in session on the day on which the counts were recorded. The locations of the traffic counts are presented in Figure 2.

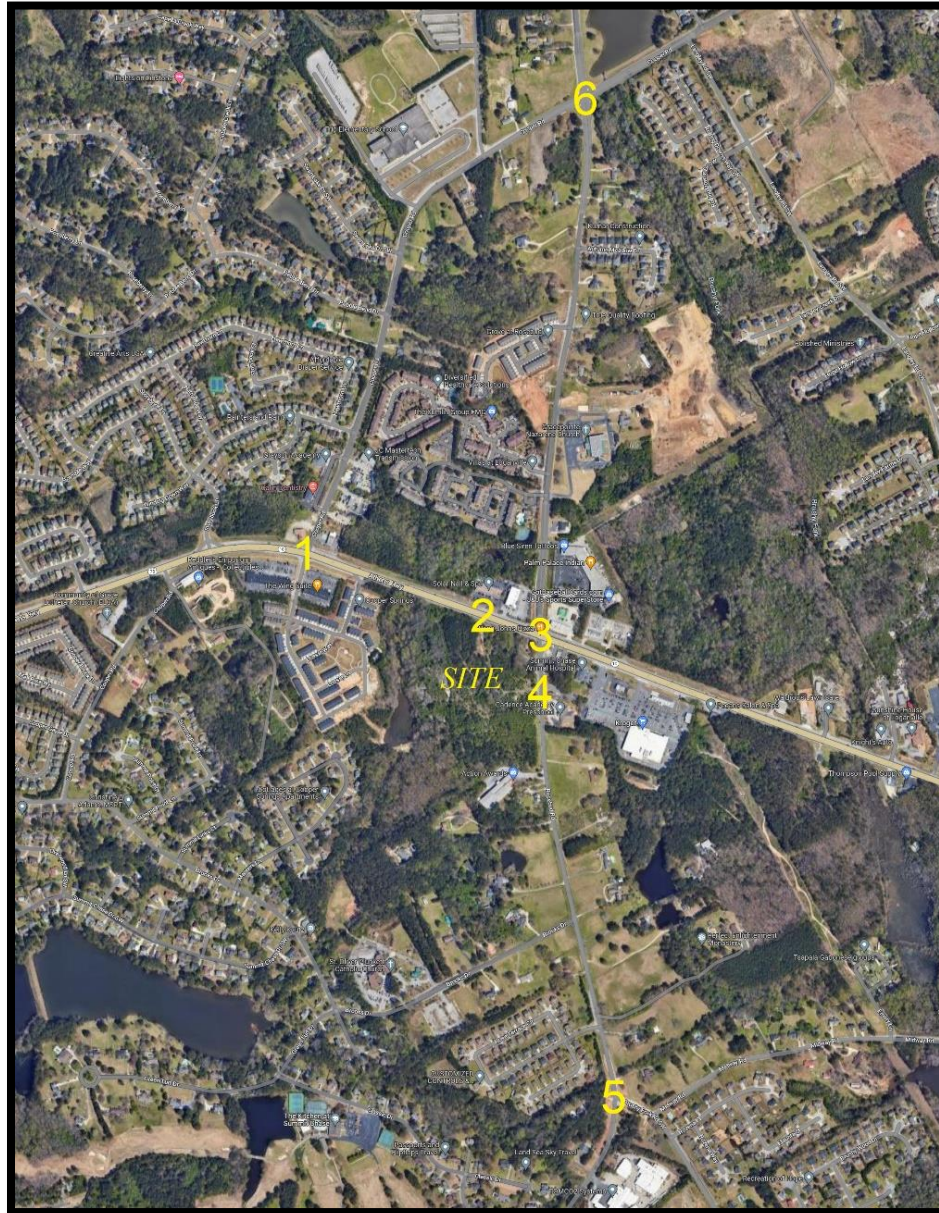


Figure 2 – Traffic Volume Count Locations

From the intersection turning movement count data, the highest four consecutive 15-minute interval volumes at each intersection, during each time period, were determined. These volumes make up the existing weekday a.m. and p.m. peak hour traffic volumes at each intersection and are shown in Figure 3. The raw count data is found in Appendix A.

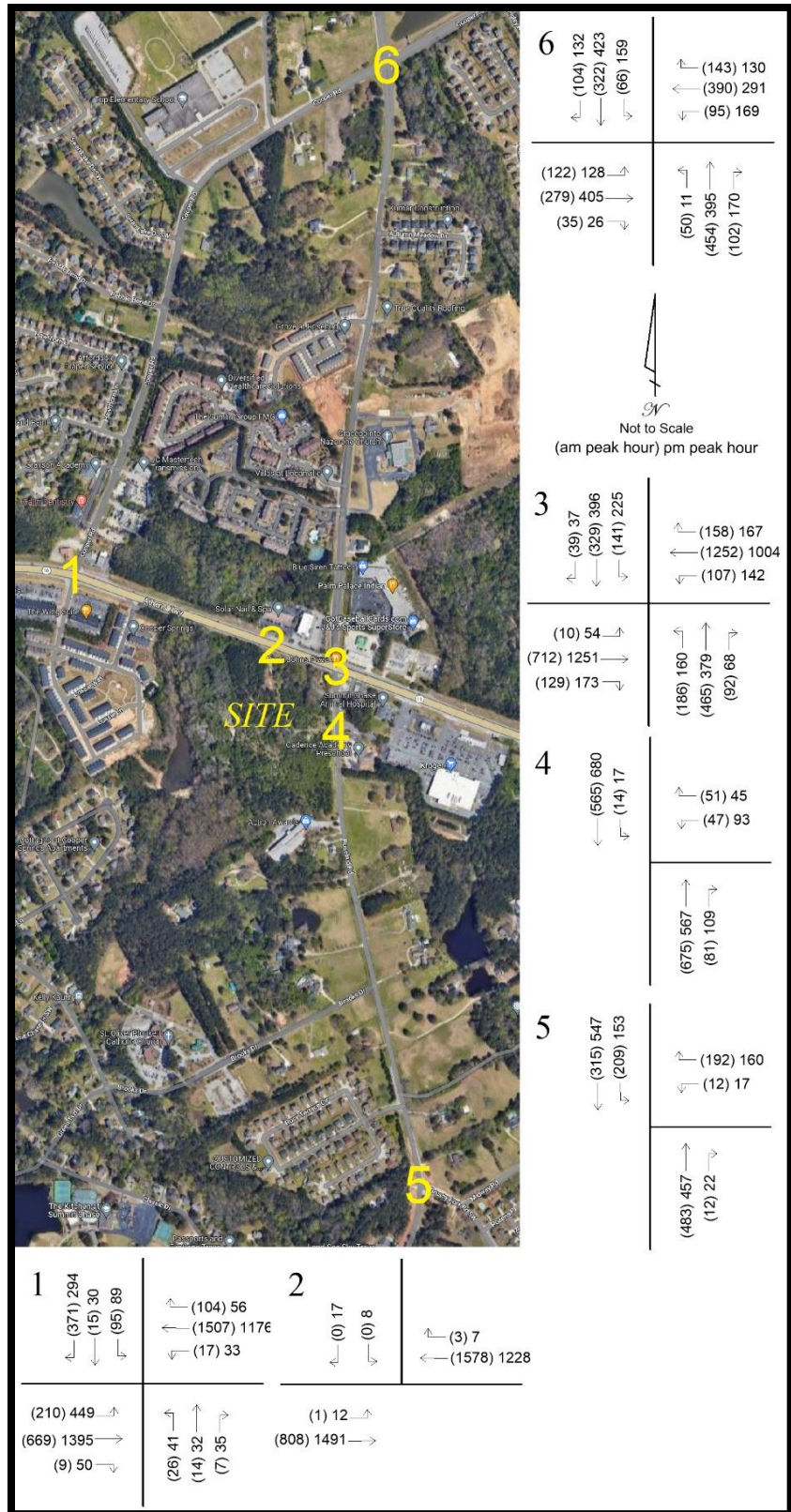


Figure 3 – Existing Weekday A.M. and P.M. Peak Hour Traffic Volumes

Existing Intersection Operations

Existing traffic operations were analyzed at the counted intersections using Synchro software, version 10, in accordance with the methodology presented in the Transportation Research Board's 2016 *Highway Capacity Manual (HCM 6)*. This methodology is presented in Appendix B. The results of the analysis are shown in Table 1. Computer printouts containing detailed results of the existing analysis are located in Appendix C. Levels of service and delays are provided for each overall intersection and for each controlled approach or movement. Locations that operate unacceptably (LOS E or LOS F) are presented in bold type.

Table 1 – Existing Intersection Operations

Intersection / Approach	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay (s/veh)	LOS	Delay (s/veh)
1. US 78 at Cooper Road / Cooper Springs Road (signal)	C	32.5	C	24.5
northbound approach	D	43.3	D	35.2
southbound approach	F	86.0	D	40.7
eastbound approach	B	17.0	C	20.2
westbound approach	C	25.7	C	24.9
2. US 78 at Midway Station Retail Center Access (side street stop)	A	0.0	A	0.6
southbound approach	A	0.0	E	48.6
eastbound left turn	C	15.6	B	11.8
3. US 78 at Rosebud Road (signal)	C	28.7	D	48.2
northbound approach	C	31.6	D	51.9
southbound approach	C	29.2	D	45.9
eastbound approach	C	20.7	E	72.4
westbound approach	C	31.6	B	20.0
4. Rosebud Road at Kroger Retail Center Access (side street stop)	A	2.7	A	7.8
southbound left turn	A	9.4	A	9.1
westbound approach	E	35.5	F	76.4
5. Rosebud Road at Brushy Fork Road (side street stop)	A	6.1	A	4.1
southbound left turn	A	9.6	A	9.1
westbound approach	C	24.4	C	21.9
6. Rosebud Road at Cooper Road (signal)	C	24.5	C	28.1
northbound approach	C	23.4	C	27.4
southbound approach	B	19.3	C	21.6
eastbound approach	C	24.7	D	37.9
westbound approach	C	31.0	C	27.0

The analysis of the existing conditions reveals heavy major street volumes, but generally acceptable traffic operations. There are a few failing locations, as follows:

The southbound approach of Cooper Road at US 78 fails in the a.m. peak. This is due to a very heavy southbound right turn volume turning from Cooper Road (371 vehicles) competing with a very heavy westbound through on US 78 (1,507 vehicles). Changing the southbound lane striping from the current left turn lane and shared through/right to a shared left/through and an exclusive right turn lane would provide additional capacity for the right turn movement, improving the approach level of service from LOS F to LOS E.

The southbound approach exiting the Midway Station retail center fails in the p.m. This is common on side street stop sign controlled approaches at busy thoroughfares such as US 78. Mitigation would require either a change in control to a signal or prohibition of the exiting left turns. Since this is a private driveway with very low exiting volumes, no changes are recommended.

The US 78 / Rosebud intersection operates well overall in both a.m. and p.m. peaks. However, in the p.m., the eastbound approach operates at LOS E due to the very heavy eastbound flows on US 78 in the evening peak (almost 1,500 vehicles). An exclusive right turn lane should be added on the eastbound approach. There is a granite block retaining wall along that frontage which will likely need to be removed. However, the eastbound right turn volume is significant enough (129 vehicles in the a.m. and 173 vehicles in the p.m.) to justify adding this lane. The eastbound left turn should receive protected/permissive signal phasing. Currently the other three approaches have protected/permissive phasing but the eastbound approach, oddly, is permissive only.

The westbound approach exiting the Kroger retail center at Rosebud Road fails in both time periods. This is not unusual on side street stop sign controlled approaches at busy roads such as Rosebud Road. Mitigation would require a change in control to a signal or prohibition of exiting left turns. The volumes do not appear to satisfy any volume-based signal warrants and, therefore, signalization is improbable at this intersection. Prohibition of exiting left turns merits some consideration since those left turns must cross the Rosebud through lanes plus the southern end of the northbound left turn lane on Rosebud Road at US 78. However, prohibiting those exiting left turns would simply shift that demand elsewhere which would most likely mean turning left from the Kroger center onto US 78, then turning left from westbound US 78 to southbound Rosebud Road, to pass the same location. Those additional turn movements and vehicle miles of travel are less desirable than the moderately high delays incurred by the vehicles exiting at the Rosebud access. Therefore, no change is recommended.

The intersections of Rosebud Road at Brushy Fork Road and Rosebud Road at Cooper Road both operate acceptably. No changes are recommended at those intersections in the existing condition.

No-Build Traffic Conditions

A 2028 no-build condition was developed. This represents the traffic conditions that will exist in the future at the anticipated date of the build-out of the multi-use development, but not including the project's trips. The purpose of the analysis of this condition is to isolate the traffic impacts of the proposed development from background growth in volumes that are expected to occur in the area while the project is under construction.

In order to develop no-build volumes, background growth factors were developed using historic Georgia DOT 24-hour traffic counts that were collected in this area for the years 2017 through 2021, as shown in Table 2.

Table 2 – Historic Georgia DOT Traffic Volume Counts and Annual Growth Rates

Year	US 78 W of Brooks	Annual Growth	Rosebud S of Brushy Fork	Annual Growth	Rosebud N of Cooper	Annual Growth
Station ID	135-0058		135-0516		135-0518	
2017	41,700		12,400		14,800	
2018	38,500	-7.7%	12,400	0.0%	15,500	4.7%
2019	38,800	0.8%	12,500	0.8%	15,700	1.3%
2020	35,500	-8.5%	11,500	-8.0%	14,400	-8.3%
2021	38,400	8.2%	13,100	13.9%	15,600	8.3%
<i>avg growth</i>		-1.6%		1.1%		1.1%

Growth in the area has been low-to-moderate. All three count locations experienced a decrease from 2019 to 2020, which is considered an anomaly due to the pandemic. The growth in the subsequent year primarily consisted of a return to pre-pandemic volumes. Based on the growth trends identified in Table 2 and taking the pandemic into consideration, a moderately-low 2.0% annual growth factor was applied to the existing volumes to project the future no-build volumes. The growth factor was applied for five years, for a total of 10.4% growth that will occur while the proposed multi-use development is under construction. The existing traffic volumes were increased by the 10.4% growth factor. The results are the 2028 no-build traffic volumes that will be on the roadway network in the future when the proposed project is completely developed, but excluding the multi-use development's trips.

Programmed and Planned Transportation Infrastructure Improvements

The Georgia DOT projects website and the Atlanta Regional Commission (ARC) Regional Transportation Plan were researched for planned (anticipated) or programmed (funded and scheduled) transportation improvement projects. The following project was identified:

Georgia DOT Project #0007853 – US 78 from Scenic Highway to Walton County Line – This project is listed as a long range reconstruction / rehabilitation project. No additional project information is provided.

No-Build Intersection Operations

The no-build condition includes the no-build traffic volumes and the existing lane configurations and control. These were entered into the Synchro model and the 2028 no-build traffic operations were analyzed at the study intersections using Synchro 10 software in accordance with the HCM 6 methodology. The results of the no-build analysis are shown in Table 3. Computer printouts containing detailed results of the no-build analysis are located in Appendix D. Levels of service and delays are provided for each overall intersection and for each controlled approach or movement. Locations that operate unacceptably (LOS E or LOS F) are presented in bold type.

Table 3 – No-Build Intersection Operations

Intersection / Approach	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay (s/veh)	LOS	Delay (s/veh)
1. US 78 at Cooper Road / Cooper Springs Road (signal)	D	46.8	C	29.9
northbound approach	D	45.2	E	55.9
southbound approach	F	148.3	E	74.3
eastbound approach	C	22.8	C	20.2
westbound approach	C	31.4	C	27.8
2. US 78 at Midway Station Retail Center Access (side street stop)	A	0.0	A	0.9
southbound approach	A	0.0	F	74.3
eastbound left turn	C	17.1	B	12.5
3. US 78 at Rosebud Road (signal)	D	36.6	E	65.3
northbound approach	D	44.7	E	74.4
southbound approach	D	38.0	E	72.5
eastbound approach	C	31.3	F	97.0
westbound approach	D	35.7	C	21.8
4. Rosebud Road at Kroger Retail Center Access (side street stop)	A	3.9	B	14.7
southbound left turn	A	9.7	A	9.3
westbound approach	F	51.5	F	146.1
5. Rosebud Road at Brushy Fork Road (side street stop)	A	7.9	A	5.0
southbound left turn	B	10.1	A	9.3
westbound approach	D	34.1	D	28.8
6. Rosebud Road at Cooper Road (signal)	C	26.8	C	31.1
northbound approach	C	28.6	C	30.6
southbound approach	C	22.0	C	25.5
eastbound approach	C	24.5	D	40.7
westbound approach	C	31.5	C	28.4

The no-build analysis reveals modest deteriorations in operations due to the expected background growth in volumes.

The recommendation to change the striping on southbound Cooper Road at US 78 to a shared left/through and separate right turn lane is still appropriate, but additional capacity is needed for that right turn movement. A southbound right turn overlap phase should be added to the signal. This would provide a green arrow for the southbound right turners concurrent with the protected eastbound left turn phase.

As with the existing analysis, no change is recommended at the US 78 / Midway Station access.

The entire US 78 / Rosebud Road intersection will begin to fail by the no-build p.m. The eastbound exclusive right turn lane and left turn protected/permissive phasing recommended in the existing analysis will continue to be necessary and will allow for generally acceptable operations.

The side street approach exiting the Kroger retail center will continue to fail, with higher delays, in the no-build condition. The volumes may just begin to satisfy a warrant for signalization, but the case for signalization will still be weak.

The intersections of Rosebud Road at Brushy Fork Road and Rosebud Road at Cooper Road both will continue to operate acceptably. Therefore, no changes are recommended at those intersections in the no-build condition.

Project Traffic Characteristics

This section describes the anticipated traffic characteristics of the proposed multi-use development, including a site description, how much traffic the project will generate, and where that traffic will travel.

Project Description

The site will be developed with 57,000 square feet of retail village, 300 multi-family residential units, and 25 residential townhomes. The project will have two accesses on US 78, the eastern of which will align with the Midway Station retail access on the north side of US 78, and two accesses on Rosebud Road, the northern of which will align with the access to the Kroger retail center on the east side of Rosebud Road. The site plan is presented in Figure 4.



Figure 4 – Site Plan for Proposed Multi-Use Development

Trip Generation

Trip generation is an estimate of the number of entering and exiting vehicular trips that will be generated by the proposed development. The volume of traffic that will be generated by the multi-use development was calculated using the equations in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th Edition (the current edition). ITE Land Use 215 – Single-Family Attached Housing was chosen for the townhomes and ITE Land Use 221 – Multifamily Housing (Mid-Rise) was chosen as representative of the multi-family use. ITE Land Use 821 – Shopping Plaza (40-150 kft²) was chosen for the retail.

An adjustment was made to the retail trips to account for the effect of pass-by trips. Pass-by trips are trips that are already driving by the property but will be intercepted by the retail in this project. These trips are new to the project driveways, but do not represent new trips to the adjacent roadways, since they are currently occurring and are, therefore, included in the existing traffic volume counts. The ITE *Trip Generation Handbook*, 3rd Edition provides data and average rates for the pass-by percentages for Land Use 820 – Shopping Center, which is the most similar land use to the retail use chosen for this study, for which pass-by data is available. This use has an average p.m. peak hour pass-by percentage of 34%. Therefore, a 34% adjustment was applied to the p.m. peak hour trips, while a 24% reduction was applied to the a.m. and 24-hour trips.

Often, a multi-use adjustment is also applied to account for the interaction between the land uses within a multi-use development. The multi-use adjustment is calculated based on the methodology proscribed in the ITE *Trip Generation Handbook*, 3rd Edition, which reflects the methodology set forth in *NCHRP Report 684*. This methodology is used to calculate how many trips will occur between compatible land uses within the development. For example, some of the residential trips that are included in the raw trip generation calculations are trips that will travel to and from retail shopping. Since the project includes retail shopping, some of these trips will be accommodated within the property and will not be new external trips to and from the site. Therefore, these internal trips are typically subtracted from the raw project trip generation. However, the analysis revealed very low trips between the uses, in the low single digits. Therefore, to be slightly conservative, no multi-use adjustment was applied.

The trip generation for the project is presented in Table 4.

Table 4 – US 78 at Rosebud Multi-Use Development Trip Generation

Land Use	ITE Code	Size	A.M. Peak Hour			P.M. Peak Hour			24-Hour
			In	Out	Total	In	Out	Total	2-Way
Townhomes	215	25 homes	2	5	7	7	4	11	140
Multi-Family	221	300 units	28	92	120	72	45	117	1,386
<i>Residential Subtotal</i>		325 units	30	97	127	79	49	128	1,526
Retail Village	821	57,000 ft ²	125	76	201	267	289	556	5,800
-pass-by trips		24/34/24%	-30	-18	-48	-90	-98	-188	-1,392
<i>Retail New Trips</i>			95	58	153	177	191	368	4,408
<i>Project Total New Trips</i>			125	155	280	256	240	496	5,934

The proposed multi-use development will generate 280 new a.m. peak hour new trips, 496 new p.m. peak hour new trips, and 5,934 new weekday new trips.

Trip Distribution and Assignment

The trip distribution percentages indicate what proportion of the project's trips will travel to and from various directions. Two distributions were developed, one for the residential uses and one for the new retail trips. The trip distribution percentages for the residential uses were developed based on the locations and proximity of likely trip origins and destinations including regional employment centers, retail and offices in the area, nearby schools, other regional trip attractors, and the major routes of travel in the area. The new retail trips were distributed based on population densities in the area. The retail pass-by trips were assigned based on the existing traffic flows passing the site. The project trips, shown in Table 4, were assigned to the roadway network based on the distribution percentages. The trip distribution percentages and the a.m. and p.m. peak hour trips expected to be generated by the proposed multi-use development are shown in Figure 5. Appendix A contains traffic volume worksheets that show the trips for each land use, at each intersection.

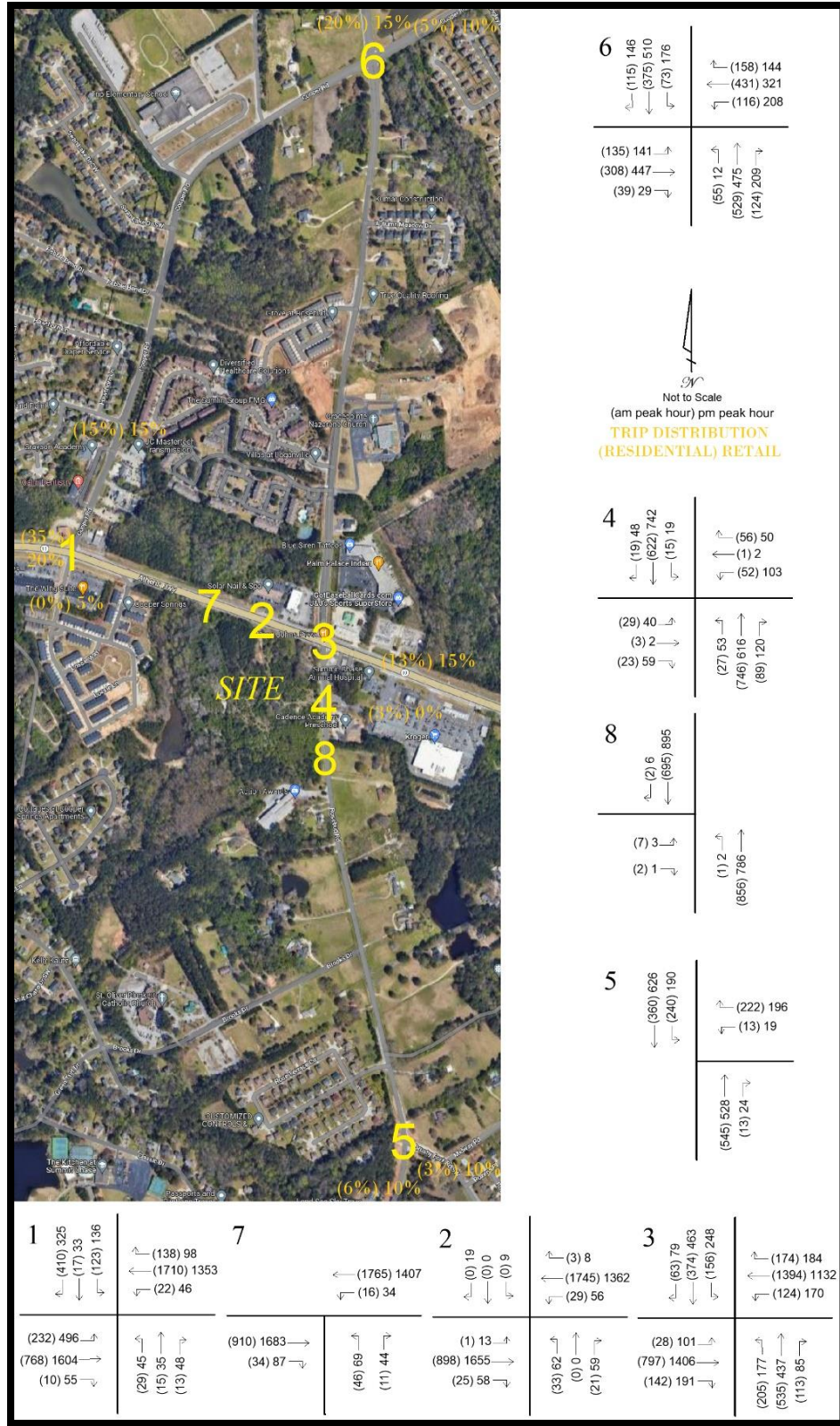


Figure 5 – Weekday A.M. and P.M. Peak Hour Project Trips and Distribution Percentages

Future Traffic Conditions

The future volumes consist of the no-build volumes plus the trips that will be generated by the proposed subdivision. The future volumes are shown in Figure 6.

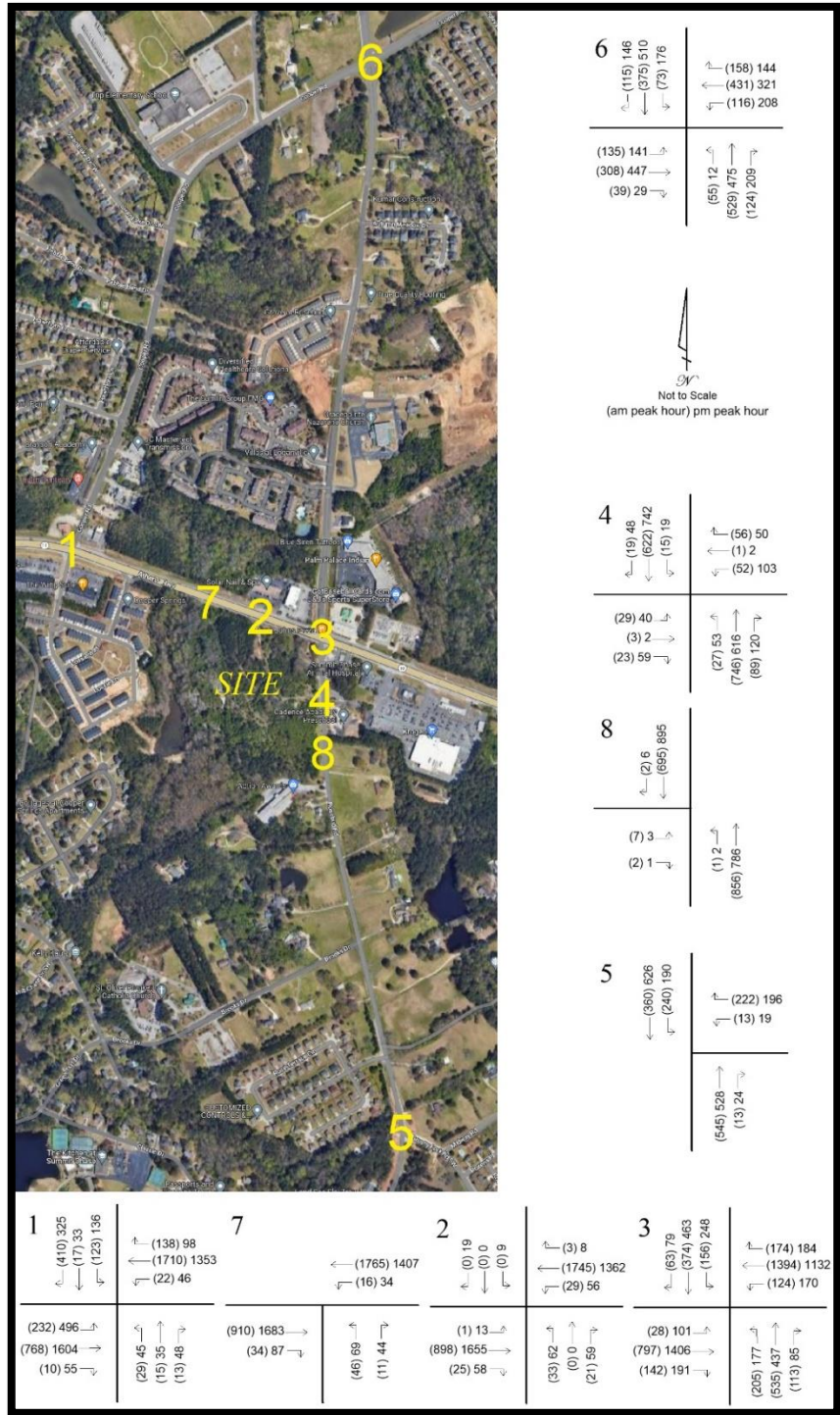


Figure 6 – Future Weekday A.M. and P.M. Peak Hour Volumes

Auxiliary Lane Requirements at Project Accesses

Two sets of standards were evaluated to determine the left and right turn lane requirements at each project access – the Georgia DOT standards for the accesses on US 78 and Gwinnett County standards for the accesses on Rosebud Road.

US 78 Accesses

US 78 falls under the jurisdiction of the Georgia DOT. There is a center two-way left turn lane (TWLTL) on US 78 along the property frontage which will serve as the westbound left turn lane for each project access. In order to determine if an eastbound right turn lane is required at each project access on US 78, the Georgia DOT standards for determining the need for these auxiliary lanes, as set forth in their *Regulations for Driveway and Encroachment Control (Driveway Manual)*, revision 5.3 dated 11/1/2021, were reviewed. The right turn lane analysis was based on *Driveway Manual* Table 4-6, Minimum Volumes Requiring Right Turn Lanes, which is shown below as Table 5.

Table 5 – Georgia DOT Right Turn Lane Standards

Posted Speed	2 Lane Routes		More than 2 Lanes on Main Road	
	AADT		AADT	
	< 6,000	>=6,000	<10,000	>=10,000
35 MPH or Less	200 RTV a day	100 RTV a day	200 RTV a day	100 RTV a day
40 to 50 MPH	150 RTV a day	75 RTV a day	150 RTV a day	75 RTV a day
55 to 60 MPH	100 RTV a day	50 RTV a day	100 RTV a day	50 RTV a day
>= 65 MPH	Always	Always	Always	Always

Table 4-6 Minimum Volumes Requiring Right Turn Lanes

The AADT on US 78 was 38,400 vpd in 2021, which is significantly above the 10,000 vpd threshold for a road with more than two lanes. For a 55 mph speed limit, above 10,000 vpd, the right turn volume (RTV) above which a right turn lane is required is 50 right turn vehicles (RTV) per day. The daily eastbound right turn volume at the project west access on US 78 is calculated at 868 RTV. At the east access, the eastbound RTV is calculated at 603 RTV. Both volumes are substantially higher than the 50 RTV threshold and, therefore, an eastbound right turn lane is required on US 78 at both project accesses.

Rosebud Road Accesses

Rosebud Road falls under the jurisdiction of Gwinnett County and, therefore, auxiliary turn lane standards were evaluated for the project accesses on Rosebud Road according to Gwinnett County requirements. The Gwinnett County *Unified Development Ordinance (UDO)*, section 900-30.2 B states that a deceleration lane shall be required at each project driveway or subdivision street entrance that is provided access to a Minor Collector or Major Thoroughfare. Rosebud Road is classified as a minor arterial and, therefore, a deceleration lane is required at each accesses. Consideration should be given to waiving the right turn lane requirement for the south access due to very low projected right turn volumes (two (2) vehicles in the a.m. peak hour and six (6) vehicles in the p.m. peak hour).

For the northbound direction on Rosebud Road, the Gwinnett County *Unified Development Ordinance* (UDO), section 900-30.2 D states that “a left turn lane shall be provided into each project driveway or subdivision street that accesses a Minor Collector or Major Thoroughfare in accordance with the Department of Transportation’s “Criteria and Guidelines for Left Turn Lanes.” Table 6, below, is Table 3 from that document, presenting the left turn lane criteria for non-residential developments.

Table 6 – Gwinnett County Left Turn Lane Standards

**Gwinnett County – Non-Residential Developments
Left Turn Lane Criteria**

TABLE 3

Posted Speed Limit (mph)	2 Lane Routes -----ADT-----		More Than 2 Lanes on Main Road -----ADT-----	
	<6000	>=6000	<10,000	>=10,000
30 to 35	30 LTV/hr	20 LTV/hr	40 LTV/hr	30 LTV/hr
40 to 50	25 LTV/hr	20 LTV/hr	35 LTV/hr	25 LTV/hr
>= 55	20 LTV/hr	15 LTV/hr	25 LTV/hr	20 LTV/hr

LTV/hr. – Left turning vehicles entering development (in peak hour)

The AADT on Rosebud Road was 13,100 vpd in 2021, which is significantly above the 6,000 vpd threshold for a road with two lanes. For a 45 mph speed limit, above 6,000 vpd, the left turn volume (LTV) above which a left turn lane is required is 20 left turn vehicles (LTV) in a peak hour. At the north project access the northbound left turn volume is calculated at 27 LTV in the a.m. peak hour and 53 LTV in the p.m. peak hour. Therefore, a left turn lane is needed at the north access. At the south access, the northbound left turn volume is projected at one (1) LTV in the a.m. peak hour and two (2) LTV in the p.m. peak hour. These volumes are very low because the south access primarily serves the small townhomes node and the only left turn trips that will likely enter at this access are townhomes trips arriving from the south on Rosebud Road. Therefore, no left turn lane is required on Rosebud Road to serve the south project access.

At least one entering and two exiting lanes should be provided at each US 78 project access and the northern Rosebud Road access. One entering and one exiting lane should be provided at the southern Rosebud Road access. Each exiting approach should be controlled by stop sign and accompanying stop bar.

The recommended lane configurations at each access are used in the future analysis.

Future Intersection Operations

An operational analysis was performed for the anticipated future project build-out at the study intersections and the project accesses using Synchro 10 software in accordance with the HCM 6 methodology. Table 7 presents the results of the future analysis. Computer printouts containing detailed results of the future analysis are located in Appendix E. Levels of service and delays are provided for each overall intersection and for each controlled approach or movement. Locations that operate unacceptably (LOS E or LOS F) are presented in bold type.

Table 7 – Future Intersection Operations

Intersection / Approach	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay (s/veh)	LOS	Delay (s/veh)
1. US 78 at Cooper Road / Cooper Springs Road (signal)	D	49.7	C	32.9
northbound approach	D	43.9	<i>E</i>	56.6
southbound approach	<i>F</i>	145.0	<i>F</i>	86.9
eastbound approach	C	22.7	C	20.2
westbound approach	D	37.7	C	31.4
2. US 78 at Midway Station / Project East Access (side street stop)	A	5.1	<i>F</i>	66.9
northbound left turn (exiting project)	<i>F</i>	NA*	<i>F</i>	NA*
northbound right turn (exiting project)	B	12.1	C	19.9
southbound approach	A	0.0	<i>F</i>	NA*
eastbound left turn	C	17.1	B	12.5
westbound left turn (entering project)	B	10.5	C	16.9
3. US 78 at Rosebud Road (signal)	D	39.1	<i>E</i>	71.4
northbound approach	D	50.6	<i>F</i>	88.8
southbound approach	D	41.3	<i>E</i>	79.8
eastbound approach	C	33.0	<i>F</i>	101.8
westbound approach	D	37.0	C	24.6
4. Rosebud Road at Kroger / Project North Access (side street stop)	B	12.6	<i>F</i>	67.6
northbound left turn (entering project)	A	9.1	A	9.8
southbound left turn	A	9.7	A	9.3
eastbound left turn (exiting project)	<i>F</i>	107.5	<i>F</i>	158.9
eastbound right turn (exiting project)	B	13.3	C	15.9
westbound approach	<i>F</i>	142.2	<i>F</i>	NA*
5. Rosebud Road at Brushy Fork Road (side street stop)	A	9.1	A	6.5
southbound left turn	B	10.2	A	9.6
westbound approach	<i>E</i>	39.7	<i>E</i>	37.8
6. Rosebud Road at Cooper Road (signal)	C	27.7	C	33.3
northbound approach	C	30.9	C	34.0
southbound approach	C	22.7	C	28.9
eastbound approach	C	24.8	D	41.5
westbound approach	C	31.3	C	29.5
7. US 78 at Project West Access (side street stop)	A	4.8	<i>E</i>	38.3
northbound left turn (exiting project)	<i>F</i>	263.7	<i>F</i>	NA*
northbound right turn (exiting project)	B	12.0	C	19.3
westbound left turn (entering project)	B	10.4	C	16.7
8. Rosebud Road at Project South Access (side street stop)	A	0.3	A	0.1
northbound left turn (entering project)	A	9.2	A	9.9
eastbound approach (exiting project)	D	34.9	<i>E</i>	37.3

* NA – limits of methodology exceeded, delay results not reasonable.

The future analysis revealed slight increases in delays, with generally the same failing locations as the no-build condition.

At the US 78 / Cooper Road intersection, the northbound and southbound side street approaches will continue to experience high delays due to the appropriate signal timing favoring the major street approached on US 78. The existing condition recommendation to change the striping on southbound Cooper Road at US 78 to a shared left/through and separate right turn lane, and the no-build mitigation to add a southbound right turn overlap phase are still appropriate. No additional mitigation is identified as a consequence of the proposed development.

The US 78 / Midway Station intersection will become the location of the eastern project access. This intersection, and the west project access on US 78 will both require eastbound right turn lanes and the TWLTL will serve as the westbound left turn lanes. Both accesses will incur high exiting delays which can only be mitigated by a change in design or control. The side street approach volumes at both accesses do not appear to be sufficient to satisfy any volume-based warrants for signalization and it is improbable that a signal would be permitted by the Georgia DOT at either access. The Georgia DOT may require an Intersection Control Evaluation (ICE) at these accesses and they may conclude that turn movement restrictions are appropriate.

The US 78 / Rosebud Road intersection will continue to fail in the future. The eastbound exclusive right turn lane and left turn protected/permissive phasing recommended in the existing analysis will continue to be necessary and will allow for generally acceptable future operations.

The Rosebud Road / Kroger access intersection will become the location of the northern project access. The side street approaches (exiting the Kroger and exiting the proposed development) will both fail. This is not unexpected due to the heavy through volumes on Rosebud Road. Signalization may merit consideration, but the volumes appear to make a weak case for signalization.

The southern project access on Rosebud Road will generally operate acceptably, with only moderately high delays exiting in the p.m. peak. However, those delays will be experienced by very low volumes (four (4) vehicles). No mitigation is recommended for this location.

The Gwinnett DOT may require an Intersection Control Evaluation (ICE) at the Rosebud Road accesses and they may conclude that turn movement restrictions are appropriate.

The westbound approach of Brushy Fork Road at Rosebud Road will begin to fail by the future build condition. However, the failure is just LOS E (not LOS F) in just the p.m. peak on the side street stop sign controlled approach. This is not unusual on stop sign controlled approaches at busy thoroughfares such as Rosebud Road. The westbound right turn and southbound left turn are a high-volume pair. Because the large majority of side street volumes are right turns, a signal would have only modest benefit. Likewise, because there are very few side street left turns, adding a lane on the Brushy Fork Road approach would only have a modest benefit. The southbound left turn movement justifies the addition of an exclusive left turn lane, and this is the case whether or not the proposed development is built.

The Rosebud Road / Cooper Road intersection will continue to operate well in the future and no mitigation is identified for this intersection.

Table 8 shows the future intersection operations without and with the mitigation identified in this report.

Table 8 – Future Intersection Operations Without and With Mitigation

Intersection / Approach	A.M. Peak Hour				P.M. Peak Hour			
	No Mitigation		With Mitigation		No Mitigation		With Mitigation	
	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)
1. US 78 at Cooper Rd	D	49.7	D	36.9	C	32.9	C	23.6
northbound approach	D	43.9	C	34.0	E	56.6	D	42.7
southbound approach	F	145.0	D	41.9	F	86.9	C	29.2
eastbound approach	C	22.7	B	18.4	C	20.2	B	19.9
westbound approach	D	37.7	D	45.2	C	31.4	C	25.2
2. US 78 at Midway Sta / Project E Access	A	5.1	A	5.1	F	66.9	F	66.9
northbound left turn (exiting project)	F	NA*	F	NA*	F	NA*	F	NA*
northbound right turn (exiting project)	B	12.1	B	12.1	C	19.9	C	19.9
southbound approach	A	0.0	A	0.0	F	NA*	F	NA*
eastbound left turn	C	17.1	C	17.1	B	12.5	B	12.5
westbound left turn (entering project)	B	10.5	B	10.5	C	16.9	C	16.9
3. US 78 at Rosebud Rd (signal)	D	39.1	D	52.1	E	71.4	D	53.6
northbound approach	D	50.6	E	56.4	F	88.8	E	69.8
southbound approach	D	41.3	D	50.3	E	79.8	E	68.3
eastbound approach	C	33.0	C	29.4	F	101.8	E	59.5
westbound approach	D	37.0	E	63.2	C	24.6	C	32.3
4. Rosebud Rd at Kroger / Project N Access	B	12.6	B	12.6	F	67.6	F	67.6
northbound left turn (entering project)	A	9.1	A	9.1	A	9.8	A	9.8
southbound left turn	A	9.7	A	9.7	A	9.3	A	9.3
eastbound left turn (exiting project)	F	107.5	F	107.5	F	158.9	F	158.9
eastbound right turn (exiting project)	B	13.3	B	13.3	C	15.9	C	15.9
westbound approach	F	142.2	F	142.2	F	NA*	F	NA*
5. Rosebud Rd at Brushy Fork Rd	A	9.1	A	8.6	A	6.5	A	5.8
southbound left turn	B	10.2	B	10.2	A	9.6	A	9.6
westbound approach	E	39.7	E	36.8	E	37.8	D	32.8
6. Rosebud Rd at Cooper Rd	C	27.7	C	27.7	C	33.3	C	33.3
northbound approach	C	30.9	C	30.9	C	34.0	C	34.0
southbound approach	C	22.7	C	22.7	C	28.9	C	28.9
eastbound approach	C	24.8	C	24.8	D	41.5	D	41.5
westbound approach	C	31.3	C	31.3	C	29.5	C	29.5
7. US 78 at Project W Access	A	4.8	A	4.8	E	38.3	E	38.3
northbound left turn (exiting project)	F	263.7	F	263.7	F	NA*	F	NA*
northbound right turn (exiting project)	B	12.0	B	12.0	C	19.3	C	19.3
westbound left turn (entering project)	B	10.4	B	10.4	C	16.7	C	16.7

table continued on next page

8. Rosebud Rd at Project South Access	A	0.3	A	0.3	A	0.1	A	0.1
northbound left turn (entering project)	A	9.2	A	9.2	A	9.9	A	9.9
eastbound approach (exiting project)	D	34.9	D	34.9	<i>E</i>	37.3	<i>E</i>	37.3

*NA – limits of methodology exceeded; delay results not reasonable.

Discussion of Results and Recommendations

This study assesses the traffic impact of a proposed multi-use development in Snellville. The site is located in the southwest quadrant of the intersection of US 78 and Rosebud Road and will be developed with 57,000 square feet of retail village, 300 multi-family residential units, and 25 residential townhomes. The project will have two accesses on US 78 and two accesses on Rosebud Road. The following are the findings and recommendations of this study:

1. The existing analysis reveals generally acceptable operating conditions at the study intersections. The following recommendations are made for the existing condition:
 - a. Change the southbound lane striping on Cooper Road at US 78 from the current left turn lane and shared through/right to a shared left/through and an exclusive right turn lane.
 - b. Add an exclusive right turn lane on the eastbound approach of US 78 at Rosebud Road. Add protected/permissive signal phasing for the eastbound left turn lane.
2. No planned or programmed roadway improvement projects in the area were identified.
3. Traffic volume growth in this area has been positive and moderately-low and this is expected to continue into the future, with an annual growth rate of 2.0% used in developing future volume projections.
4. The no-build analysis shows a moderate deterioration in operations due to anticipated growth in this area. The following mitigation is identified for the no-build condition.
 - a. Add a southbound right turn overlap phase on Cooper Road at US 78.
5. The proposed multi-use development will generate 280 new a.m. peak hour new trips, 496 new p.m. peak hour new trips, and 5,934 new weekday new trips.
6. The future analysis with the addition of the proposed development's trips reveals modest deteriorations in operations at the study intersections. No off-site mitigation is recommended as a consequence of the proposed development.
7. While no off-site mitigation is recommended due to the proposed development, consideration should be given to adding a southbound exclusive left turn lane on Rosebud Road at Brushy Fork Road whether or not the proposed development is built.
8. An eastbound right turn lane is required on US 78 at both project accesses. The existing center TWLTL will serve as the left turn lane on US 78 at both project accesses.
9. The Georgia DOT may require an Intersection Control Evaluation (ICE) at the US 78 accesses and they may conclude that turn movement restrictions are appropriate.

10. A southbound right turn lane and a northbound left turn lane should be constructed on Rosebud Road at the northern project access, aligning with the Kroger access. The northbound left turn lane should be designed so as to not conflict with the northbound left turn lane on Rosebud Road at US 78.
11. At the southern project access on Rosebud Road, a southbound right turn lane is required by Code, but consideration should be given to waiving this requirement due to extremely low right turn volumes (two (2) vehicles in the a.m. peak hour and six (6) vehicles in the p.m. peak hour). A northbound left turn lane is not necessary at the southern access.
12. The Gwinnett DOT may require an Intersection Control Evaluation (ICE) at the Rosebud Road accesses and they may conclude that turn movement restrictions are appropriate.
13. At least one entering and two exiting lanes should be provided at each US 78 project access and the northern Rosebud Road access. One entering and one exiting lane should be provided at the southern Rosebud Road access. Each exiting approach should be controlled by stop sign and accompanying stop bar.
14. The project civil/site engineer should comply with all applicable design standards including sight distances, turn radii, turn lane storage and taper lengths, driveway widths, islands, angles with the adjacent roadways, and grades.

Appendix A

Traffic Count Data and Volume Worksheets

US 78 at Rosebud Road Multi-Use Development Traffic Impact Study

City of Snellville, Georgia

March 2023

Intersection: 1. US 78 at Cooper Road / Cooper Springs Road

Weekday A.M. Peak Hour	Northbound Cooper Springs Road				Southbound Cooper Road				Eastbound US 78				Westbound US 78			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, March 15, 2023 7:15-8:15)	26	14	7	47	95	15	371	481	210	669	9	888	17	1507	104	1628
Total Annual Background Growth	10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%	
2027 No-Build Volumes	29	15	8	52	105	17	410	531	232	739	10	980	19	1664	115	1797
Project Residential Trips	0	0	0	0	4	0	0	4	0	10	0	10	0	34	14	48
Project Retail New Trips	0	0	5	5	14	0	0	14	0	19	0	19	3	12	9	24
Project Retail Pass-by Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Total Trips	0	0	5	5	18	0	0	18	0	29	0	29	3	46	23	72
Build Volumes	29	15	13	57	123	17	410	549	232	768	10	1009	22	1710	138	1869

Weekday P.M. Peak Hour	Northbound Cooper Springs Road				Southbound Cooper Road				Eastbound US 78				Westbound US 78			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, March 15, 2023 5:00-6:00)	41	32	35	108	89	30	294	413	449	1395	50	1894	33	1176	56	1265
Total Annual Background Growth	10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%	
2027 No-Build Volumes	45	35	39	119	98	33	325	456	496	1540	55	2091	36	1298	62	1397
Project Residential Trips	0	0	0	0	11	0	0	11	0	29	0	29	0	17	7	24
Project Retail New Trips	0	0	9	9	27	0	0	27	0	35	0	35	10	38	29	77
Project Retail Pass-by Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Total Trips	0	0	9	9	38	0	0	38	0	64	0	64	10	55	36	101
Build Volumes	45	35	48	128	136	33	325	494	496	1604	55	2155	46	1353	98	1498

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US 78 at Rosebud Road Multi-Use Development Traffic Impact Study

City of Snellville, Georgia

March 2023

Intersection: 2. US 78 at Midway Station Retail Access / Project Access

Weekday A.M. Peak Hour	Northbound Project Access				Southbound Midway Station Access				Eastbound US 78				Westbound US 78			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, March 15, 2023 7:15-8:15)					0		0	0	1	808		809		1578	3	1581
Total Annual Background Growth					10.4%		10.4%		10.4%	10.4%				10.4%	10.4%	
2027 No-Build Volumes					0		0	0	1	892		893		1742	3	1745
Project Residential Trips	17	0	9	26	0	0	0	0	0	0	3	3	3	0	0	3
Project Retail New Trips	12	0	10	22	0	0	0	0	0	9	19	28	19	10	0	29
Project Retail Pass-by Trips	4	0	2	6	0	0	0	0	0	-3	3	0	7	-7	0	0
Project Total Trips	33	0	21	54	0	0	0	0	0	6	25	31	29	3	0	32
Build Volumes	33	0	21	54	0	0	0	0	1	898	25	924	29	1745	3	1777

Weekday P.M. Peak Hour	Northbound Project Access				Southbound Midway Station Access				Eastbound US 78				Westbound US 78			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, March 15, 2023 5:00-6:00)					8		17	25	12	1491		1503		1228	7	1235
Total Annual Background Growth					10.4%		10.4%		10.4%	10.4%				10.4%	10.4%	
2027 No-Build Volumes					9		19	28	13	1646		1659		1356	8	1363
Project Residential Trips	8	0	5	13	0	0	0	0	0	0	5	5	5	0	0	5
Project Retail New Trips	39	0	35	74	0	0	0	0	0	26	36	62	37	20	0	57
Project Retail Pass-by Trips	15	0	19	34	0	0	0	0	0	-17	17	0	14	-14	0	0
Project Total Trips	62	0	59	121	0	0	0	0	0	9	58	67	56	6	0	62
Build Volumes	62	0	59	121	9	0	19	28	13	1655	58	1726	56	1362	8	1425

MARC R. ACAMPORA, PE, LLC

US 78 at Rosebud Road Multi-Use Development Traffic Impact Study

City of Snellville, Georgia

March 2023

Intersection: 3. US 78 at Rosebud Road

Weekday A.M. Peak Hour

	Northbound Rosebud Road				Southbound Rosebud Road				Eastbound US 78				Westbound US 78			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, March 15, 2023 7:30-8:30)	186	465	92	743	141	329	39	509	10	712	129	851	107	1252	158	1517
Total Annual Background Growth	10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%	
2027 No-Build Volumes	205	513	102	820	156	363	43	562	11	786	142	940	118	1382	174	1675
Project Residential Trips	0	19	9	28	0	6	2	8	5	4	0	9	3	1	0	4
Project Retail New Trips	0	3	2	5	0	5	18	23	12	7	0	19	3	11	0	14
Project Retail Pass-by Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Total Trips	0	22	11	33	0	11	20	31	17	11	0	28	6	12	0	18
Build Volumes	205	535	113	853	156	374	63	593	28	797	142	968	124	1394	174	1693

Weekday P.M. Peak Hour

	Northbound Rosebud Road				Southbound Rosebud Road				Eastbound US 78				Westbound US 78			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, March 15, 2023 5:00-6:00)	160	379	68	607	225	396	37	658	54	1251	173	1478	142	1004	167	1313
Total Annual Background Growth	10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%	
2027 No-Build Volumes	177	418	75	670	248	437	41	726	60	1381	191	1632	157	1108	184	1450
Project Residential Trips	0	9	4	13	0	17	3	20	3	2	0	5	8	2	0	10
Project Retail New Trips	0	10	6	16	0	9	35	44	38	23	0	61	5	22	0	27
Project Retail Pass-by Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Total Trips	0	19	10	29	0	26	38	64	41	25	0	66	13	24	0	37
Build Volumes	177	437	85	699	248	463	79	790	101	1406	191	1698	170	1132	184	1487

MARC R. ACAMPORA, PE, LLC

US 78 at Rosebud Road Multi-Use Development Traffic Impact Study

City of Snellville, Georgia

March 2023

Intersection: 4. Rosebud Road at Kroger Access / Project Access

Weekday A.M. Peak Hour	Northbound Rosebud Road				Southbound Rosebud Road				Eastbound Project Access				Westbound Kroger Access			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, March 15, 2023 7:45-8:45)		675	81	756	14	565		579					47		51	98
Total Annual Background Growth		10.4%	10.4%		10.4%	10.4%							10.4%		10.4%	
2027 No-Build Volumes		745	89	835	15	624		639					52		56	108
Project Residential Trips	2	7	0	9	0	2	7	9	21	3	7	31	0	1	0	1
Project Retail New Trips	19	0	0	19	0	0	8	8	5	0	12	17	0	0	0	0
Project Retail Pass-by Trips	6	-6	0	0	0	-4	4	0	3	0	4	7	0	0	0	0
Project Total Trips	27	1	0	28	0	-2	19	17	29	3	23	55	0	1	0	1
Build Volumes	27	746	89	863	15	622	19	656	29	3	23	55	52	1	56	109

Weekday P.M. Peak Hour	Northbound Rosebud Road				Southbound Rosebud Road				Eastbound Project Access				Westbound Kroger Access			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, March 15, 2023 4:45-5:45)		567	109	676	17	680		697					93		45	138
Total Annual Background Growth		10.4%	10.4%		10.4%	10.4%							10.4%		10.4%	
2027 No-Build Volumes		626	120	746	19	751		769					103		50	152
Project Residential Trips	5	3	0	8	0	6	19	25	10	2	4	16	0	2	0	2
Project Retail New Trips	35	0	0	35	0	0	14	14	16	0	38	54	0	0	0	0
Project Retail Pass-by Trips	13	-13	0	0	0	-15	15	0	14	0	17	31	0	0	0	0
Project Total Trips	53	-10	0	43	0	-9	48	39	40	2	59	101	0	2	0	2
Build Volumes	53	616	120	789	19	742	48	808	40	2	59	101	103	2	50	154

MARC R. ACAMPORA, PE, LLC

US 78 at Rosebud Road Multi-Use Development Traffic Impact Study

City of Snellville, Georgia

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Intersection: 5. Rosebud Road at Brushy Fork Road

Weekday A.M. Peak Hour	Northbound Rosebud Road			Southbound Rosebud Road				Westbound Brushy Fork Road		
	T	R	Tot	L	T	Tot		L	R	Tot
Counted Volumes (Wednesday, March 15, 2023 7:45-8:45)	483	12	495	209	315	524		12	192	204
Total Annual Background Growth	10.4%	10.4%		10.4%	10.4%			10.4%	10.4%	
2027 No-Build Volumes	533	13	546	231	348	578		13	212	225
Project Residential Trips	2	0	2	3	6	9		0	1	1
Project Retail New Trips	10	0	10	6	6	12		0	9	9
Project Retail Pass-by Trips	0	0	0	0	0	0		0	0	0
Project Total Trips	12	0	12	9	12	21		0	10	10
Build Volumes	545	13	558	240	360	599		13	222	235

Weekday P.M. Peak Hour	Northbound Rosebud Road			Southbound Rosebud Road				Westbound Brushy Fork Road		
	T	R	Tot	L	T	Tot		L	R	Tot
Counted Volumes (Wednesday, March 15, 2023 5:00-6:00)	457	22	479	153	547	700		17	160	177
Total Annual Background Growth	10.4%	10.4%		10.4%	10.4%			10.4%	10.4%	
2027 No-Build Volumes	505	24	529	169	604	773		19	177	195
Project Residential Trips	5	0	5	2	3	5		0	2	2
Project Retail New Trips	18	0	18	19	19	38		0	17	17
Project Retail Pass-by Trips	0	0	0	0	0	0		0	0	0
Project Total Trips	23	0	23	21	22	43		0	19	19
Build Volumes	528	24	552	190	626	816		19	196	214

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US 78 at Rosebud Road Multi-Use Development Traffic Impact Study

City of Snellville, Georgia

March 2023

Intersection: 6. Rosebud Road at Cooper Road

Weekday A.M. Peak Hour	Northbound Rosebud Road				Southbound Rosebud Road				Eastbound Cooper Road				Westbound Cooper Road			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, March 15, 2023 7:30-8:30)	50	454	102	606	66	322	104	492	122	279	35	436	95	390	143	628
Total Annual Background Growth	10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%	
2027 No-Build Volumes	55	501	113	669	73	355	115	543	135	308	39	481	105	431	158	693
Project Residential Trips	0	19	5	24	0	6	0	6	0	0	0	0	2	0	0	2
Project Retail New Trips	0	9	6	15	0	14	0	14	0	0	0	0	9	0	0	9
Project Retail Pass-by Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Total Trips	0	28	11	39	0	20	0	20	0	0	0	0	11	0	0	11
Build Volumes	55	529	124	708	73	375	115	563	135	308	39	481	116	431	158	704

Weekday P.M. Peak Hour	Northbound Rosebud Road				Southbound Rosebud Road				Eastbound Cooper Road				Westbound Cooper Road			
	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Counted Volumes (Wednesday, March 15, 2023 4:15-5:15)	11	395	170	576	159	423	132	714	128	405	26	559	169	291	130	590
Total Annual Background Growth	10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%		10.4%	10.4%	10.4%	
2027 No-Build Volumes	12	436	188	636	176	467	146	788	141	447	29	617	187	321	144	651
Project Residential Trips	0	10	2	12	0	16	0	16	0	0	0	0	4	0	0	4
Project Retail New Trips	0	29	19	48	0	27	0	27	0	0	0	0	17	0	0	17
Project Retail Pass-by Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Total Trips	0	39	21	60	0	43	0	43	0	0	0	0	21	0	0	21
Build Volumes	12	475	209	696	176	510	146	831	141	447	29	617	208	321	144	672

MARC R. ACAMPORA, PE, LLC

US 78 at Rosebud Road Multi-Use Development Traffic Impact Study

City of Snellville, Georgia

March 2023

Intersection: 7. US 78 at Project West Access

Weekday A.M. Peak Hour	Northbound Project Access				Eastbound US 78			Westbound US 78		
	L	R	Tot		T	R	Tot	L	T	Tot
Counted Volumes (Wednesday, March 15, 2023 7:15-8:15)					808		808		1578	1578
Total Annual Background Growth					10.4%				10.4%	
2027 No-Build Volumes					892		892		1742	1742
Project Residential Trips	31	0	31		3	11	14	0	17	17
Project Retail New Trips	12	9	21		19	19	38	10	12	22
Project Retail Pass-by Trips	3	2	5		-4	4	0	6	-6	0
Project Total Trips	46	11	57		18	34	52	16	23	39
Build Volumes	46	11	57		910	34	944	16	1765	1781

Weekday P.M. Peak Hour	Northbound Project Access				Eastbound US 78			Westbound US 78		
	L	R	Tot		T	R	Tot	L	T	Tot
Counted Volumes (Wednesday, March 15, 2023 5:00-6:00)					1503		1503		1245	1245
Total Annual Background Growth					10.4%				10.4%	
2027 No-Build Volumes					1659		1659		1374	1374
Project Residential Trips	16	0	16		5	35	40	0	8	8
Project Retail New Trips	38	26	64		36	35	71	20	39	59
Project Retail Pass-by Trips	15	18	33		-17	17	0	14	-14	0
Project Total Trips	69	44	113		24	87	111	34	33	67
Build Volumes	69	44	113		1683	87	1770	34	1407	1441

MARC R. ACAMPORA, PE, LLC

US 78 at Rosebud Road Multi-Use Development Traffic Impact Study

City of Snellville, Georgia

March 2023

Intersection: 8. Rosebud Road at Project South Access

Weekday A.M. Peak Hour

	Northbound Rosebud Road			Southbound Rosebud Road			Eastbound Project Access		
	L	T	Tot	T	R	Tot	L	R	Tot
Counted Volumes (Wednesday, March 15, 2023 7:45-8:45)		756	756	612		612			
Total Annual Background Growth		10.4%		10.4%					
2027 No-Build Volumes		835	835	676		676			
Project Residential Trips	1	2	3	7	2	9	7	2	9
Project Retail New Trips	0	19	19	12	0	12	0	0	0
Project Retail Pass-by Trips	0	0	0	0	0	0	0	0	0
Project Total Trips	1	21	22	19	2	21	7	2	9
Build Volumes	1	856	857	695	2	697	7	2	9

Weekday P.M. Peak Hour

	Northbound Rosebud Road			Southbound Rosebud Road			Eastbound Project Access		
	L	T	Tot	T	R	Tot	L	R	Tot
Counted Volumes (Wednesday, March 15, 2023 4:45-5:45)		676	676	773		773			
Total Annual Background Growth		10.4%		10.4%					
2027 No-Build Volumes		746	746	853		853			
Project Residential Trips	2	5	7	4	6	10	3	1	4
Project Retail New Trips	0	35	35	38	0	38	0	0	0
Project Retail Pass-by Trips	0	0	0	0	0	0	0	0	0
Project Total Trips	2	40	42	42	6	48	3	1	4
Build Volumes	2	786	788	895	6	901	3	1	4

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TMC Data
 US 78 @ Cooper Rd/Cooper Springs Rd
 Snellville, GA
 7-9 AM | 4-6 PM

File Name : 47570001
 Site Code : 47570001
 Start Date : 3/15/2023
 Page No : 1

Groups Printed- Cars, Buses and Trucks

Start Time	Cooper Springs Rd Northbound					Cooper Rd Southbound					US 78 Eastbound					US 78 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	3	0	0	0	3	22	2	95	0	119	38	146	2	0	186	1	284	20	0	305	613
07:15 AM	8	2	2	0	12	11	4	101	0	116	45	131	2	0	178	2	376	19	0	397	703
07:30 AM	8	2	2	0	12	21	3	99	0	123	63	182	3	0	248	6	442	23	0	471	854
07:45 AM	6	7	0	0	13	29	5	94	0	128	49	187	1	0	237	4	326	39	0	369	747
Total	25	11	4	0	40	83	14	389	0	486	195	646	8	0	849	13	1428	101	0	1542	2917
08:00 AM	4	3	3	0	10	34	3	77	0	114	53	169	3	0	225	5	363	23	0	391	740
08:15 AM	8	3	3	0	14	22	4	79	0	105	50	164	3	0	217	1	326	16	0	343	679
08:30 AM	2	4	3	0	9	13	7	87	0	107	51	215	2	0	268	4	318	14	0	336	720
08:45 AM	2	6	0	0	8	9	4	96	0	109	48	155	4	0	207	4	294	16	0	314	638
Total	16	16	9	0	41	78	18	339	0	435	202	703	12	0	917	14	1301	69	0	1384	2777
*** BREAK ***																					
04:00 PM	1	8	14	0	23	17	8	84	0	109	102	329	3	0	434	7	234	14	0	255	821
04:15 PM	3	4	7	0	14	30	10	80	0	120	106	335	8	0	449	7	263	23	0	293	876
04:30 PM	5	4	9	0	18	21	5	82	0	108	103	313	9	0	425	3	256	15	0	274	825
04:45 PM	5	9	8	0	22	20	5	86	0	111	119	351	10	0	480	4	264	16	0	284	897
Total	14	25	38	0	77	88	28	332	0	448	430	1328	30	0	1788	21	1017	68	0	1106	3419
05:00 PM	8	9	6	0	23	25	7	67	0	99	103	344	11	0	458	12	293	15	0	320	900
05:15 PM	10	10	9	0	29	22	10	74	0	106	116	336	14	0	466	7	296	10	0	313	914
05:30 PM	12	5	14	0	31	19	8	79	0	106	102	354	14	0	470	4	304	13	0	321	928
05:45 PM	11	8	6	0	25	23	5	74	0	102	128	361	11	0	500	10	283	18	0	311	938
Total	41	32	35	0	108	89	30	294	0	413	449	1395	50	0	1894	33	1176	56	0	1265	3680
Grand Total	96	84	86	0	266	338	90	1354	0	1782	1276	4072	100	0	5448	81	4922	294	0	5297	12793
Apprch %	36.1	31.6	32.3	0		19	5.1	76	0		23.4	74.7	1.8	0		1.5	92.9	5.6	0		
Total %	0.8	0.7	0.7	0	2.1	2.6	0.7	10.6	0	13.9	10	31.8	0.8	0	42.6	0.6	38.5	2.3	0	41.4	

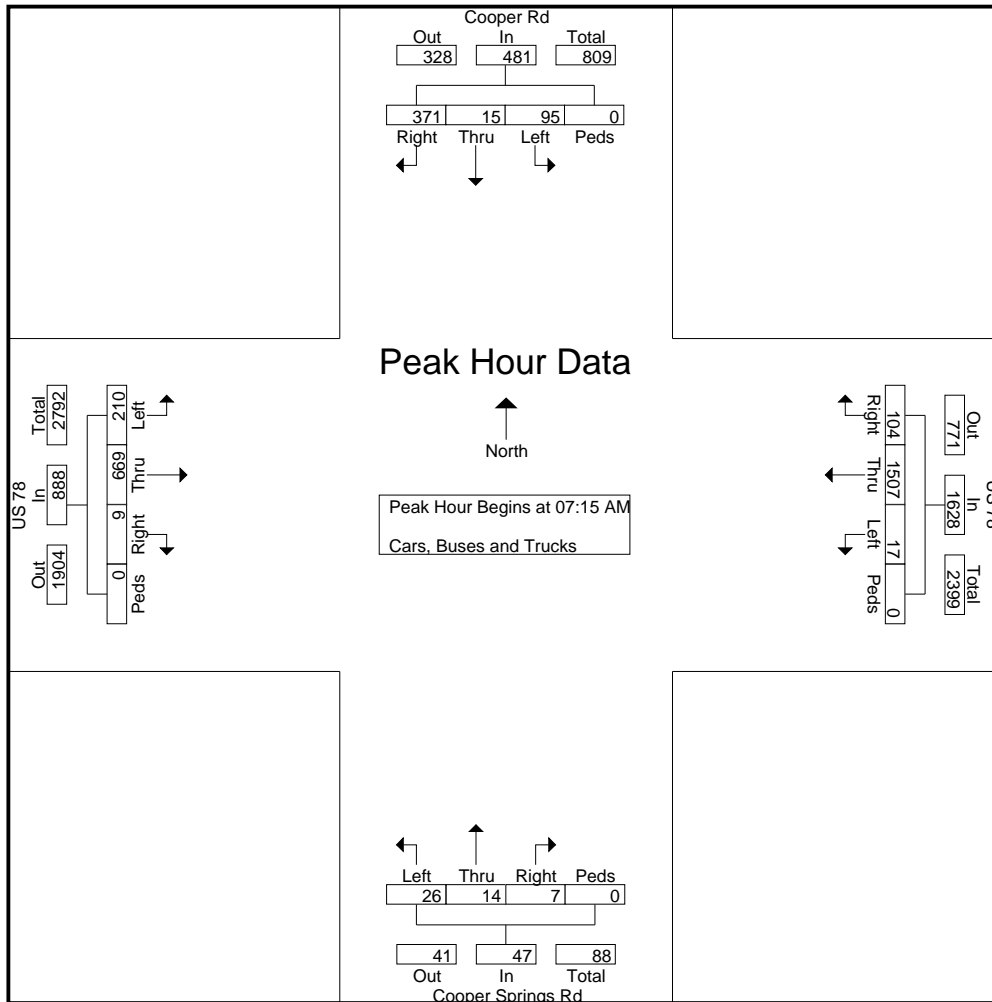
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TMC Data
 US 78 @ Cooper Rd/Cooper Springs Rd
 Snellville, GA
 7-9 AM | 4-6 PM

File Name : 47570001
 Site Code : 47570001
 Start Date : 3/15/2023
 Page No : 2

Start Time	Cooper Springs Rd Northbound					Cooper Rd Southbound					US 78 Eastbound					US 78 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	8	2	2	0	12	11	4	101	0	116	45	131	2	0	178	2	376	19	0	397	703
07:30 AM	8	2	2	0	12	21	3	99	0	123	63	182	3	0	248	6	442	23	0	471	854
07:45 AM	6	7	0	0	13	29	5	94	0	128	49	187	1	0	237	4	326	39	0	369	747
08:00 AM	4	3	3	0	10	34	3	77	0	114	53	169	3	0	225	5	363	23	0	391	740
Total Volume	26	14	7	0	47	95	15	371	0	481	210	669	9	0	888	17	1507	104	0	1628	3044
% App. Total	55.3	29.8	14.9	0		19.8	3.1	77.1	0		23.6	75.3	1	0		1	92.6	6.4	0		
PHF	.813	.500	.583	.000	.904	.699	.750	.918	.000	.939	.833	.894	.750	.000	.895	.708	.852	.667	.000	.864	.891



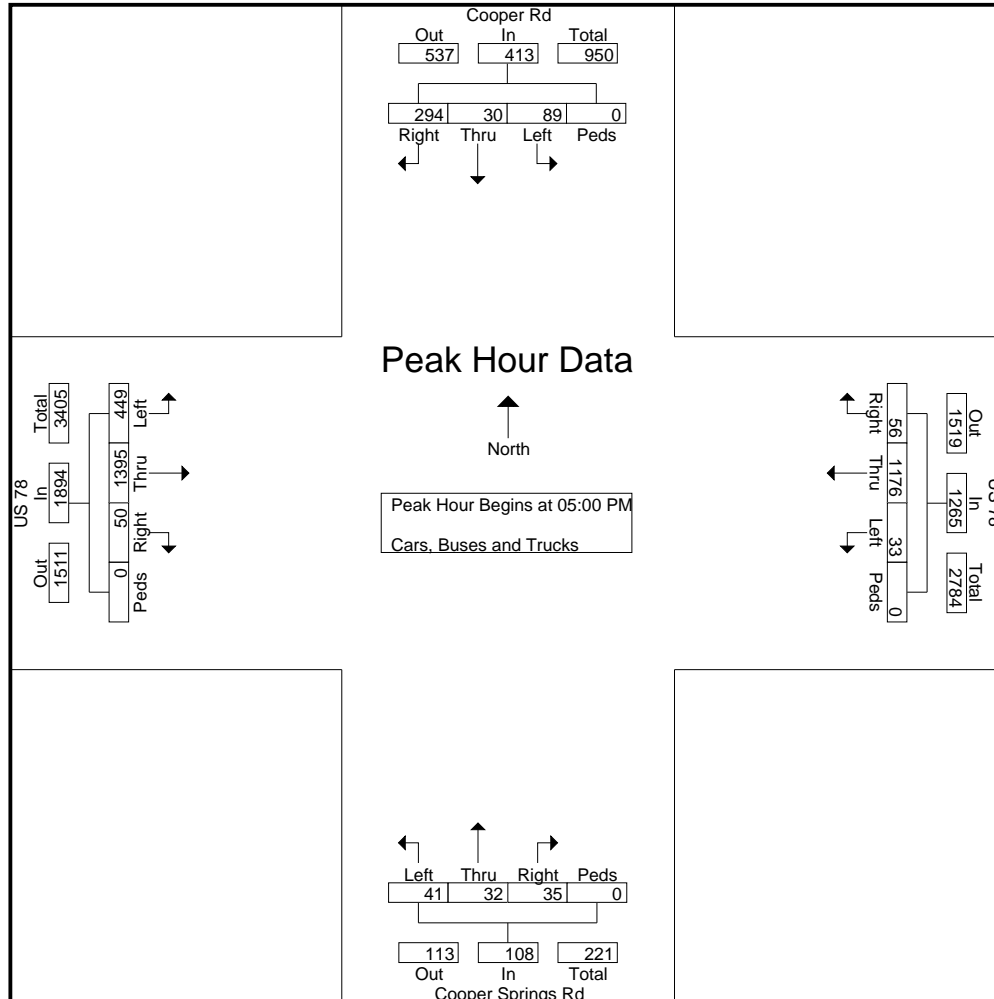
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TMC Data
 US 78 @ Cooper Rd/Cooper Springs Rd
 Snellville, GA
 7-9 AM | 4-6 PM

File Name : 47570001
 Site Code : 47570001
 Start Date : 3/15/2023
 Page No : 3

Start Time	Cooper Springs Rd Northbound					Cooper Rd Southbound					US 78 Eastbound					US 78 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	8	9	6	0	23	25	7	67	0	99	103	344	11	0	458	12	293	15	0	320	900
05:15 PM	10	10	9	0	29	22	10	74	0	106	116	336	14	0	466	7	296	10	0	313	914
05:30 PM	12	5	14	0	31	19	8	79	0	106	102	354	14	0	470	4	304	13	0	321	928
05:45 PM	11	8	6	0	25	23	5	74	0	102	128	361	11	0	500	10	283	18	0	311	938
Total Volume	41	32	35	0	108	89	30	294	0	413	449	1395	50	0	1894	33	1176	56	0	1265	3680
% App. Total	38	29.6	32.4	0		21.5	7.3	71.2	0		23.7	73.7	2.6	0		2.6	93	4.4	0		
PHF	.854	.800	.625	.000	.871	.890	.750	.930	.000	.974	.877	.966	.893	.000	.947	.688	.967	.778	.000	.985	.981



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TMC Data
 US 78 @ Midway Station Retail Ctr Drwy
 Snellville, GA
 7-9 AM | 4-6 PM

File Name : 47570002
 Site Code : 47570002
 Start Date : 3/15/2023
 Page No : 1

Groups Printed- Cars, Buses and Trucks

Start Time	Private Drwy (Gated) Northbound					Midway Station Retail Center Drwy Southbound					US 78 Eastbound					US 78 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	163	0	0	163	0	305	0	0	305	468
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	174	0	0	174	0	394	0	0	394	568
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	208	0	0	208	0	445	2	0	447	655
07:45 AM	0	0	0	0	0	0	0	0	0	0	1	219	0	0	220	0	372	1	0	373	593
Total	0	0	0	0	0	0	0	0	0	0	1	764	0	0	765	0	1516	3	0	1519	2284
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	207	0	0	207	0	367	0	0	367	574
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	199	0	0	199	0	334	0	0	334	533
08:30 AM	0	0	0	0	0	0	0	0	0	0	1	226	0	0	227	0	326	1	0	327	554
08:45 AM	0	0	0	0	0	0	0	0	0	0	2	186	0	0	188	0	319	2	0	321	509
Total	0	0	0	0	0	0	0	0	0	0	3	818	0	0	821	0	1346	3	0	1349	2170
*** BREAK ***																					
04:00 PM	0	0	0	0	0	2	0	6	0	8	5	356	0	0	361	0	234	2	0	236	605
04:15 PM	0	0	0	0	0	1	0	5	0	6	1	367	0	0	368	0	276	1	0	277	651
04:30 PM	0	0	0	0	0	1	0	5	0	6	2	340	0	0	342	0	254	2	0	256	604
04:45 PM	0	0	0	0	0	1	0	5	0	6	1	367	0	0	368	0	286	2	0	288	662
Total	0	0	0	0	0	5	0	21	0	26	9	1430	0	0	1439	0	1050	7	0	1057	2522
05:00 PM	0	0	0	0	0	1	0	3	0	4	3	370	0	0	373	0	317	1	0	318	695
05:15 PM	0	0	0	0	0	2	0	3	0	5	6	367	0	0	373	0	296	3	0	299	677
05:30 PM	0	0	0	0	0	4	0	4	0	8	1	375	0	0	376	0	311	3	0	314	698
05:45 PM	0	0	0	0	0	1	0	7	0	8	2	379	0	0	381	0	304	0	0	304	693
Total	0	0	0	0	0	8	0	17	0	25	12	1491	0	0	1503	0	1228	7	0	1235	2763
Grand Total	0	0	0	0	0	13	0	38	0	51	25	4503	0	0	4528	0	5140	20	0	5160	9739
Apprch %	0	0	0	0	0	25.5	0	74.5	0	0	0.6	99.4	0	0	0	0	99.6	0.4	0	0	
Total %	0	0	0	0	0	0.1	0	0.4	0	0.5	0.3	46.2	0	0	46.5	0	52.8	0.2	0	53	

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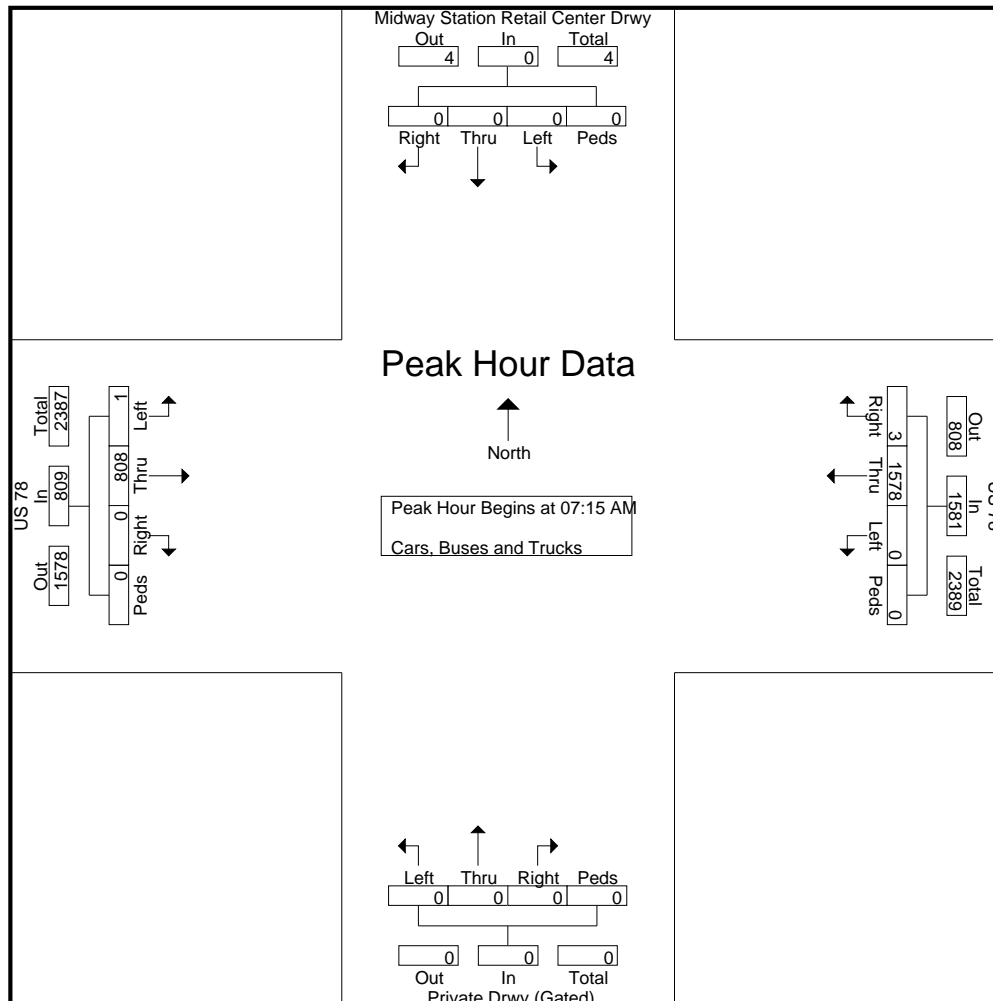
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TMC Data
 US 78 @ Midway Station Retail Ctr Drwy
 Snellville, GA
 7-9 AM | 4-6 PM

File Name : 47570002
 Site Code : 47570002
 Start Date : 3/15/2023
 Page No : 2

Start Time	Private Drwy (Gated) Northbound					Midway Station Retail Center Drwy Southbound					US 78 Eastbound					US 78 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	174	0	0	174	0	394	0	0	394	568
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	208	0	0	208	0	445	2	0	447	655
07:45 AM	0	0	0	0	0	0	0	0	0	0	1	219	0	0	220	0	372	1	0	373	593
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	207	0	0	207	0	367	0	0	367	574
Total Volume	0	0	0	0	0	0	0	0	0	0	1	808	0	0	809	0	1578	3	0	1581	2390
% App. Total	0	0	0	0	0	0	0	0	0	0	0.1	99.9	0	0	0	0	99.8	0.2	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.922	.000	.000	.919	.000	.887	.375	.000	.884	.912

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
 Peak Hour for Entire Intersection Begins at 07:15 AM



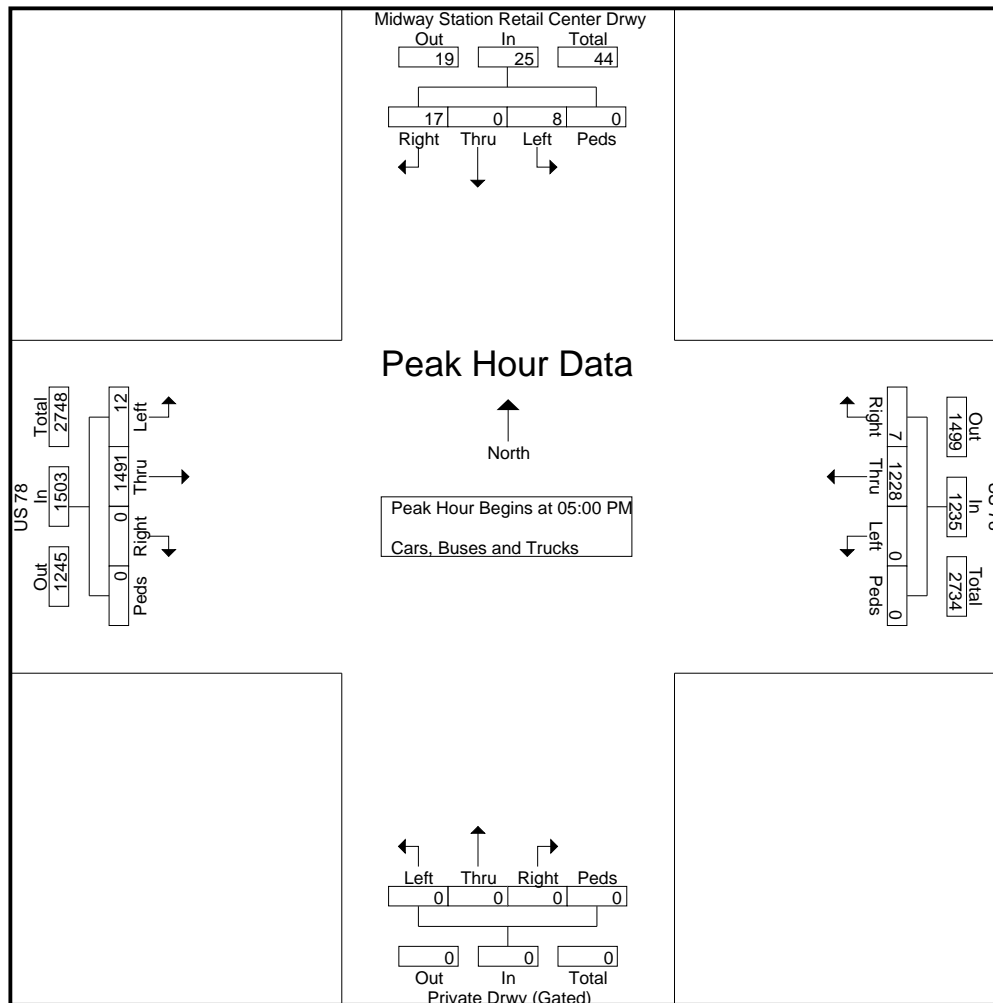
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TMC Data
 US 78 @ Midway Station Retail Ctr Drwy
 Snellville, GA
 7-9 AM | 4-6 PM

File Name : 47570002
 Site Code : 47570002
 Start Date : 3/15/2023
 Page No : 3

Start Time	Private Drwy (Gated) Northbound					Midway Station Retail Center Drwy Southbound					US 78 Eastbound					US 78 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	0	0	0	0	1	0	3	0	4	3	370	0	0	373	0	317	1	0	318	695
05:15 PM	0	0	0	0	0	2	0	3	0	5	6	367	0	0	373	0	296	3	0	299	677
05:30 PM	0	0	0	0	0	4	0	4	0	8	1	375	0	0	376	0	311	3	0	314	698
05:45 PM	0	0	0	0	0	1	0	7	0	8	2	379	0	0	381	0	304	0	0	304	693
Total Volume	0	0	0	0	0	8	0	17	0	25	12	1491	0	0	1503	0	1228	7	0	1235	2763
% App. Total	0	0	0	0	0	32	0	68	0		0.8	99.2	0	0		0	99.4	0.6	0		
PHF	.000	.000	.000	.000	.000	.500	.000	.607	.000	.781	.500	.984	.000	.000	.986	.000	.968	.583	.000	.971	.990



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TMC Data
 US 78 @ Rosebud Rd
 Snellville, GA
 7-9 AM | 4-6 PM

File Name : 47570003
 Site Code : 47570003
 Start Date : 3/15/2023
 Page No : 1

Groups Printed- Cars, Buses and Trucks

Start Time	Rosebud Rd Northbound					Rosebud Rd Southbound					US 78 Eastbound					US 78 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	25	85	20	0	130	26	56	13	0	95	9	170	15	0	194	29	286	32	0	347	766
07:15 AM	38	125	15	0	178	31	79	10	0	120	4	147	21	0	172	17	308	42	0	367	837
07:30 AM	47	107	29	0	183	27	59	13	0	99	5	183	37	0	225	20	391	35	0	446	953
07:45 AM	48	136	16	0	200	35	84	7	0	126	1	175	21	0	197	21	297	53	0	371	894
Total	158	453	80	0	691	119	278	43	0	440	19	675	94	0	788	87	1282	162	0	1531	3450
08:00 AM	48	113	26	0	187	39	88	9	0	136	1	197	36	0	234	36	291	39	0	366	923
08:15 AM	43	109	21	0	173	40	98	10	0	148	3	157	35	0	195	30	273	31	0	334	850
08:30 AM	55	112	25	0	192	30	70	9	0	109	4	182	39	0	225	36	267	34	0	337	863
08:45 AM	42	105	21	0	168	39	77	12	0	128	2	155	29	0	186	28	258	31	0	317	799
Total	188	439	93	0	720	148	333	40	0	521	10	691	139	0	840	130	1089	135	0	1354	3435
*** BREAK ***																					
04:00 PM	28	100	9	0	137	39	98	9	0	146	9	317	34	0	360	28	222	38	0	288	931
04:15 PM	32	113	9	0	154	47	95	12	0	154	14	331	33	0	378	34	235	45	0	314	1000
04:30 PM	47	105	11	0	163	62	90	9	0	161	12	318	31	0	361	27	218	37	0	282	967
04:45 PM	32	92	17	0	141	48	92	9	0	149	17	307	36	0	360	32	220	42	0	294	944
Total	139	410	46	0	595	196	375	39	0	610	52	1273	134	0	1459	121	895	162	0	1178	3842
05:00 PM	41	93	12	0	146	62	106	11	0	179	12	316	44	0	372	35	249	44	0	328	1025
05:15 PM	44	96	21	0	161	56	97	9	0	162	10	311	36	0	357	31	258	44	0	333	1013
05:30 PM	39	82	18	0	139	50	92	10	0	152	15	316	50	0	381	35	255	40	0	330	1002
05:45 PM	36	108	17	0	161	57	101	7	0	165	17	308	43	0	368	41	242	39	0	322	1016
Total	160	379	68	0	607	225	396	37	0	658	54	1251	173	0	1478	142	1004	167	0	1313	4056
Grand Total	645	1681	287	0	2613	688	1382	159	0	2229	135	3890	540	0	4565	480	4270	626	0	5376	14783
Apprch %	24.7	64.3	11	0		30.9	62	7.1	0		3	85.2	11.8	0		8.9	79.4	11.6	0		
Total %	4.4	11.4	1.9	0	17.7	4.7	9.3	1.1	0	15.1	0.9	26.3	3.7	0	30.9	3.2	28.9	4.2	0	36.4	

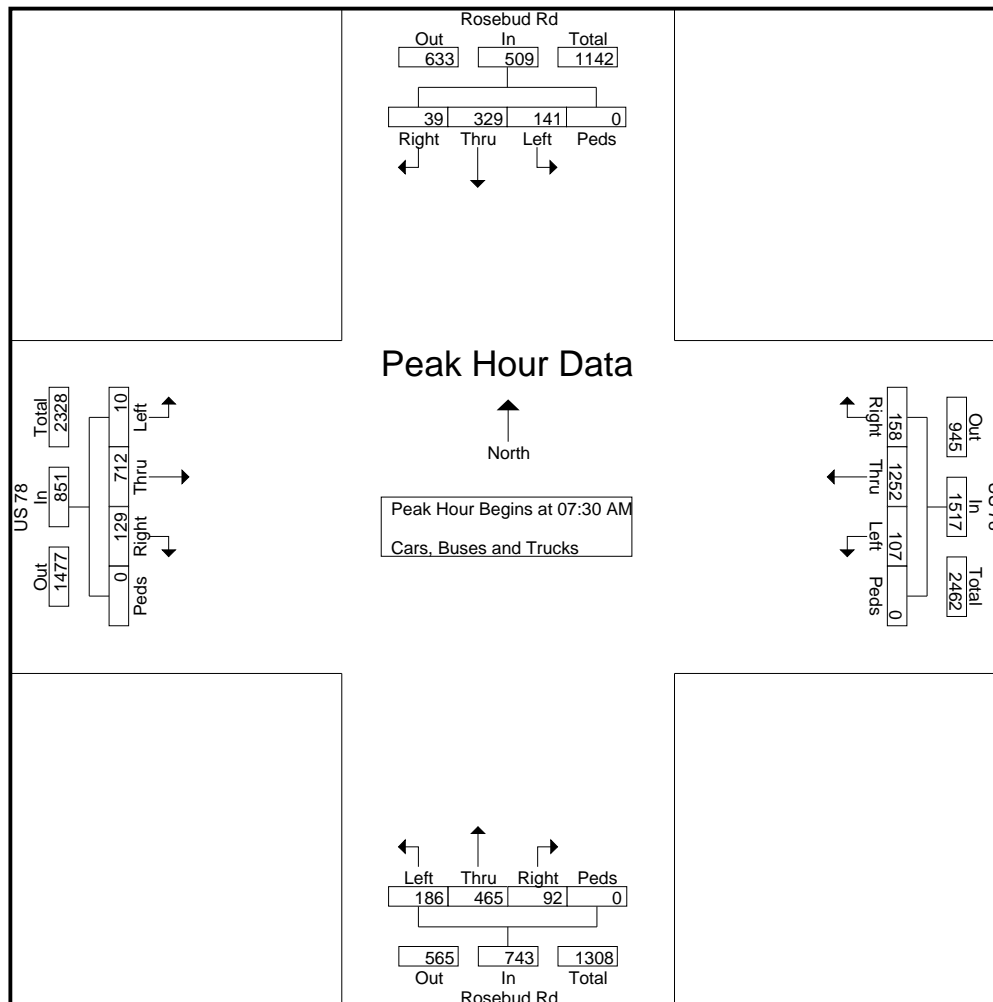
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TMC Data
 US 78 @ Rosebud Rd
 Snellville, GA
 7-9 AM | 4-6 PM

File Name : 47570003
 Site Code : 47570003
 Start Date : 3/15/2023
 Page No : 2

Start Time	Rosebud Rd Northbound					Rosebud Rd Southbound					US 78 Eastbound					US 78 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	47	107	29	0	183	27	59	13	0	99	5	183	37	0	225	20	391	35	0	446	953
07:45 AM	48	136	16	0	200	35	84	7	0	126	1	175	21	0	197	21	297	53	0	371	894
08:00 AM	48	113	26	0	187	39	88	9	0	136	1	197	36	0	234	36	291	39	0	366	923
08:15 AM	43	109	21	0	173	40	98	10	0	148	3	157	35	0	195	30	273	31	0	334	850
Total Volume	186	465	92	0	743	141	329	39	0	509	10	712	129	0	851	107	1252	158	0	1517	3620
% App. Total	25	62.6	12.4	0		27.7	64.6	7.7	0		1.2	83.7	15.2	0		7.1	82.5	10.4	0		
PHF	.969	.855	.793	.000	.929	.881	.839	.750	.000	.860	.500	.904	.872	.000	.909	.743	.801	.745	.000	.850	.950



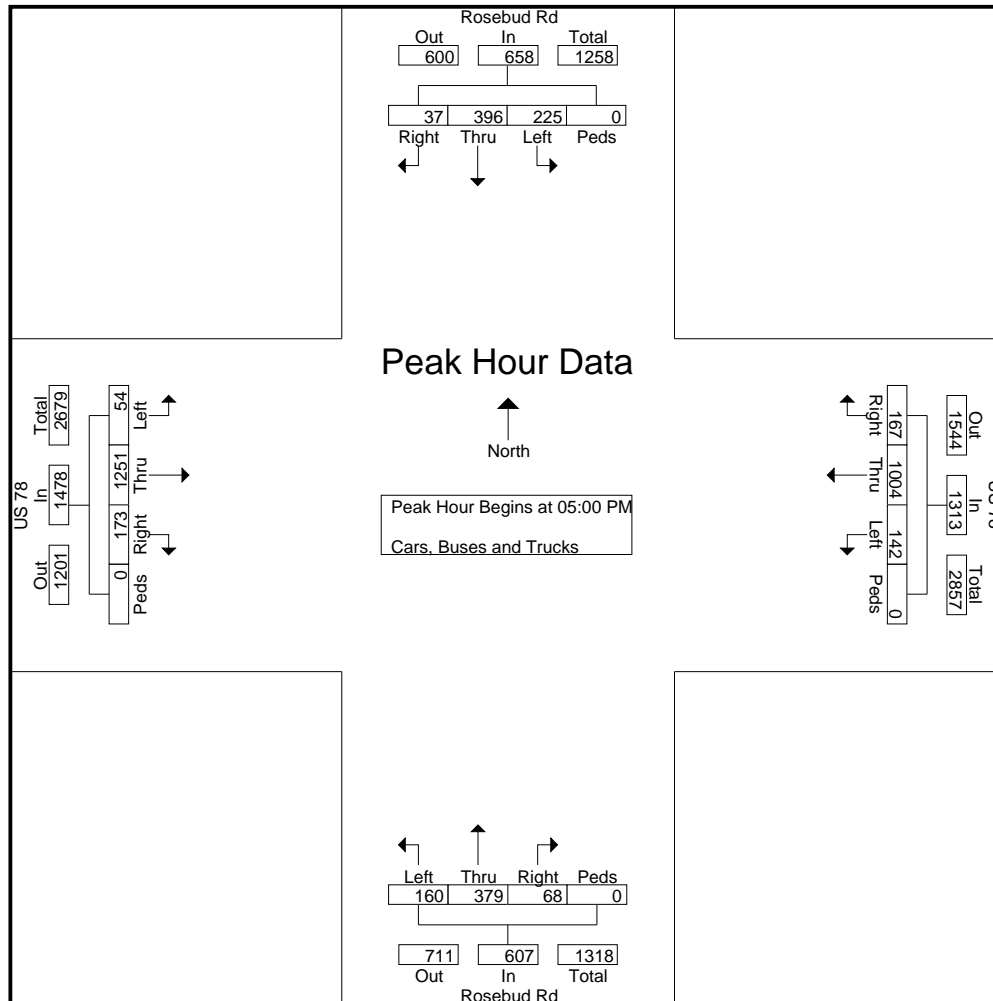
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TMC Data
 US 78 @ Rosebud Rd
 Snellville, GA
 7-9 AM | 4-6 PM

File Name : 47570003
 Site Code : 47570003
 Start Date : 3/15/2023
 Page No : 3

Start Time	Rosebud Rd Northbound					Rosebud Rd Southbound					US 78 Eastbound					US 78 Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	41	93	12	0	146	62	106	11	0	179	12	316	44	0	372	35	249	44	0	328	1025
05:15 PM	44	96	21	0	161	56	97	9	0	162	10	311	36	0	357	31	258	44	0	333	1013
05:30 PM	39	82	18	0	139	50	92	10	0	152	15	316	50	0	381	35	255	40	0	330	1002
05:45 PM	36	108	17	0	161	57	101	7	0	165	17	308	43	0	368	41	242	39	0	322	1016
Total Volume	160	379	68	0	607	225	396	37	0	658	54	1251	173	0	1478	142	1004	167	0	1313	4056
% App. Total	26.4	62.4	11.2	0		34.2	60.2	5.6	0		3.7	84.6	11.7	0		10.8	76.5	12.7	0		
PHF	.909	.877	.810	.000	.943	.907	.934	.841	.000	.919	.794	.990	.865	.000	.970	.866	.973	.949	.000	.986	.989



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TMC Data
 Rosebud Rd @ Kroger Retail Drwy
 Snellville, GA
 7-9 AM | 4-6 PM

File Name : 47570004
 Site Code : 47570004
 Start Date : 3/15/2023
 Page No : 1

Groups Printed- Cars, Buses and Trucks

Start Time	Rosebud Rd Northbound					Rosebud Rd Southbound					Private Drwy Eastbound					Kroger Retail Drwy Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	0	146	8	0	154	1	94	0	0	95	0	0	0	0	0	3	0	5	0	8	257
07:15 AM	0	150	9	0	159	0	97	0	0	97	0	0	0	0	0	8	0	8	0	16	272
07:30 AM	0	167	11	0	178	2	119	0	0	121	0	0	0	0	0	7	0	6	0	13	312
07:45 AM	0	180	19	0	199	3	128	0	0	131	0	0	0	0	0	8	0	14	0	22	352
Total	0	643	47	0	690	6	438	0	0	444	0	0	0	0	0	26	0	33	0	59	1193
08:00 AM	0	149	17	0	166	4	152	0	0	156	0	0	0	0	0	17	0	11	0	28	350
08:15 AM	0	175	24	0	199	4	147	0	0	151	0	0	0	0	0	12	0	12	0	24	374
08:30 AM	0	171	21	0	192	3	138	0	0	141	0	0	1	0	1	10	0	14	0	24	358
08:45 AM	0	163	14	0	177	3	132	0	0	135	0	0	0	0	0	11	0	7	0	18	330
Total	0	658	76	0	734	14	569	0	0	583	0	0	1	0	1	50	0	44	0	94	1412
*** BREAK ***																					
04:00 PM	0	134	16	0	150	3	160	0	0	163	0	0	0	0	0	17	0	11	0	28	341
04:15 PM	0	146	21	0	167	5	163	0	0	168	0	0	0	0	0	19	0	10	0	29	364
04:30 PM	0	148	19	0	167	4	156	0	0	160	0	0	0	0	0	15	0	12	0	27	354
04:45 PM	0	139	30	0	169	4	163	0	0	167	0	0	0	0	0	18	0	11	0	29	365
Total	0	567	86	0	653	16	642	0	0	658	0	0	0	0	0	69	0	44	0	113	1424
05:00 PM	0	142	24	0	166	5	178	0	0	183	0	0	0	0	0	28	0	12	0	40	389
05:15 PM	0	147	27	0	174	5	175	0	0	180	0	0	0	0	0	22	0	13	0	35	389
05:30 PM	0	139	28	0	167	3	164	0	0	167	0	0	0	0	0	25	0	9	0	34	368
05:45 PM	1	145	20	0	166	5	147	0	0	152	0	0	0	0	0	22	0	11	0	33	351
Total	1	573	99	0	673	18	664	0	0	682	0	0	0	0	0	97	0	45	0	142	1497
Grand Total	1	2441	308	0	2750	54	2313	0	0	2367	0	0	1	0	1	242	0	166	0	408	5526
Apprch %	0	88.8	11.2	0		2.3	97.7	0	0		0	0	100	0		59.3	0	40.7	0		
Total %	0	44.2	5.6	0	49.8	1	41.9	0	0	42.8	0	0	0	0	0	4.4	0	3	0	7.4	

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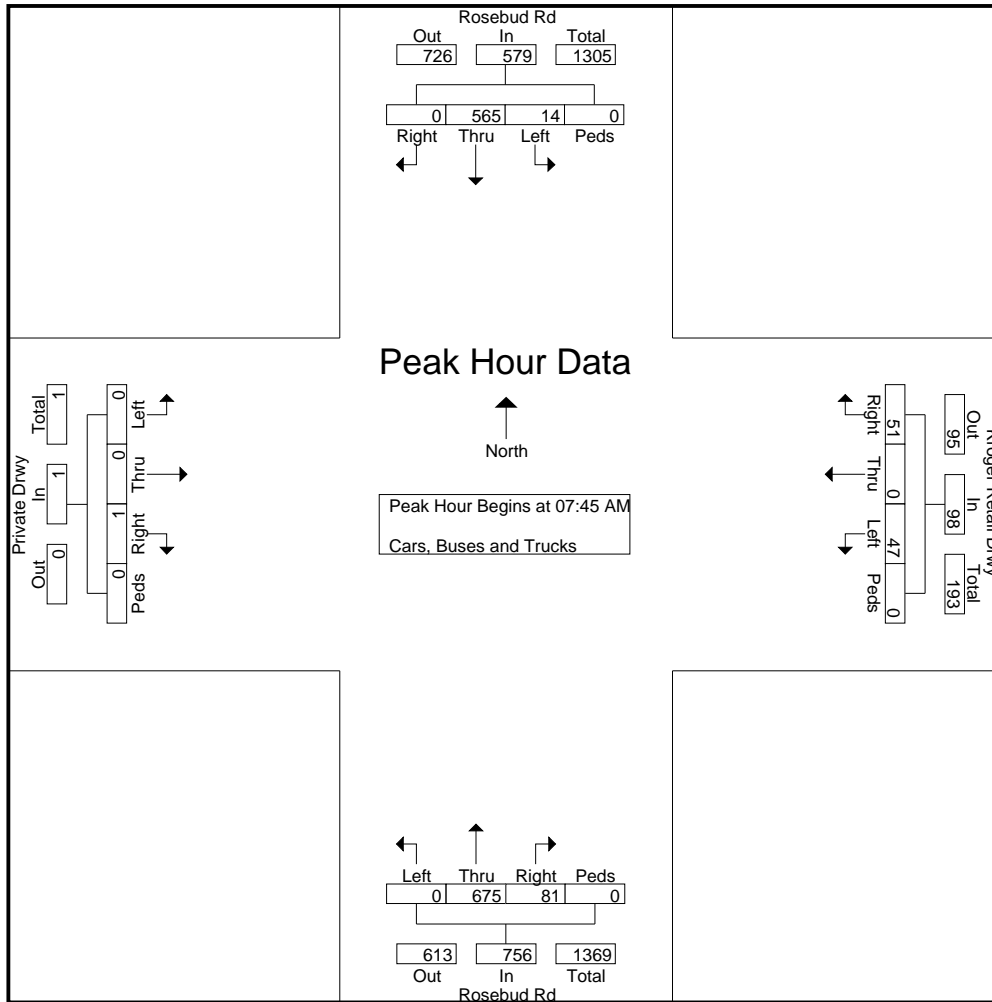
TMC Data
 Rosebud Rd @ Kroger Retail Drwy
 Snellville, GA
 7-9 AM | 4-6 PM

File Name : 47570004
 Site Code : 47570004
 Start Date : 3/15/2023
 Page No : 2

Start Time	Rosebud Rd Northbound					Rosebud Rd Southbound					Private Drwy Eastbound					Kroger Retail Drwy Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:45 AM	0	180	19	0	199	3	128	0	0	131	0	0	0	0	0	8	0	14	0	22	352
08:00 AM	0	149	17	0	166	4	152	0	0	156	0	0	0	0	0	17	0	11	0	28	350
08:15 AM	0	175	24	0	199	4	147	0	0	151	0	0	0	0	0	12	0	12	0	24	374
08:30 AM	0	171	21	0	192	3	138	0	0	141	0	0	1	0	1	10	0	14	0	24	358
Total Volume	0	675	81	0	756	14	565	0	0	579	0	0	1	0	1	47	0	51	0	98	1434
% App. Total		89.3	10.7				97.6						.250	.000	.250	.691	.000	.911	.000	.875	.959
PHF	.000	.938	.844	.000	.950	.875	.929	.000	.000	.928	.000	.000	.250	.000	.250	.691	.000	.911	.000	.875	.959

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:45 AM



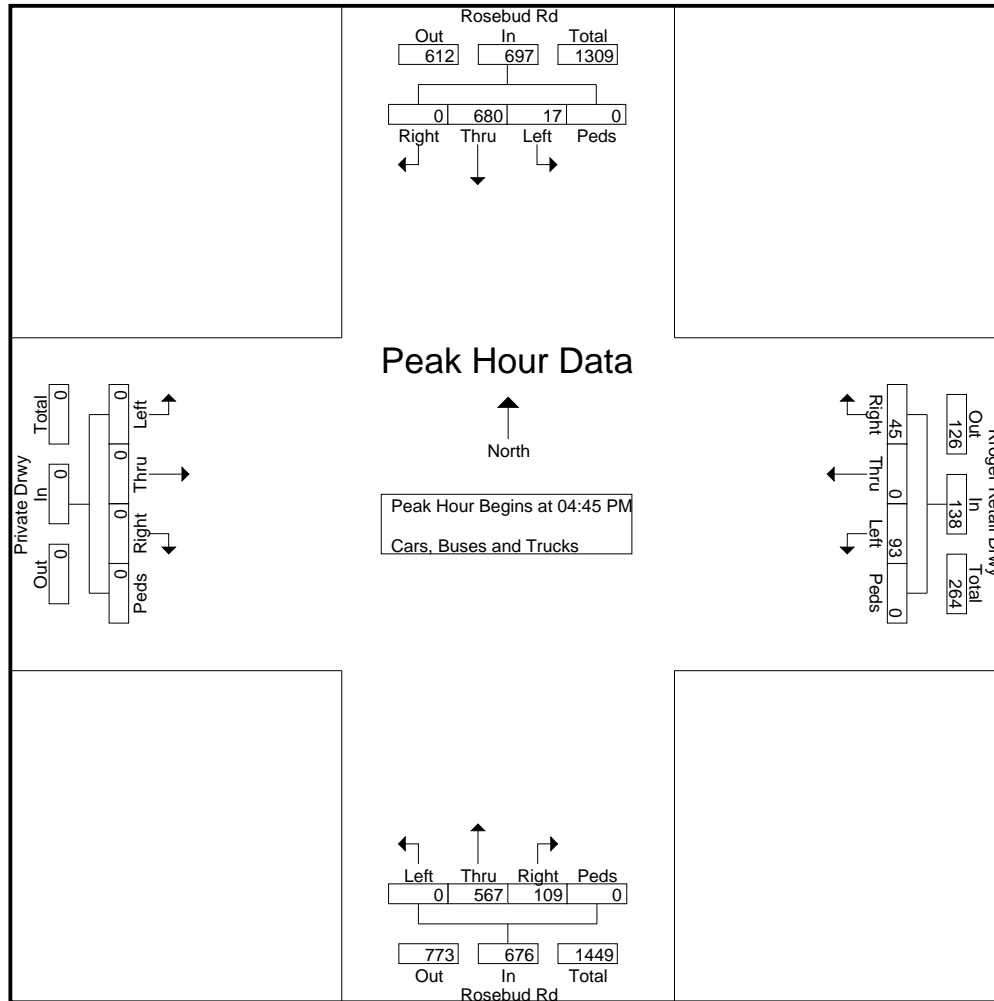
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TMC Data
 Rosebud Rd @ Kroger Retail Drwy
 Snellville, GA
 7-9 AM | 4-6 PM

File Name : 47570004
 Site Code : 47570004
 Start Date : 3/15/2023
 Page No : 3

Start Time	Rosebud Rd Northbound					Rosebud Rd Southbound					Private Drwy Eastbound					Kroger Retail Drwy Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	139	30	0	169	4	163	0	0	167	0	0	0	0	0	18	0	11	0	29	365
05:00 PM	0	142	24	0	166	5	178	0	0	183	0	0	0	0	0	28	0	12	0	40	389
05:15 PM	0	147	27	0	174	5	175	0	0	180	0	0	0	0	0	22	0	13	0	35	389
05:30 PM	0	139	28	0	167	3	164	0	0	167	0	0	0	0	0	25	0	9	0	34	368
Total Volume	0	567	109	0	676	17	680	0	0	697	0	0	0	0	0	93	0	45	0	138	1511
% App. Total		83.9	16.1			97.6					67.4					32.6					
PHF	.000	.964	.908	.000	.971	.850	.955	.000	.000	.952	.000	.000	.000	.000	.000	.830	.000	.865	.000	.863	.971



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TMC Data
 Rosebud Rd @ Brushy Fork Rd (Roundabout)
 Snellville, GA
 7-9 AM | 4-6 PM

File Name : 47570005
 Site Code : 47570005
 Start Date : 3/15/2023
 Page No : 1

Groups Printed- Cars, Buses and Trucks

Start Time	Rosebud Rd Northbound					Rosebud Rd Southbound					Private Drwy Eastbound					Brushy Fork Rd Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	0	109	0	0	109	13	80	0	0	93	0	0	0	0	0	2	0	19	0	21	223
07:15 AM	0	119	1	0	120	12	77	0	0	89	0	0	0	0	0	1	0	30	0	31	240
07:30 AM	0	106	4	0	110	31	82	0	0	113	0	0	0	0	0	4	0	41	0	45	268
07:45 AM	0	137	3	0	140	37	66	0	0	103	0	0	0	0	0	3	0	45	0	48	291
Total	0	471	8	0	479	93	305	0	0	398	0	0	0	0	0	10	0	135	0	145	1022
08:00 AM	0	108	0	0	108	48	98	0	0	146	0	0	0	0	0	1	0	35	0	36	290
08:15 AM	0	125	7	0	132	59	85	0	0	144	0	0	0	0	0	5	0	50	0	55	331
08:30 AM	0	113	2	0	115	65	66	0	0	131	0	0	0	0	0	3	0	62	0	65	311
08:45 AM	0	100	5	0	105	33	86	0	0	119	0	0	0	0	0	6	0	58	0	64	288
Total	0	446	14	0	460	205	335	0	0	540	0	0	0	0	0	15	0	205	0	220	1220
*** BREAK ***																					
04:00 PM	0	107	8	0	115	41	129	0	0	170	0	0	0	0	0	5	0	32	0	37	322
04:15 PM	0	115	9	0	124	44	133	0	0	177	0	0	0	0	0	7	0	36	0	43	344
04:30 PM	0	108	11	0	119	31	122	0	0	153	0	0	0	0	0	7	0	40	0	47	319
04:45 PM	0	96	6	0	102	35	131	0	0	166	0	0	0	0	0	6	0	37	0	43	311
Total	0	426	34	0	460	151	515	0	0	666	0	0	0	0	0	25	0	145	0	170	1296
05:00 PM	0	109	4	0	113	43	135	0	0	178	0	0	0	0	0	6	0	42	0	48	339
05:15 PM	0	122	7	0	129	38	139	0	0	177	0	0	0	0	0	4	0	36	0	40	346
05:30 PM	0	106	5	0	111	42	147	0	0	189	0	0	0	0	0	3	0	35	0	38	338
05:45 PM	0	120	6	0	126	30	126	0	0	156	0	0	0	0	0	4	0	47	0	51	333
Total	0	457	22	0	479	153	547	0	0	700	0	0	0	0	0	17	0	160	0	177	1356
Grand Total	0	1800	78	0	1878	602	1702	0	0	2304	0	0	0	0	0	67	0	645	0	712	4894
Apprch %	0	95.8	4.2	0		26.1	73.9	0	0		0	0	0	0		9.4	0	90.6	0		
Total %	0	36.8	1.6	0	38.4	12.3	34.8	0	0	47.1	0	0	0	0		1.4	0	13.2	0	14.5	

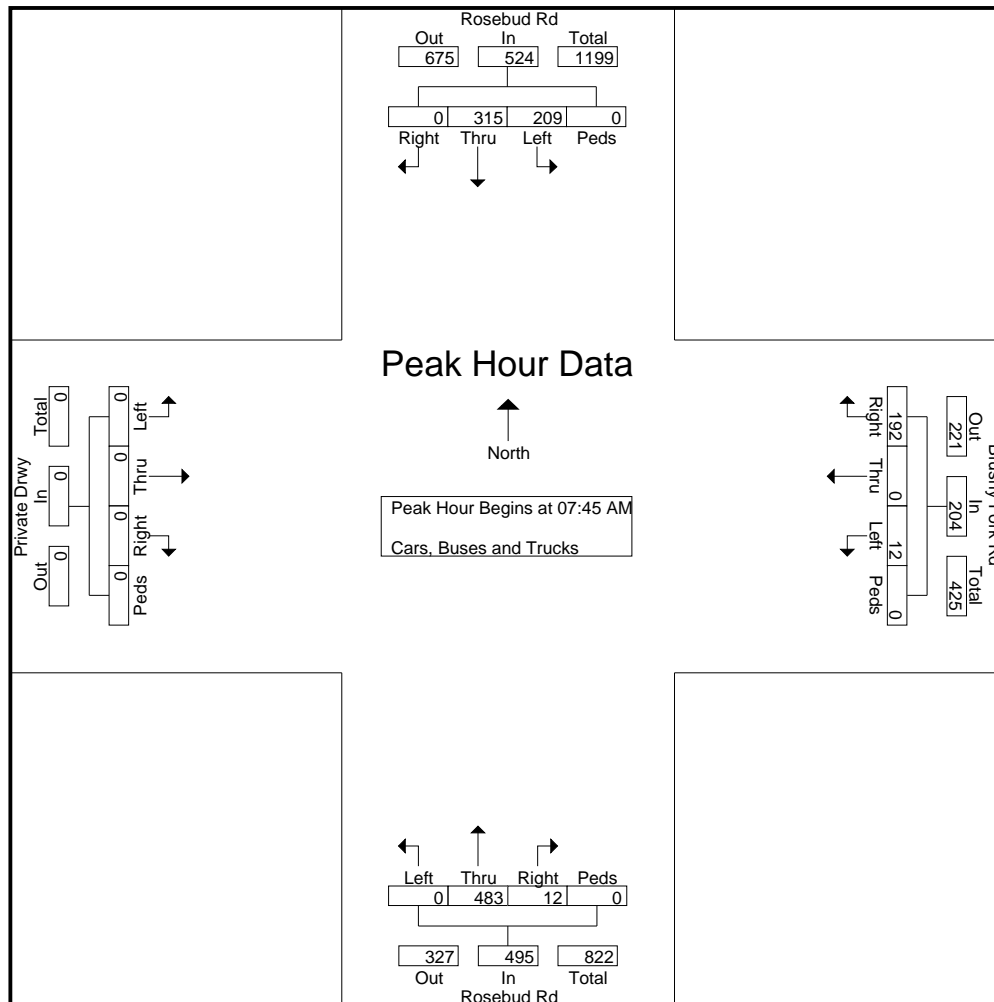
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TMC Data
 Rosebud Rd @ Brushy Fork Rd (Roundabout)
 Snellville, GA
 7-9 AM | 4-6 PM

File Name : 47570005
 Site Code : 47570005
 Start Date : 3/15/2023
 Page No : 2

Start Time	Rosebud Rd Northbound					Rosebud Rd Southbound					Private Drwy Eastbound					Brushy Fork Rd Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	137	3	0	140	37	66	0	0	103	0	0	0	0	0	3	0	45	0	48	291
08:00 AM	0	108	0	0	108	48	98	0	0	146	0	0	0	0	0	1	0	35	0	36	290
08:15 AM	0	125	7	0	132	59	85	0	0	144	0	0	0	0	0	5	0	50	0	55	331
08:30 AM	0	113	2	0	115	65	66	0	0	131	0	0	0	0	0	3	0	62	0	65	311
Total Volume	0	483	12	0	495	209	315	0	0	524	0	0	0	0	0	12	0	192	0	204	1223
% App. Total	97.6					39.9 60.1										94.1					
PHF	.000	.881	.429	.000	.884	.804	.804	.000	.000	.897	.000	.000	.000	.000	.000	.600	.000	.774	.000	.785	.924



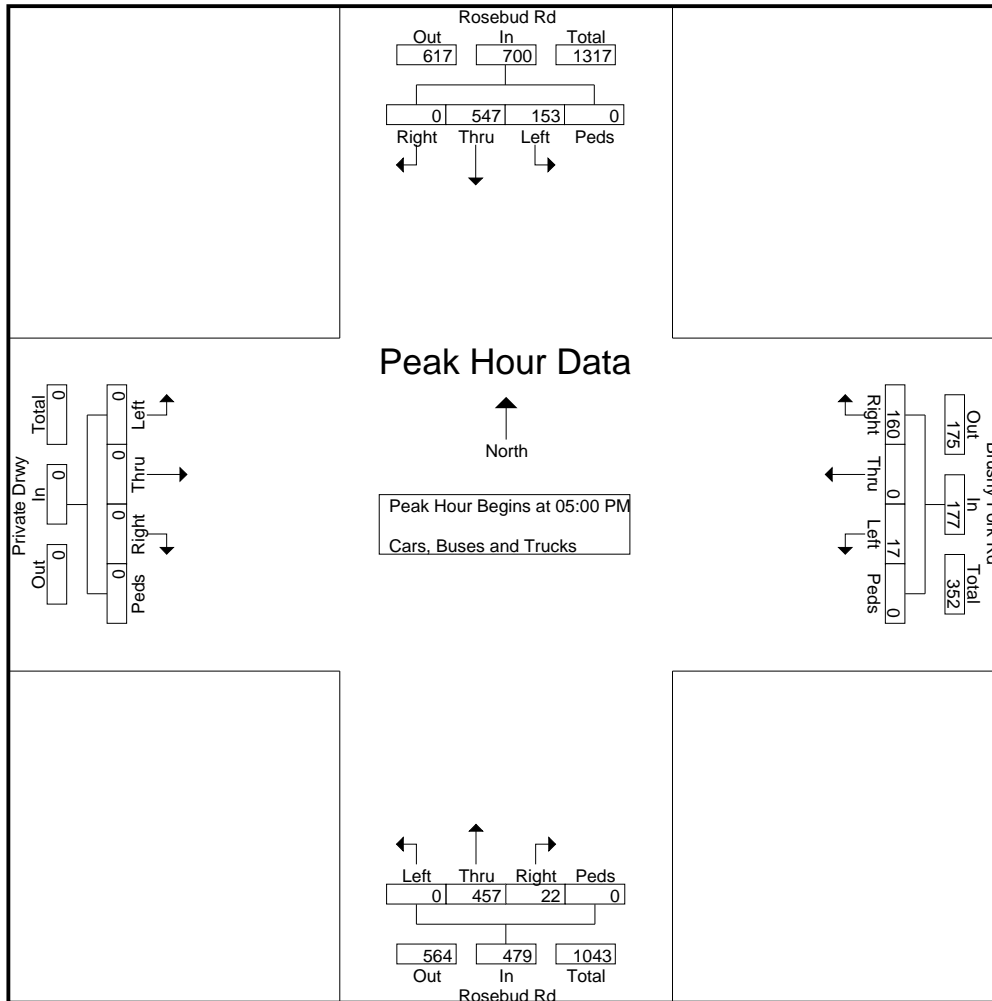
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TMC Data
 Rosebud Rd @ Brushy Fork Rd (Roundabout)
 Snellville, GA
 7-9 AM | 4-6 PM

File Name : 47570005
 Site Code : 47570005
 Start Date : 3/15/2023
 Page No : 3

Start Time	Rosebud Rd Northbound					Rosebud Rd Southbound					Private Drwy Eastbound					Brushy Fork Rd Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	109	4	0	113	43	135	0	0	178	0	0	0	0	0	6	0	42	0	48	339
05:15 PM	0	122	7	0	129	38	139	0	0	177	0	0	0	0	0	4	0	36	0	40	346
05:30 PM	0	106	5	0	111	42	147	0	0	189	0	0	0	0	0	3	0	35	0	38	338
05:45 PM	0	120	6	0	126	30	126	0	0	156	0	0	0	0	0	4	0	47	0	51	333
Total Volume	0	457	22	0	479	153	547	0	0	700	0	0	0	0	0	17	0	160	0	177	1356
% App. Total	95.4					21.9 78.1					90.4										
PHF	.000	.936	.786	.000	.928	.890	.930	.000	.000	.926	.000	.000	.000	.000	.000	.708	.000	.851	.000	.868	.980



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TMC Data
 Rosebud Rd @ Cooper Rd
 Snellville, GA
 7-9 AM | 4-6 PM

File Name : 47570006
 Site Code : 47570006
 Start Date : 3/15/2023
 Page No : 1

Groups Printed- Cars, Buses and Trucks

Start Time	Rosebud Rd Northbound					Rosebud Rd Southbound					Cooper Rd Eastbound					Cooper Rd Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	6	128	18	0	152	11	59	23	0	93	25	59	6	0	90	19	113	25	0	157	492
07:15 AM	12	122	17	0	151	12	78	28	0	118	33	24	0	0	57	29	110	23	0	162	488
07:30 AM	11	121	25	0	157	11	67	24	0	102	31	52	4	0	87	19	109	24	0	152	498
07:45 AM	17	111	29	0	157	16	77	23	0	116	31	78	9	0	118	28	112	35	0	175	566
Total	46	482	89	0	617	50	281	98	0	429	120	213	19	0	352	95	444	107	0	646	2044
08:00 AM	10	125	25	0	160	20	89	28	0	137	30	73	6	0	109	25	87	45	0	157	563
08:15 AM	12	97	23	0	132	19	89	29	0	137	30	76	16	0	122	23	82	39	0	144	535
08:30 AM	3	116	18	0	137	16	85	22	0	123	33	53	5	0	91	27	67	34	0	128	479
08:45 AM	7	94	31	0	132	17	74	42	0	133	32	49	5	0	86	30	74	47	0	151	502
Total	32	432	97	0	561	72	337	121	0	530	125	251	32	0	408	105	310	165	0	580	2079
*** BREAK ***																					
04:00 PM	7	95	34	0	136	36	99	38	0	173	30	100	9	0	139	26	82	29	0	137	585
04:15 PM	8	102	42	0	152	57	113	22	0	192	38	110	11	0	159	48	53	36	0	137	640
04:30 PM	2	96	45	0	143	45	99	35	0	179	25	89	9	0	123	48	81	26	0	155	600
04:45 PM	0	110	40	0	150	27	101	39	0	167	25	106	1	0	132	27	78	36	0	141	590
Total	17	403	161	0	581	165	412	134	0	711	118	405	30	0	553	149	294	127	0	570	2415
05:00 PM	1	87	43	0	131	30	110	36	0	176	40	100	5	0	145	46	79	32	0	157	609
05:15 PM	2	114	42	0	158	37	118	35	0	190	30	94	4	0	128	36	68	17	0	121	597
05:30 PM	2	100	37	0	139	39	103	34	0	176	36	90	4	0	130	34	80	24	0	138	583
05:45 PM	2	89	46	0	137	22	107	29	0	158	27	112	3	0	142	45	74	32	0	151	588
Total	7	390	168	0	565	128	438	134	0	700	133	396	16	0	545	161	301	105	0	567	2377
Grand Total	102	1707	515	0	2324	415	1468	487	0	2370	496	1265	97	0	1858	510	1349	504	0	2363	8915
Apprch %	4.4	73.5	22.2	0		17.5	61.9	20.5	0		26.7	68.1	5.2	0		21.6	57.1	21.3	0		
Total %	1.1	19.1	5.8	0	26.1	4.7	16.5	5.5	0	26.6	5.6	14.2	1.1	0	20.8	5.7	15.1	5.7	0	26.5	

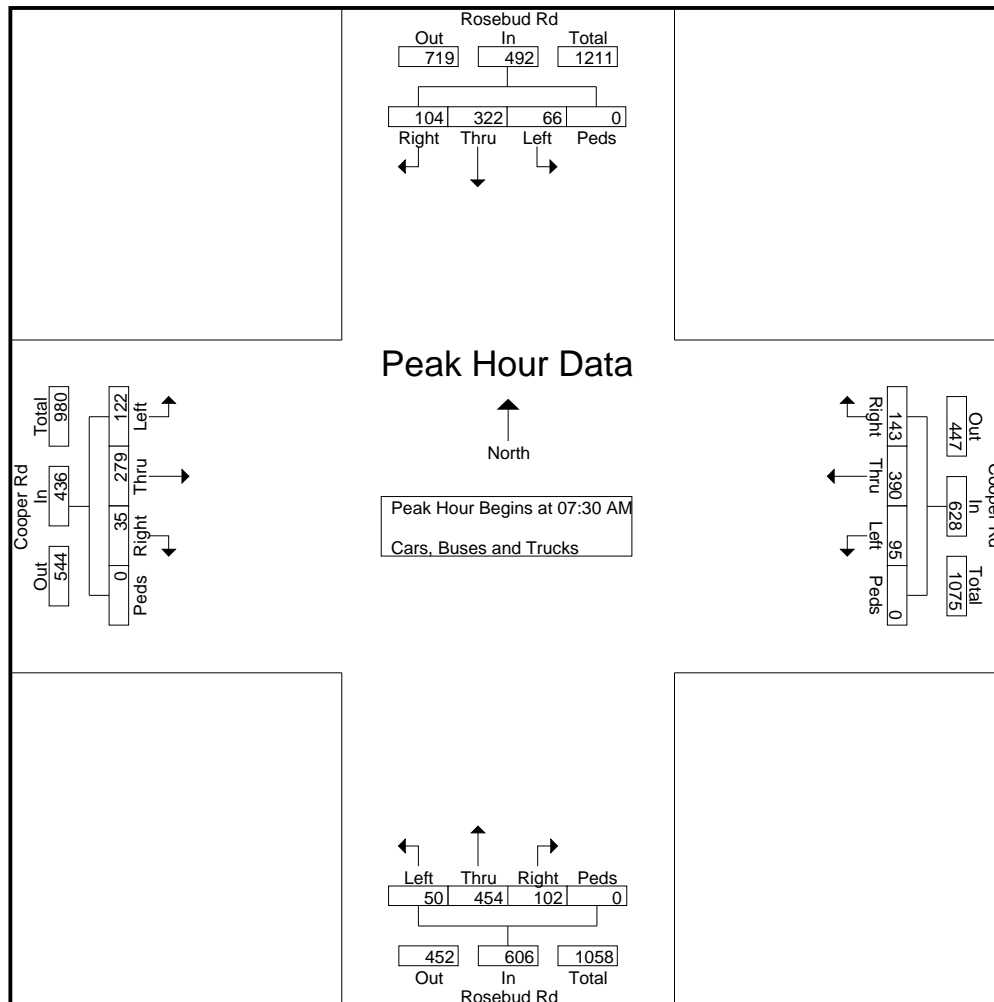
Reliable Traffic Data Services

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 Info@reliabletraffic.org | www.reliabletraffic.org

TMC Data
 Rosebud Rd @ Cooper Rd
 Snellville, GA
 7-9 AM | 4-6 PM

File Name : 47570006
 Site Code : 47570006
 Start Date : 3/15/2023
 Page No : 2

Start Time	Rosebud Rd Northbound					Rosebud Rd Southbound					Cooper Rd Eastbound					Cooper Rd Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	11	121	25	0	157	11	67	24	0	102	31	52	4	0	87	19	109	24	0	152	498
07:45 AM	17	111	29	0	157	16	77	23	0	116	31	78	9	0	118	28	112	35	0	175	566
08:00 AM	10	125	25	0	160	20	89	28	0	137	30	73	6	0	109	25	87	45	0	157	563
08:15 AM	12	97	23	0	132	19	89	29	0	137	30	76	16	0	122	23	82	39	0	144	535
Total Volume	50	454	102	0	606	66	322	104	0	492	122	279	35	0	436	95	390	143	0	628	2162
% App. Total		74.9	16.8			13.4	65.4	21.1								15.1	62.1	22.8			
PHF	.735	.908	.879	.000	.947	.825	.904	.897	.000	.898	.984	.894	.547	.000	.893	.848	.871	.794	.000	.897	.955



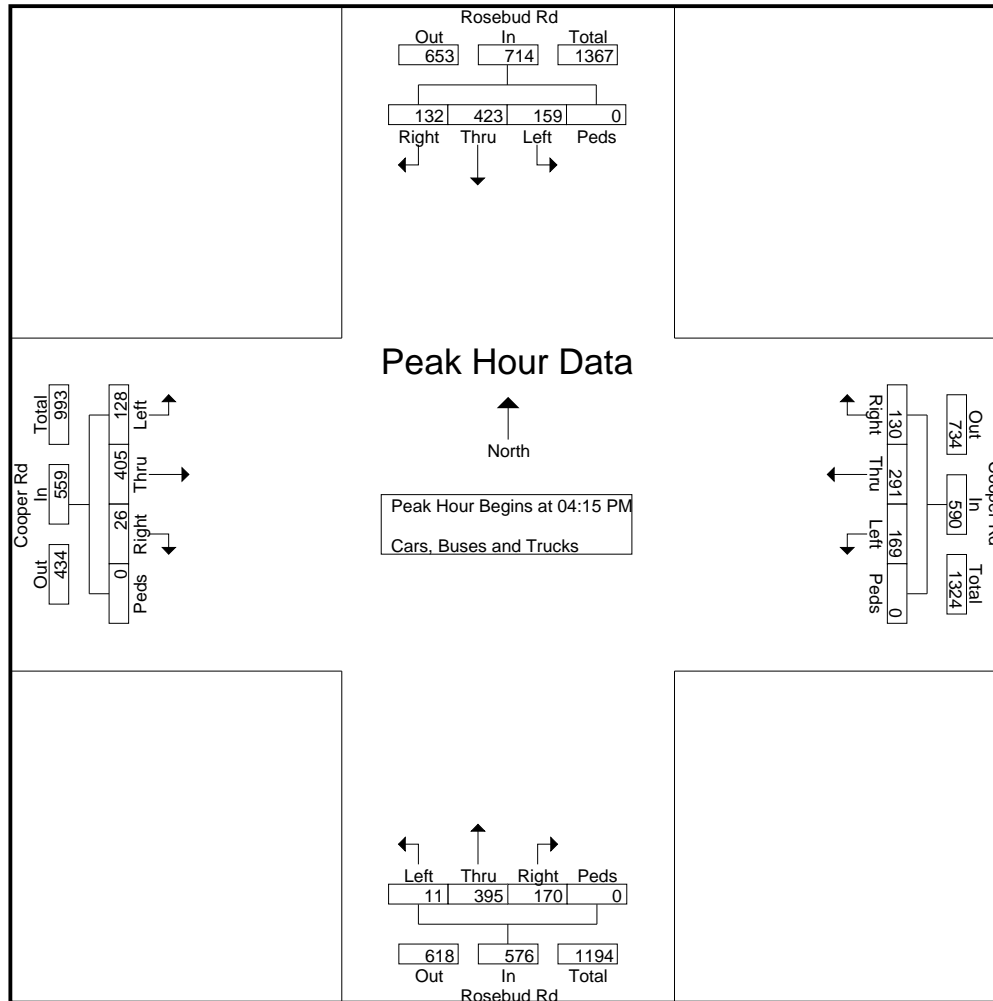
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TMC Data
 Rosebud Rd @ Cooper Rd
 Snellville, GA
 7-9 AM | 4-6 PM

File Name : 47570006
 Site Code : 47570006
 Start Date : 3/15/2023
 Page No : 3

Start Time	Rosebud Rd Northbound					Rosebud Rd Southbound					Cooper Rd Eastbound					Cooper Rd Westbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	8	102	42	0	152	57	113	22	0	192	38	110	11	0	159	48	53	36	0	137	640
04:30 PM	2	96	45	0	143	45	99	35	0	179	25	89	9	0	123	48	81	26	0	155	600
04:45 PM	0	110	40	0	150	27	101	39	0	167	25	106	1	0	132	27	78	36	0	141	590
05:00 PM	1	87	43	0	131	30	110	36	0	176	40	100	5	0	145	46	79	32	0	157	609
Total Volume	11	395	170	0	576	159	423	132	0	714	128	405	26	0	559	169	291	130	0	590	2439
% App. Total		68.6	29.5			22.3	59.2	18.5			22.9	72.5				28.6	49.3				
PHF	.344	.898	.944	.000	.947	.697	.936	.846	.000	.930	.800	.920	.591	.000	.879	.880	.898	.903	.000	.939	.953



Appendix B

Intersection Analysis Methodology

Intersection Analysis Methodology

The methodology used for evaluating traffic operations at intersections is presented in the Transportation Research Board's *Highway Capacity Manual*, 2016 edition (HCM 6). Synchro 10 software, which emulates the HCM 6 methodology, was used for all analyses. The following is an overview of the methodology employed for the analysis of signalized intersections and roundabouts and stop-sign controlled (unsignalized) intersections. Levels of service (LOS) are assigned letters A through F. LOS A indicates operations with very low control delay while LOS F describes operations with high control delay. LOS F is considered to be unacceptable by most drivers, while LOS E is typically considered to be the limit of acceptable delay.

Signalized Intersections and Roundabouts – Level of service for a signalized intersection and a roundabout is defined in terms of control delay per vehicle. For signalized intersections and roundabouts, a composite intersection level of service is determined. The thresholds for each level of service are higher for signalized intersections and roundabouts than for unsignalized intersections. This is attributable to a variety of factors including expectation and acceptance of higher delays at signals/roundabouts, and the fact that drivers can relax when waiting at a signal as opposed to having to remain attentive as they proceed through the unsignalized intersection. The level of service criteria for signalized intersections and roundabouts are shown in Table A.

Table A – Level of Service Criteria for Signalized Intersections and Roundabouts

Control Delay (s/veh)	LOS
≤ 10	A
> 10 and ≤ 20	B
> 20 and ≤ 35	C
> 35 and ≤ 55	D
> 55 and ≤ 80	E
> 80	F

Source: Highway Capacity Manual 6

Unsignalized Intersections – Level of service for an unsignalized intersection is defined in terms of control delay per vehicle. Control delay is that portion of delay attributable to the control device and includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The delays at unsignalized intersections are based on gap acceptance theory, factoring in availability of gaps, usefulness of the gaps, and the priority of right-of-way given to each traffic stream. The level of service criteria for unsignalized intersections are presented in Table B.

Table B – Level of Service Criteria for Unsignalized Intersections

Control Delay (s/veh)	LOS
0 – 10	A
> 10 and ≤ 15	B
> 15 and ≤ 25	C
> 25 and ≤ 35	D
> 35 and ≤ 50	E
> 50	F

Source: Highway Capacity Manual 6

Appendix C

Existing Intersection Operational Analysis

US 78 at Rosebud Multi-Use Development
 1: Cooper Springs Road/Cooper Road & US 78

existing a.m.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	669	9	17	1507	104	26	14	7	95	15	371
Future Volume (veh/h)	210	669	9	17	1507	104	26	14	7	95	15	371
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	233	743	10	20	1752	121	29	16	8	101	16	395
Peak Hour Factor	0.90	0.90	0.90	0.86	0.86	0.86	0.90	0.90	0.90	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	267	2342	1044	443	1816	810	80	284	142	400	15	369
Arrive On Green	0.10	0.66	0.66	0.68	0.68	0.68	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	1781	3554	1585	710	3554	1585	975	1176	588	1387	62	1532
Grp Volume(v), veh/h	233	743	10	20	1752	121	29	0	24	101	0	411
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	710	1777	1585	975	0	1764	1387	0	1595
Q Serve(g_s), s	6.8	8.1	0.2	0.8	41.3	2.4	0.0	0.0	0.9	5.4	0.0	21.7
Cycle Q Clear(g_c), s	6.8	8.1	0.2	0.8	41.3	2.4	21.7	0.0	0.9	6.4	0.0	21.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.33	1.00		0.96
Lane Grp Cap(c), veh/h	267	2342	1044	443	1816	810	80	0	425	400	0	384
V/C Ratio(X)	0.87	0.32	0.01	0.05	0.96	0.15	0.36	0.00	0.06	0.25	0.00	1.07
Avail Cap(c_a), veh/h	269	2365	1055	447	1836	819	80	0	425	400	0	384
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.0	6.6	5.3	7.2	13.7	7.4	45.0	0.0	26.3	28.7	0.0	34.2
Incr Delay (d2), s/veh	25.3	0.1	0.0	0.0	13.5	0.1	12.3	0.0	0.3	1.5	0.0	65.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	2.1	0.0	0.1	10.4	0.7	0.9	0.0	0.4	1.9	0.0	14.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.3	6.7	5.3	7.2	27.2	7.5	57.3	0.0	26.5	30.2	0.0	99.7
LnGrp LOS	D	A	A	A	C	A	E	A	C	C	A	F
Approach Vol, veh/h		986			1893			53				512
Approach Delay, s/veh		17.0			25.7			43.3				86.0
Approach LOS		B			C			D				F
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		26.2		63.8		26.2	13.3	50.5				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		21.1		59.9		21.1	8.9	46.5				
Max Q Clear Time (g_c+I1), s		23.7		10.1		23.7	8.8	43.3				
Green Ext Time (p_c), s		0.0		5.0		0.0	0.0	2.7				
Intersection Summary												
HCM 6th Ctrl Delay				32.5								
HCM 6th LOS				C								

US 78 at Rosebud Multi-Use Development

3: Rosebud Road & US 78

existing a.m.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	712	129	107	1252	158	186	465	92	141	329	39
Future Volume (veh/h)	10	712	129	107	1252	158	186	465	92	141	329	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1841	1870	1870	1841	1870
Adj Flow Rate, veh/h	11	782	142	126	1473	186	200	500	0	164	383	0
Peak Hour Factor	0.91	0.91	0.91	0.85	0.85	0.85	0.93	0.93	0.93	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	2
Cap, veh/h	94	987	179	280	1573	702	374	637		281	598	
Arrive On Green	0.66	0.66	0.66	0.06	0.44	0.44	0.08	0.35	0.00	0.06	0.33	0.00
Sat Flow, veh/h	300	3004	545	1781	3554	1585	1781	1841	1585	1781	1841	1585
Grp Volume(v), veh/h	11	463	461	126	1473	186	200	500	0	164	383	0
Grp Sat Flow(s),veh/h/ln	300	1777	1772	1781	1777	1585	1781	1841	1585	1781	1841	1585
Q Serve(g_s), s	3.2	16.8	16.8	4.0	35.5	6.7	6.7	21.9	0.0	5.5	16.0	0.0
Cycle Q Clear(g_c), s	28.4	16.8	16.8	4.0	35.5	6.7	6.7	21.9	0.0	5.5	16.0	0.0
Prop In Lane	1.00		0.31	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	94	584	582	280	1573	702	374	637		281	598	
V/C Ratio(X)	0.12	0.79	0.79	0.45	0.94	0.27	0.53	0.78		0.58	0.64	
Avail Cap(c_a), veh/h	94	584	582	303	1599	713	374	637		281	598	
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	27.5	13.2	13.2	19.0	23.9	15.8	19.6	26.4	0.0	21.7	25.9	0.0
Incr Delay (d2), s/veh	0.5	7.3	7.4	1.1	10.7	0.2	1.5	9.4	0.0	3.1	5.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	4.7	4.7	1.5	14.8	2.1	2.7	10.4	0.0	2.4	7.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.1	20.6	20.6	20.2	34.6	16.0	21.1	35.8	0.0	24.8	31.1	0.0
LnGrp LOS	C	C	C	C	C	B	C	D		C	C	
Approach Vol, veh/h		935			1785			700	A		547	A
Approach Delay, s/veh		20.7			31.6			31.6			29.2	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	35.7	10.3	34.1	11.9	33.8		44.3				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.5	30.5	6.9	29.1	7.4	28.6		40.5				
Max Q Clear Time (g_c+I1), s	7.5	23.9	6.0	30.4	8.7	18.0		37.5				
Green Ext Time (p_c), s	0.0	1.6	0.0	0.0	0.0	1.5		2.3				

Intersection Summary

HCM 6th Ctrl Delay	28.7
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

US 78 at Rosebud Multi-Use Development
 2: US 78 & Midway Station Access

existing a.m.

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	808	1578	3	0	0
Future Vol, veh/h	1	808	1578	3	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	88	88	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	878	1793	3	0	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1796	0	-	0	2234 897
Stage 1	-	-	-	-	1793 -
Stage 2	-	-	-	-	441 -
Critical Hdwy	4.14	-	-	-	6.84 6.94
Critical Hdwy Stg 1	-	-	-	-	5.84 -
Critical Hdwy Stg 2	-	-	-	-	5.84 -
Follow-up Hdwy	2.22	-	-	-	3.52 3.32
Pot Cap-1 Maneuver	340	-	-	-	36 283
Stage 1	-	-	-	-	118 -
Stage 2	-	-	-	-	616 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	340	-	-	-	36 283
Mov Cap-2 Maneuver	-	-	-	-	36 -
Stage 1	-	-	-	-	118 -
Stage 2	-	-	-	-	616 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	340	-	-	-	-
HCM Lane V/C Ratio	0.003	-	-	-	-
HCM Control Delay (s)	15.6	-	-	-	0
HCM Lane LOS	C	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

US 78 at Rosebud Multi-Use Development
4: Rosebud Road & Kroger Access

existing a.m.

Intersection						
Int Delay, s/veh	2.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	47	51	675	81	14	565
Future Vol, veh/h	47	51	675	81	14	565
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	95	95	93	93
Heavy Vehicles, %	2	2	4	2	2	4
Mvmt Flow	53	58	711	85	15	608

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1392	754	0	0	796
Stage 1	754	-	-	-	-
Stage 2	638	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	156	409	-	-	826
Stage 1	465	-	-	-	-
Stage 2	526	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	152	409	-	-	826
Mov Cap-2 Maneuver	152	-	-	-	-
Stage 1	452	-	-	-	-
Stage 2	526	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	35.5	0	0.2
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	226	826
HCM Lane V/C Ratio	-	-	0.493	0.018
HCM Control Delay (s)	-	-	35.5	9.4
HCM Lane LOS	-	-	E	A
HCM 95th %tile Q(veh)	-	-	2.5	0.1

US 78 at Rosebud Multi-Use Development
5: Rosebud Road & Bushy Fork Road

existing a.m.

Intersection						
Int Delay, s/veh	6.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	T		T		T	
Traffic Vol, veh/h	12	192	483	12	209	315
Future Vol, veh/h	12	192	483	12	209	315
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	79	79	88	88	90	90
Heavy Vehicles, %	2	2	4	2	2	4
Mvmt Flow	15	243	549	14	232	350

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1370	556	0	0	563
Stage 1	556	-	-	-	-
Stage 2	814	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	161	531	-	-	1008
Stage 1	574	-	-	-	-
Stage 2	436	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	115	531	-	-	1008
Mov Cap-2 Maneuver	115	-	-	-	-
Stage 1	410	-	-	-	-
Stage 2	436	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.4	0	3.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	438	1008
HCM Lane V/C Ratio	-	-	0.59	0.23
HCM Control Delay (s)	-	-	24.4	9.6
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	3.7	0.9

US 78 at Rosebud Multi-Use Development
6: Rosebud Road & Cooper Road

existing a.m.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	279	35	95	390	143	50	454	102	66	322	104
Future Volume (veh/h)	122	279	35	95	390	143	50	454	102	66	322	104
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1841	1870	1870	1841	1870
Adj Flow Rate, veh/h	137	313	0	106	433	0	53	478	107	73	358	116
Peak Hour Factor	0.89	0.89	0.89	0.90	0.90	0.90	0.95	0.95	0.95	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	2
Cap, veh/h	265	523		344	507		389	699	602	316	712	613
Arrive On Green	0.07	0.28	0.00	0.06	0.27	0.00	0.04	0.38	0.38	0.05	0.39	0.39
Sat Flow, veh/h	1781	1870	0	1781	1870	0	1781	1841	1585	1781	1841	1585
Grp Volume(v), veh/h	137	313	0	106	433	0	53	478	107	73	358	116
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	1870	0	1781	1841	1585	1781	1841	1585
Q Serve(g_s), s	4.3	11.4	0.0	3.3	17.3	0.0	1.4	17.1	3.5	1.9	11.7	3.8
Cycle Q Clear(g_c), s	4.3	11.4	0.0	3.3	17.3	0.0	1.4	17.1	3.5	1.9	11.7	3.8
Prop In Lane	1.00		0.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	265	523		344	507		389	699	602	316	712	613
V/C Ratio(X)	0.52	0.60		0.31	0.85		0.14	0.68	0.18	0.23	0.50	0.19
Avail Cap(c_a), veh/h	265	729		378	748		427	699	602	342	712	613
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.7	24.5	0.0	19.5	27.2	0.0	14.3	20.4	16.2	15.4	18.4	16.0
Incr Delay (d2), s/veh	1.8	1.1	0.0	0.5	6.4	0.0	0.2	5.4	0.6	0.4	2.5	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	4.9	0.0	1.3	8.1	0.0	0.5	7.5	1.3	0.7	4.9	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.5	25.6	0.0	20.0	33.7	0.0	14.5	25.8	16.9	15.7	20.9	16.6
LnGrp LOS	C	C		B	C		B	C	B	B	C	B
Approach Vol, veh/h		450	A		539	A		638			547	
Approach Delay, s/veh		24.7			31.0			23.4			19.3	
Approach LOS		C			C			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.5	34.4	9.3	26.5	7.9	35.0	10.0	25.8				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.1	29.9	6.3	30.7	5.1	29.9	5.5	31.5				
Max Q Clear Time (g_c+I1), s	3.9	19.1	5.3	13.4	3.4	13.7	6.3	19.3				
Green Ext Time (p_c), s	0.0	2.3	0.0	1.6	0.0	2.1	0.0	2.0				
Intersection Summary												
HCM 6th Ctrl Delay			24.5									
HCM 6th LOS			C									
Notes												
Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.												

US 78 at Rosebud Multi-Use Development
 1: Cooper Springs Road/Cooper Road & US 78

existing p.m.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑	↗	↘	↗	↘	↘	↗	↘
Traffic Volume (veh/h)	449	1395	50	33	1176	56	41	32	35	89	30	294
Future Volume (veh/h)	449	1395	50	33	1176	56	41	32	35	89	30	294
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	473	1468	53	33	1188	57	47	37	40	92	31	303
Peak Hour Factor	0.95	0.95	0.95	0.99	0.99	0.99	0.87	0.87	0.87	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	509	2238	998	194	1262	563	168	230	249	398	42	409
Arrive On Green	0.23	0.63	0.63	0.71	0.71	0.71	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	1781	3554	1585	343	3554	1585	1046	822	889	1322	149	1459
Grp Volume(v), veh/h	473	1468	53	33	1188	57	47	0	77	92	0	334
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	343	1777	1585	1046	0	1710	1322	0	1608
Q Serve(g_s), s	20.2	26.1	1.3	3.5	29.2	1.1	4.3	0.0	3.4	5.6	0.0	18.9
Cycle Q Clear(g_c), s	20.2	26.1	1.3	3.5	29.2	1.1	23.1	0.0	3.4	9.0	0.0	18.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.52	1.00		0.91
Lane Grp Cap(c), veh/h	509	2238	998	194	1262	563	168	0	479	398	0	451
V/C Ratio(X)	0.93	0.66	0.05	0.17	0.94	0.10	0.28	0.00	0.16	0.23	0.00	0.74
Avail Cap(c_a), veh/h	593	2505	1117	203	1361	607	168	0	479	398	0	451
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.8	11.7	7.1	9.8	13.6	9.5	43.2	0.0	27.1	30.5	0.0	32.7
Incr Delay (d2), s/veh	19.6	0.5	0.0	0.4	12.5	0.1	4.1	0.0	0.7	1.4	0.0	10.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.0	8.0	0.4	0.2	6.5	0.4	1.3	0.0	1.5	1.9	0.0	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.4	12.2	7.1	10.3	26.1	9.6	47.3	0.0	27.8	31.9	0.0	43.2
LnGrp LOS	D	B	A	B	C	A	D	A	C	C	A	D
Approach Vol, veh/h		1994			1278			124				426
Approach Delay, s/veh		20.2			24.9			35.2				40.7
Approach LOS		C			C			D				D
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		32.5		67.5		32.5	27.5	40.0				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		20.5		70.5		20.5	27.7	38.3				
Max Q Clear Time (g_c+I1), s		25.1		28.1		20.9	22.2	31.2				
Green Ext Time (p_c), s		0.0		13.5		0.0	0.8	4.3				
Intersection Summary												
HCM 6th Ctrl Delay				24.5								
HCM 6th LOS				C								

US 78 at Rosebud Multi-Use Development

3: Rosebud Road & US 78

existing p.m.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	1251	173	142	1004	167	160	379	68	225	396	37
Future Volume (veh/h)	54	1251	173	142	1004	167	160	379	68	225	396	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1841	1870	1870	1841	1870
Adj Flow Rate, veh/h	56	1290	178	143	1014	169	170	403	0	245	430	0
Peak Hour Factor	0.97	0.97	0.97	0.99	0.99	0.99	0.94	0.94	0.94	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	2
Cap, veh/h	225	1303	179	172	1834	818	248	456		288	534	
Arrive On Green	0.14	0.14	0.14	0.06	0.52	0.52	0.06	0.25	0.00	0.10	0.29	0.00
Sat Flow, veh/h	474	3139	431	1781	3554	1585	1781	1841	1585	1781	1841	1585
Grp Volume(v), veh/h	56	727	741	143	1014	169	170	403	0	245	430	0
Grp Sat Flow(s),veh/h/ln	474	1777	1793	1781	1777	1585	1781	1841	1585	1781	1841	1585
Q Serve(g_s), s	11.0	40.8	41.3	4.4	19.3	5.8	5.9	21.1	0.0	10.1	21.6	0.0
Cycle Q Clear(g_c), s	20.2	40.8	41.3	4.4	19.3	5.8	5.9	21.1	0.0	10.1	21.6	0.0
Prop In Lane	1.00		0.24	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	225	737	744	172	1834	818	248	456		288	534	
V/C Ratio(X)	0.25	0.99	1.00	0.83	0.55	0.21	0.69	0.88		0.85	0.81	
Avail Cap(c_a), veh/h	225	737	744	172	1834	818	248	456		288	534	
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.3	42.9	43.1	23.5	16.4	13.1	31.3	36.2	0.0	26.6	32.9	0.0
Incr Delay (d2), s/veh	0.6	29.4	32.0	27.4	0.4	0.1	7.7	21.2	0.0	20.6	12.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	25.1	26.0	2.9	6.8	1.8	1.6	11.6	0.0	5.6	10.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.8	72.3	75.1	51.0	16.8	13.2	39.0	57.4	0.0	47.2	45.1	0.0
LnGrp LOS	D	E	E	D	B	B	D	E		D	D	
Approach Vol, veh/h		1524			1326			573	A		675	A
Approach Delay, s/veh		72.4			20.0			51.9			45.9	
Approach LOS		E			B			D			D	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	14.6	29.3	10.1	46.0	10.4	33.5		56.1				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.1	24.8	5.6	41.5	5.9	29.0		51.6				
Max Q Clear Time (g_c+I1), s	12.1	23.1	6.4	43.3	7.9	23.6		21.3				
Green Ext Time (p_c), s	0.0	0.4	0.0	0.0	0.0	1.1		7.8				

Intersection Summary

HCM 6th Ctrl Delay	48.2
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

US 78 at Rosebud Multi-Use Development
 2: US 78 & Midway Station Access

existing p.m.

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	1491	1228	7	8	17
Future Vol, veh/h	12	1491	1228	7	8	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	99	99	97	97	70	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	1506	1266	7	11	22

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1273	0	-	0	2043 633
Stage 1	-	-	-	-	1266 -
Stage 2	-	-	-	-	777 -
Critical Hdwy	4.14	-	-	-	6.84 6.94
Critical Hdwy Stg 1	-	-	-	-	5.84 -
Critical Hdwy Stg 2	-	-	-	-	5.84 -
Follow-up Hdwy	2.22	-	-	-	3.52 3.32
Pot Cap-1 Maneuver	541	-	-	-	49 422
Stage 1	-	-	-	-	229 -
Stage 2	-	-	-	-	414 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	541	-	-	-	48 422
Mov Cap-2 Maneuver	-	-	-	-	48 -
Stage 1	-	-	-	-	224 -
Stage 2	-	-	-	-	414 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	48.6
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	541	-	-	-	115
HCM Lane V/C Ratio	0.022	-	-	-	0.289
HCM Control Delay (s)	11.8	-	-	-	48.6
HCM Lane LOS	B	-	-	-	E
HCM 95th %tile Q(veh)	0.1	-	-	-	1.1

US 78 at Rosebud Multi-Use Development
4: Rosebud Road & Kroger Access

existing p.m.

Intersection						
Int Delay, s/veh	7.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	93	45	567	109	17	680
Future Vol, veh/h	93	45	567	109	17	680
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	97	97	95	95
Heavy Vehicles, %	2	2	4	2	2	4
Mvmt Flow	108	52	585	112	18	716

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1393	641	0	0	697
Stage 1	641	-	-	-	-
Stage 2	752	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	156	475	-	-	899
Stage 1	525	-	-	-	-
Stage 2	466	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	151	475	-	-	899
Mov Cap-2 Maneuver	151	-	-	-	-
Stage 1	508	-	-	-	-
Stage 2	466	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	76.4	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	194	899
HCM Lane V/C Ratio	-	-	0.827	0.02
HCM Control Delay (s)	-	-	76.4	9.1
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	5.9	0.1

US 78 at Rosebud Multi-Use Development
5: Rosebud Road & Bushy Fork Road

existing p.m.

Intersection						
Int Delay, s/veh	4.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	160	457	22	153	547
Future Vol, veh/h	17	160	457	22	153	547
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	93	93	93	93
Heavy Vehicles, %	2	2	4	2	2	4
Mvmt Flow	20	184	491	24	165	588























Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1421	503	0	0	515
Stage 1	503	-	-	-	-
Stage 2	918	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	150	569	-	-	1051
Stage 1	607	-	-	-	-
Stage 2	389	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	115	569	-	-	1051
Mov Cap-2 Maneuver	115	-	-	-	-
Stage 1	466	-	-	-	-
Stage 2	389	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21.9	0	2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	413	1051
HCM Lane V/C Ratio	-	-	0.493	0.157
HCM Control Delay (s)	-	-	21.9	9.1
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	2.6	0.6

US 78 at Rosebud Multi-Use Development
6: Rosebud Road & Cooper Road

existing p.m.

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	128	405	26	169	291	130	11	395	170	159	423	132
Future Volume (veh/h)	128	405	26	169	291	130	11	395	170	159	423	132
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1841	1870	1870	1841	1870
Adj Flow Rate, veh/h	145	460	0	180	310	0	12	416	179	171	455	142
Peak Hour Factor	0.88	0.88	0.88	0.94	0.94	0.94	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	2
Cap, veh/h	381	519		285	549		289	644	555	353	764	658
Arrive On Green	0.08	0.28	0.00	0.09	0.29	0.00	0.01	0.35	0.35	0.08	0.41	0.41
Sat Flow, veh/h	1781	1870	0	1781	1870	0	1781	1841	1585	1781	1841	1585
Grp Volume(v), veh/h	145	460	0	180	310	0	12	416	179	171	455	142
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	1870	0	1781	1841	1585	1781	1841	1585
Q Serve(g_s), s	5.1	21.2	0.0	6.4	12.6	0.0	0.4	17.1	7.5	5.2	17.3	5.2
Cycle Q Clear(g_c), s	5.1	21.2	0.0	6.4	12.6	0.0	0.4	17.1	7.5	5.2	17.3	5.2
Prop In Lane	1.00		0.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	381	519		285	549		289	644	555	353	764	658
V/C Ratio(X)	0.38	0.89		0.63	0.56		0.04	0.65	0.32	0.48	0.60	0.22
Avail Cap(c_a), veh/h	384	654		346	746		362	644	555	360	764	658
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.2	31.2	0.0	22.9	26.9	0.0	19.1	24.6	21.5	17.5	20.5	16.9
Incr Delay (d2), s/veh	0.6	11.8	0.0	2.6	0.9	0.0	0.1	4.9	1.5	1.0	3.4	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	10.8	0.0	2.7	5.6	0.0	0.2	7.7	2.9	2.0	7.4	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.8	43.0	0.0	25.5	27.9	0.0	19.1	29.5	23.0	18.6	23.9	17.7
LnGrp LOS	C	D		C	C		B	C	C	B	C	B
Approach Vol, veh/h		605	A		490	A		607			768	
Approach Delay, s/veh		37.9			27.0			27.4			21.6	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.7	36.0	12.9	29.5	5.8	41.9	11.5	30.9				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	7.5	31.5	11.5	31.5	5.0	34.0	7.1	35.9				
Max Q Clear Time (g_c+I1), s	7.2	19.1	8.4	23.2	2.4	19.3	7.1	14.6				
Green Ext Time (p_c), s	0.0	2.4	0.1	1.8	0.0	2.6	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay			28.1									
HCM 6th LOS			C									
Notes												
Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.												

US 78 at Rosebud Multi-Use Development
 1: Cooper Springs Road/Cooper Road & US 78

existing a.m. with mitigation



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	669	9	17	1507	104	26	14	7	95	15	371
Future Volume (veh/h)	210	669	9	17	1507	104	26	14	7	95	15	371
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	233	743	10	20	1752	121	29	16	8	101	16	395
Peak Hour Factor	0.90	0.90	0.90	0.86	0.86	0.86	0.90	0.90	0.90	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	266	2355	1050	445	1826	814	239	279	140	356	51	376
Arrive On Green	0.10	0.66	0.66	0.51	0.51	0.51	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	1781	3554	1585	710	3554	1585	975	1176	588	1186	216	1585
Grp Volume(v), veh/h	233	743	10	20	1752	121	29	0	24	117	0	395
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	710	1777	1585	975	0	1764	1402	0	1585
Q Serve(g_s), s	7.0	8.0	0.2	1.3	42.6	3.6	2.3	0.0	0.9	5.7	0.0	21.4
Cycle Q Clear(g_c), s	7.0	8.0	0.2	1.3	42.6	3.6	9.0	0.0	0.9	6.7	0.0	21.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.33	0.86		1.00
Lane Grp Cap(c), veh/h	266	2355	1050	445	1826	814	239	0	419	407	0	376
V/C Ratio(X)	0.88	0.32	0.01	0.04	0.96	0.15	0.12	0.00	0.06	0.29	0.00	1.05
Avail Cap(c_a), veh/h	266	2365	1055	447	1836	819	239	0	419	407	0	376
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.6	6.5	5.2	10.9	21.0	11.5	32.5	0.0	26.5	28.9	0.0	34.3
Incr Delay (d2), s/veh	26.1	0.1	0.0	0.0	12.8	0.1	1.0	0.0	0.3	1.8	0.0	60.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	2.1	0.0	0.2	17.3	1.1	0.6	0.0	0.4	2.2	0.0	13.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.7	6.6	5.2	11.0	33.8	11.6	33.5	0.0	26.8	30.7	0.0	94.4
LnGrp LOS	D	A	A	B	C	B	C	A	C	C	A	F
Approach Vol, veh/h		986			1893			53				512
Approach Delay, s/veh		17.2			32.1			30.5				79.9
Approach LOS		B			C			C				E
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		25.9		64.1		25.9	13.4	50.7				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		21.1		59.9		21.1	8.9	46.5				
Max Q Clear Time (g_c+I1), s		11.0		10.0		23.4	9.0	44.6				
Green Ext Time (p_c), s		0.1		5.0		0.0	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay				34.9								
HCM 6th LOS				C								

US 78 at Rosebud Multi-Use Development

3: Rosebud Road & US 78

existing a.m. with mitigation



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗↗	↖	↖	↗↗	↖	↖	↗	↖	↖	↗	↖
Traffic Volume (veh/h)	10	712	129	107	1252	158	186	465	92	141	329	39
Future Volume (veh/h)	10	712	129	107	1252	158	186	465	92	141	329	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1841	1870	1870	1841	1870
Adj Flow Rate, veh/h	11	782	142	126	1473	186	200	500	0	164	383	0
Peak Hour Factor	0.91	0.91	0.91	0.85	0.85	0.85	0.93	0.93	0.93	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	2
Cap, veh/h	96	1305	582	295	1475	658	344	609		254	580	
Arrive On Green	0.01	0.37	0.37	0.06	0.42	0.42	0.08	0.33	0.00	0.06	0.31	0.00
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	1841	1585	1781	1841	1585
Grp Volume(v), veh/h	11	782	142	126	1473	186	200	500	0	164	383	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1841	1585	1781	1841	1585
Q Serve(g_s), s	0.4	17.8	6.2	4.2	41.4	7.8	7.7	25.0	0.0	6.1	18.0	0.0
Cycle Q Clear(g_c), s	0.4	17.8	6.2	4.2	41.4	7.8	7.7	25.0	0.0	6.1	18.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	96	1305	582	295	1475	658	344	609		254	580	
V/C Ratio(X)	0.11	0.60	0.24	0.43	1.00	0.28	0.58	0.82		0.65	0.66	
Avail Cap(c_a), veh/h	161	1329	593	348	1475	658	344	609		254	580	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	26.1	25.7	22.0	18.9	29.2	19.4	22.9	30.7	0.0	25.4	29.6	0.0
Incr Delay (d2), s/veh	0.5	0.7	0.2	1.0	23.1	0.2	2.5	11.8	0.0	5.6	5.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	6.9	2.1	1.6	20.1	2.6	3.2	12.3	0.0	2.9	8.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.6	26.4	22.2	19.9	52.4	19.6	25.3	42.6	0.0	31.0	35.5	0.0
LnGrp LOS	C	C	C	B	D	B	C	D		C	D	
Approach Vol, veh/h		935			1785			700	A		547	A
Approach Delay, s/veh		25.8			46.6			37.6			34.1	
Approach LOS		C			D			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.6	37.6	10.6	41.2	12.2	36.0	5.8	46.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	6.1	28.9	9.1	37.4	7.7	27.3	5.0	41.5				
Max Q Clear Time (g_c+I1), s	8.1	27.0	6.2	19.8	9.7	20.0	2.4	43.4				
Green Ext Time (p_c), s	0.0	0.6	0.1	4.8	0.0	1.2	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	38.4
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

US 78 at Rosebud Multi-Use Development
 1: Cooper Springs Road/Cooper Road & US 78

existing p.m. with mitigation



























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	449	1395	50	33	1176	56	41	32	35	89	30	294
Future Volume (veh/h)	449	1395	50	33	1176	56	41	32	35	89	30	294
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	473	1468	53	33	1188	57	47	37	40	92	31	303
Peak Hour Factor	0.95	0.95	0.95	0.99	0.99	0.99	0.87	0.87	0.87	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	509	2238	998	194	1262	563	265	230	249	326	101	444
Arrive On Green	0.23	0.63	0.63	0.71	0.71	0.71	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	1781	3554	1585	343	3554	1585	1046	822	889	939	361	1585
Grp Volume(v), veh/h	473	1468	53	33	1188	57	47	0	77	123	0	303
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	343	1777	1585	1046	0	1710	1300	0	1585
Q Serve(g_s), s	20.2	26.1	1.3	3.5	29.2	1.1	3.8	0.0	3.4	6.1	0.0	17.0
Cycle Q Clear(g_c), s	20.2	26.1	1.3	3.5	29.2	1.1	13.4	0.0	3.4	9.5	0.0	17.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.52	0.75		1.00
Lane Grp Cap(c), veh/h	509	2238	998	194	1262	563	265	0	479	427	0	444
V/C Ratio(X)	0.93	0.66	0.05	0.17	0.94	0.10	0.18	0.00	0.16	0.29	0.00	0.68
Avail Cap(c_a), veh/h	593	2505	1117	203	1361	607	265	0	479	427	0	444
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.8	11.7	7.1	9.8	13.6	9.5	34.8	0.0	27.1	30.1	0.0	32.0
Incr Delay (d2), s/veh	19.6	0.5	0.0	0.4	12.5	0.1	1.5	0.0	0.7	1.7	0.0	8.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.0	8.0	0.4	0.2	6.5	0.4	1.1	0.0	1.5	2.5	0.0	7.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.4	12.2	7.1	10.3	26.1	9.6	36.2	0.0	27.8	31.8	0.0	40.2
LnGrp LOS	D	B	A	B	C	A	D	A	C	C	A	D
Approach Vol, veh/h		1994			1278			124				426
Approach Delay, s/veh		20.2			24.9			31.0				37.8
Approach LOS		C			C			C				D
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		32.5		67.5		32.5	27.5	40.0				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		20.5		70.5		20.5	27.7	38.3				
Max Q Clear Time (g_c+I1), s		15.4		28.1		19.0	22.2	31.2				
Green Ext Time (p_c), s		0.2		13.5		0.3	0.8	4.3				
Intersection Summary												
HCM 6th Ctrl Delay				24.1								
HCM 6th LOS				C								

US 78 at Rosebud Multi-Use Development

3: Rosebud Road & US 78

existing p.m. with mitigation

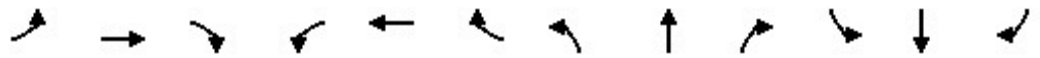
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	1251	173	142	1004	167	160	379	68	225	396	37
Future Volume (veh/h)	54	1251	173	142	1004	167	160	379	68	225	396	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1841	1870	1870	1841	1870
Adj Flow Rate, veh/h	56	1290	178	143	1014	169	170	403	0	245	430	0
Peak Hour Factor	0.97	0.97	0.97	0.99	0.99	0.99	0.94	0.94	0.94	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	2
Cap, veh/h	223	1390	620	181	1445	645	282	532		311	569	
Arrive On Green	0.01	0.13	0.13	0.05	0.41	0.41	0.06	0.29	0.00	0.09	0.31	0.00
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	1841	1585	1781	1841	1585
Grp Volume(v), veh/h	56	1290	178	143	1014	169	170	403	0	245	430	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1841	1585	1781	1841	1585
Q Serve(g_s), s	1.9	35.9	10.2	4.8	23.7	7.1	6.5	19.9	0.0	8.5	21.1	0.0
Cycle Q Clear(g_c), s	1.9	35.9	10.2	4.8	23.7	7.1	6.5	19.9	0.0	8.5	21.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	223	1390	620	181	1445	645	282	532		311	569	
V/C Ratio(X)	0.25	0.93	0.29	0.79	0.70	0.26	0.60	0.76		0.79	0.76	
Avail Cap(c_a), veh/h	258	1404	626	181	1445	645	282	532		311	569	
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	20.1	42.2	30.9	24.2	24.6	19.7	26.0	32.4	0.0	27.9	31.2	0.0
Incr Delay (d2), s/veh	0.6	10.9	0.3	20.3	1.5	0.2	3.6	9.7	0.0	12.6	9.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	18.9	3.9	2.8	9.2	2.4	3.0	9.8	0.0	5.0	10.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.7	53.1	31.2	44.5	26.2	19.9	29.6	42.1	0.0	40.5	40.2	0.0
LnGrp LOS	C	D	C	D	C	B	C	D		D	D	
Approach Vol, veh/h		1524			1326			573	A		675	A
Approach Delay, s/veh		49.3			27.3			38.4			40.3	
Approach LOS		D			C			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	33.4	10.0	43.6	11.0	35.4	8.4	45.2				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	8.5	28.5	5.5	39.5	6.5	30.5	5.9	39.1				
Max Q Clear Time (g_c+I1), s	10.5	21.9	6.8	37.9	8.5	23.1	3.9	25.7				
Green Ext Time (p_c), s	0.0	1.2	0.0	1.2	0.0	1.4	0.0	5.6				
Intersection Summary												
HCM 6th Ctrl Delay			39.2									
HCM 6th LOS			D									
Notes												
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Appendix D

No-Build Intersection Operational Analysis

US 78 at Rosebud Multi-Use Development
 1: Cooper Springs Road/Cooper Road & US 78

no-build a.m.

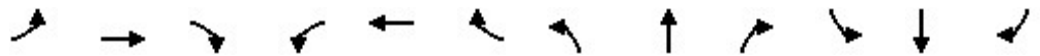


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	232	739	10	19	1664	115	29	15	8	105	17	410
Future Volume (veh/h)	232	739	10	19	1664	115	29	15	8	105	17	410
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	252	803	11	21	1870	129	32	17	9	111	18	432
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.90	0.90	0.90	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	259	2409	1074	434	1876	837	80	256	135	372	14	340
Arrive On Green	0.10	0.68	0.68	0.70	0.70	0.70	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	1781	3554	1585	671	3554	1585	940	1151	609	1385	64	1531
Grp Volume(v), veh/h	252	803	11	21	1870	129	32	0	26	111	0	450
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	671	1777	1585	940	0	1761	1385	0	1595
Q Serve(g_s), s	8.6	8.5	0.2	0.9	47.0	2.4	0.0	0.0	1.0	6.2	0.0	20.0
Cycle Q Clear(g_c), s	8.6	8.5	0.2	0.9	47.0	2.4	20.0	0.0	1.0	7.2	0.0	20.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.35	1.00		0.96
Lane Grp Cap(c), veh/h	259	2409	1074	434	1876	837	80	0	391	372	0	354
V/C Ratio(X)	0.97	0.33	0.01	0.05	1.00	0.15	0.40	0.00	0.07	0.30	0.00	1.27
Avail Cap(c_a), veh/h	259	2409	1074	434	1876	837	80	0	391	372	0	354
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.8	6.0	4.7	6.5	13.3	6.7	45.0	0.0	27.6	30.5	0.0	35.0
Incr Delay (d2), s/veh	48.0	0.1	0.0	0.0	20.0	0.1	14.2	0.0	0.3	2.1	0.0	141.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	2.1	0.0	0.1	12.1	0.7	1.0	0.0	0.5	2.2	0.0	21.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	76.7	6.1	4.7	6.5	33.4	6.8	59.2	0.0	28.0	32.5	0.0	176.9
LnGrp LOS	E	A	A	A	C	A	E	A	C	C	A	F
Approach Vol, veh/h		1066			2020			58				561
Approach Delay, s/veh		22.8			31.4			45.2				148.3
Approach LOS		C			C			D				F
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		24.5		65.5		24.5	13.5	52.0				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		20.0		61.0		20.0	9.0	47.5				
Max Q Clear Time (g_c+l1), s		22.0		10.5		22.0	10.6	49.0				
Green Ext Time (p_c), s		0.0		5.5		0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay				46.8								
HCM 6th LOS				D								

US 78 at Rosebud Multi-Use Development

3: Rosebud Road & US 78

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	786	142	118	1382	174	205	513	102	156	363	43
Future Volume (veh/h)	11	786	142	118	1382	174	205	513	102	156	363	43
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1841	1870	1870	1841	1870
Adj Flow Rate, veh/h	12	854	154	136	1589	200	218	546	0	177	412	0
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.94	0.94	0.94	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	2
Cap, veh/h	87	1034	186	253	1637	730	336	590		232	547	
Arrive On Green	0.46	0.46	0.46	0.07	0.46	0.46	0.09	0.32	0.00	0.07	0.30	0.00
Sat Flow, veh/h	265	3007	542	1781	3554	1585	1781	1841	1585	1781	1841	1585
Grp Volume(v), veh/h	12	505	503	136	1589	200	218	546	0	177	412	0
Grp Sat Flow(s),veh/h/ln	265	1777	1773	1781	1777	1585	1781	1841	1585	1781	1841	1585
Q Serve(g_s), s	2.2	22.3	22.3	4.2	39.3	7.0	7.7	25.8	0.0	6.2	18.2	0.0
Cycle Q Clear(g_c), s	30.9	22.3	22.3	4.2	39.3	7.0	7.7	25.8	0.0	6.2	18.2	0.0
Prop In Lane	1.00		0.31	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	87	611	609	253	1637	730	336	590		232	547	
V/C Ratio(X)	0.14	0.83	0.83	0.54	0.97	0.27	0.65	0.93		0.76	0.75	
Avail Cap(c_a), veh/h	87	611	609	266	1639	731	336	590		232	547	
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.3	22.1	22.1	20.0	23.7	15.0	21.5	29.6	0.0	24.1	28.7	0.0
Incr Delay (d2), s/veh	0.7	9.1	9.1	1.9	15.7	0.2	4.3	22.7	0.0	14.0	9.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	8.3	8.3	1.6	17.2	2.2	3.3	14.1	0.0	3.3	8.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.0	31.2	31.2	21.9	39.4	15.2	25.8	52.2	0.0	38.0	37.9	0.0
LnGrp LOS	D	C	C	C	D	B	C	D		D	D	
Approach Vol, veh/h		1020			1925			764	A		589	A
Approach Delay, s/veh		31.3			35.7			44.7			38.0	
Approach LOS		C			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	10.7	33.3	10.5	35.4	12.8	31.2		46.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	6.2	28.8	6.7	30.3	8.3	26.7		41.5				
Max Q Clear Time (g_c+I1), s	8.2	27.8	6.2	32.9	9.7	20.2		41.3				
Green Ext Time (p_c), s	0.0	0.3	0.0	0.0	0.0	1.2		0.2				

Intersection Summary

HCM 6th Ctrl Delay	36.6
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

US 78 at Rosebud Multi-Use Development
 2: US 78 & Midway Station Access

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Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	892	1742	3	0	0
Future Vol, veh/h	1	892	1742	3	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	90	90	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	959	1936	3	0	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1939	0	-	0	2418 968
Stage 1	-	-	-	-	1936 -
Stage 2	-	-	-	-	482 -
Critical Hdwy	4.14	-	-	-	6.84 6.94
Critical Hdwy Stg 1	-	-	-	-	5.84 -
Critical Hdwy Stg 2	-	-	-	-	5.84 -
Follow-up Hdwy	2.22	-	-	-	3.52 3.32
Pot Cap-1 Maneuver	299	-	-	-	27 254
Stage 1	-	-	-	-	99 -
Stage 2	-	-	-	-	587 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	299	-	-	-	27 254
Mov Cap-2 Maneuver	-	-	-	-	27 -
Stage 1	-	-	-	-	99 -
Stage 2	-	-	-	-	587 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	299	-	-	-	-
HCM Lane V/C Ratio	0.004	-	-	-	-
HCM Control Delay (s)	17.1	-	-	-	0
HCM Lane LOS	C	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

US 78 at Rosebud Multi-Use Development
4: Rosebud Road & Kroger Access

no-build a.m.

Intersection						
Int Delay, s/veh	3.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	L	T
Traffic Vol, veh/h	52	56	745	89	15	624
Future Vol, veh/h	52	56	745	89	15	624
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	96	96	94	94
Heavy Vehicles, %	2	2	4	2	2	4
Mvmt Flow	59	64	776	93	16	664

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1519	823	0	0	869	0
Stage 1	823	-	-	-	-	-
Stage 2	696	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	131	373	-	-	775	-
Stage 1	431	-	-	-	-	-
Stage 2	495	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	127	373	-	-	775	-
Mov Cap-2 Maneuver	127	-	-	-	-	-
Stage 1	417	-	-	-	-	-
Stage 2	495	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	51.5	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	193	775
HCM Lane V/C Ratio	-	-	0.636	0.021
HCM Control Delay (s)	-	-	51.5	9.7
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	3.7	0.1

US 78 at Rosebud Multi-Use Development
5: Rosebud Road & Bushy Fork Road

no-build a.m.

Intersection						
Int Delay, s/veh	7.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	212	533	13	231	348
Future Vol, veh/h	13	212	533	13	231	348
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	89	89	91	91
Heavy Vehicles, %	2	2	4	2	2	4
Mvmt Flow	16	265	599	15	254	382

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1497	607	0	0	614
Stage 1	607	-	-	-	-
Stage 2	890	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	135	496	-	-	965
Stage 1	544	-	-	-	-
Stage 2	401	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	90	496	-	-	965
Mov Cap-2 Maneuver	90	-	-	-	-
Stage 1	362	-	-	-	-
Stage 2	401	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	34.1	0	4
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	393	965
HCM Lane V/C Ratio	-	-	0.716	0.263
HCM Control Delay (s)	-	-	34.1	10.1
HCM Lane LOS	-	-	D	B
HCM 95th %tile Q(veh)	-	-	5.4	1.1

US 78 at Rosebud Multi-Use Development
6: Rosebud Road & Cooper Road

no-build a.m.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	308	39	105	431	158	55	501	113	73	355	115
Future Volume (veh/h)	135	308	39	105	431	158	55	501	113	73	355	115
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1841	1870	1870	1841	1870
Adj Flow Rate, veh/h	150	342	0	115	474	0	57	522	118	80	390	126
Peak Hour Factor	0.90	0.90	0.90	0.91	0.91	0.91	0.96	0.96	0.96	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	2
Cap, veh/h	265	560		353	547		343	661	569	266	674	580
Arrive On Green	0.07	0.30	0.00	0.06	0.29	0.00	0.04	0.36	0.36	0.05	0.37	0.37
Sat Flow, veh/h	1781	1870	0	1781	1870	0	1781	1841	1585	1781	1841	1585
Grp Volume(v), veh/h	150	342	0	115	474	0	57	522	118	80	390	126
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	1870	0	1781	1841	1585	1781	1841	1585
Q Serve(g_s), s	4.7	12.5	0.0	3.5	19.2	0.0	1.6	20.3	4.1	2.2	13.6	4.4
Cycle Q Clear(g_c), s	4.7	12.5	0.0	3.5	19.2	0.0	1.6	20.3	4.1	2.2	13.6	4.4
Prop In Lane	1.00		0.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	265	560		353	547		343	661	569	266	674	580
V/C Ratio(X)	0.57	0.61		0.33	0.87		0.17	0.79	0.21	0.30	0.58	0.22
Avail Cap(c_a), veh/h	265	732		392	760		377	661	569	287	674	580
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.4	24.0	0.0	18.7	26.8	0.0	15.8	22.9	17.7	17.4	20.4	17.5
Incr Delay (d2), s/veh	2.8	1.1	0.0	0.5	7.7	0.0	0.2	9.3	0.8	0.6	3.6	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	5.4	0.0	1.4	9.2	0.0	0.6	9.5	1.5	0.8	5.9	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.2	25.1	0.0	19.2	34.5	0.0	16.0	32.2	18.6	18.0	24.0	18.3
LnGrp LOS	C	C		B	C		B	C	B	B	C	B
Approach Vol, veh/h		492	A		589	A		697			596	
Approach Delay, s/veh		24.5			31.5			28.6			22.0	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.7	33.2	9.6	28.4	8.1	33.8	10.2	27.9				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.1	28.7	6.9	31.3	5.1	28.7	5.7	32.5				
Max Q Clear Time (g_c+I1), s	4.2	22.3	5.5	14.5	3.6	15.6	6.7	21.2				
Green Ext Time (p_c), s	0.0	1.9	0.0	1.8	0.0	2.1	0.0	2.2				

Intersection Summary

HCM 6th Ctrl Delay	26.8
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

US 78 at Rosebud Multi-Use Development
 1: Cooper Springs Road/Cooper Road & US 78

no-build p.m.


























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	496	1540	55	36	1298	62	45	35	39	98	33	325
Future Volume (veh/h)	496	1540	55	36	1298	62	45	35	39	98	33	325
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	517	1604	57	36	1311	63	52	40	45	100	34	332
Peak Hour Factor	0.96	0.96	0.96	0.99	0.99	0.99	0.87	0.87	0.87	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	545	2421	1080	186	1349	602	74	184	207	319	34	334
Arrive On Green	0.26	0.68	0.68	0.76	0.76	0.76	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	1781	3554	1585	300	3554	1585	1016	804	904	1313	149	1458
Grp Volume(v), veh/h	517	1604	57	36	1311	63	52	0	85	100	0	366
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	300	1777	1585	1016	0	1708	1313	0	1608
Q Serve(g_s), s	23.4	26.2	1.2	3.8	33.9	1.0	0.2	0.0	4.0	6.7	0.0	22.7
Cycle Q Clear(g_c), s	23.4	26.2	1.2	3.8	33.9	1.0	22.9	0.0	4.0	10.7	0.0	22.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.53	1.00		0.91
Lane Grp Cap(c), veh/h	545	2421	1080	186	1349	602	74	0	391	319	0	368
V/C Ratio(X)	0.95	0.66	0.05	0.19	0.97	0.10	0.71	0.00	0.22	0.31	0.00	0.99
Avail Cap(c_a), veh/h	560	2477	1105	188	1375	613	74	0	391	319	0	368
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.4	9.3	5.3	7.9	11.5	7.6	50.0	0.0	31.3	35.6	0.0	38.5
Incr Delay (d2), s/veh	25.5	0.7	0.0	0.5	17.7	0.1	44.2	0.0	1.3	2.5	0.0	45.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.0	7.3	0.3	0.2	7.2	0.3	2.2	0.0	1.8	2.3	0.0	13.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.9	9.9	5.3	8.4	29.3	7.7	94.2	0.0	32.6	38.2	0.0	84.1
LnGrp LOS	D	A	A	A	C	A	F	A	C	D	A	F
Approach Vol, veh/h		2178			1410			137				466
Approach Delay, s/veh		20.2			27.8			55.9				74.3
Approach LOS		C			C			E				E
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		27.4		72.6		27.4	30.2	42.5				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		21.3		69.7		21.3	26.5	38.7				
Max Q Clear Time (g_c+l1), s		24.9		28.2		24.7	25.4	35.9				
Green Ext Time (p_c), s		0.0		15.6		0.0	0.2	2.1				
Intersection Summary												
HCM 6th Ctrl Delay				29.9								
HCM 6th LOS				C								

US 78 at Rosebud Multi-Use Development

3: Rosebud Road & US 78

no-build p.m.

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	1381	191	157	1108	184	177	418	75	248	437	41
Future Volume (veh/h)	60	1381	191	157	1108	184	177	418	75	248	437	41
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1841	1870	1870	1841	1870
Adj Flow Rate, veh/h	61	1409	195	159	1119	186	186	440	0	267	470	0
Peak Hour Factor	0.98	0.98	0.98	0.99	0.99	0.99	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	2
Cap, veh/h	199	1309	179	177	1851	826	220	438		261	503	
Arrive On Green	0.14	0.14	0.14	0.06	0.52	0.52	0.07	0.24	0.00	0.11	0.27	0.00
Sat Flow, veh/h	422	3140	430	1781	3554	1585	1781	1841	1585	1781	1841	1585
Grp Volume(v), veh/h	61	791	813	159	1119	186	186	440	0	267	470	0
Grp Sat Flow(s),veh/h/ln	422	1777	1793	1781	1777	1585	1781	1841	1585	1781	1841	1585
Q Serve(g_s), s	13.7	41.7	41.7	4.9	22.0	6.4	7.1	23.8	0.0	10.6	24.9	0.0
Cycle Q Clear(g_c), s	25.3	41.7	41.7	4.9	22.0	6.4	7.1	23.8	0.0	10.6	24.9	0.0
Prop In Lane	1.00		0.24	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	199	741	748	177	1851	826	220	438		261	503	
V/C Ratio(X)	0.31	1.07	1.09	0.90	0.60	0.23	0.84	1.00		1.02	0.94	
Avail Cap(c_a), veh/h	199	741	748	177	1851	826	220	438		261	503	
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	41.5	43.1	43.1	23.5	16.7	13.0	31.3	38.1	0.0	28.2	35.5	0.0
Incr Delay (d2), s/veh	0.9	52.7	59.1	40.1	0.6	0.1	24.7	44.1	0.0	62.0	26.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	30.3	31.9	3.7	7.7	2.0	4.8	15.5	0.0	8.9	14.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.4	95.9	102.2	63.6	17.3	13.1	56.0	82.2	0.0	90.2	62.4	0.0
LnGrp LOS	D	F	F	E	B	B	E	F		F	E	
Approach Vol, veh/h		1665			1464			626	A		737	A
Approach Delay, s/veh		97.0			21.8			74.4			72.5	
Approach LOS		F			C			E			E	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	15.1	28.3	10.4	46.2	11.6	31.8		56.6				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.6	23.8	5.9	41.7	7.1	27.3		52.1				
Max Q Clear Time (g_c+I1), s	12.6	25.8	6.9	43.7	9.1	26.9		24.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.1		8.7				
Intersection Summary												
HCM 6th Ctrl Delay			65.3									
HCM 6th LOS			E									
Notes												
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

US 78 at Rosebud Multi-Use Development
2: US 78 & Midway Station Access

no-build p.m.

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑	↗	↘	↘
Traffic Vol, veh/h	13	1646	1356	8	9	19
Future Vol, veh/h	13	1646	1356	8	9	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	99	99	99	99	70	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	1663	1370	8	13	24

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1378	0	-	0	2228 685
Stage 1	-	-	-	-	1370 -
Stage 2	-	-	-	-	858 -
Critical Hdwy	4.14	-	-	-	6.84 6.94
Critical Hdwy Stg 1	-	-	-	-	5.84 -
Critical Hdwy Stg 2	-	-	-	-	5.84 -
Follow-up Hdwy	2.22	-	-	-	3.52 3.32
Pot Cap-1 Maneuver	493	-	-	-	36 391
Stage 1	-	-	-	-	201 -
Stage 2	-	-	-	-	376 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	493	-	-	-	35 391
Mov Cap-2 Maneuver	-	-	-	-	35 -
Stage 1	-	-	-	-	196 -
Stage 2	-	-	-	-	376 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	74.3
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	493	-	-	-	87
HCM Lane V/C Ratio	0.027	-	-	-	0.428
HCM Control Delay (s)	12.5	-	-	-	74.3
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	1.8

US 78 at Rosebud Multi-Use Development
4: Rosebud Road & Kroger Access

no-build p.m.

Intersection						
Int Delay, s/veh	14.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	103	50	626	120	19	751
Future Vol, veh/h	103	50	626	120	19	751
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	98	98	96	96
Heavy Vehicles, %	2	2	4	2	2	4
Mvmt Flow	117	57	639	122	20	782

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1522	700	0	0	761
Stage 1	700	-	-	-	-
Stage 2	822	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	130	439	-	-	851
Stage 1	493	-	-	-	-
Stage 2	432	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	125	439	-	-	851
Mov Cap-2 Maneuver	125	-	-	-	-
Stage 1	472	-	-	-	-
Stage 2	432	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	146.1	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	163	851
HCM Lane V/C Ratio	-	-	1.067	0.023
HCM Control Delay (s)	-	-	146.1	9.3
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	8.8	0.1

US 78 at Rosebud Multi-Use Development
5: Rosebud Road & Bushy Fork Road

no-build p.m.

Intersection						
Int Delay, s/veh	5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	S	S
Traffic Vol, veh/h	19	177	505	24	169	604
Future Vol, veh/h	19	177	505	24	169	604
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	94	94	95	95
Heavy Vehicles, %	2	2	4	2	2	4
Mvmt Flow	21	199	537	26	178	636

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1542	550	0	0	563
Stage 1	550	-	-	-	-
Stage 2	992	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	127	535	-	-	1008
Stage 1	578	-	-	-	-
Stage 2	359	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	92	535	-	-	1008
Mov Cap-2 Maneuver	92	-	-	-	-
Stage 1	420	-	-	-	-
Stage 2	359	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	28.8	0	2
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	365	1008
HCM Lane V/C Ratio	-	-	0.603	0.176
HCM Control Delay (s)	-	-	28.8	9.3
HCM Lane LOS	-	-	D	A
HCM 95th %tile Q(veh)	-	-	3.8	0.6

US 78 at Rosebud Multi-Use Development
6: Rosebud Road & Cooper Road

no-build p.m.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	447	29	187	321	144	12	436	188	176	467	146
Future Volume (veh/h)	141	447	29	187	321	144	12	436	188	176	467	146
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1841	1870	1870	1841	1870
Adj Flow Rate, veh/h	158	502	0	197	338	0	12	454	196	187	497	155
Peak Hour Factor	0.89	0.89	0.89	0.95	0.95	0.95	0.96	0.96	0.96	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	2
Cap, veh/h	388	555		284	584		242	637	548	303	738	635
Arrive On Green	0.08	0.30	0.00	0.10	0.31	0.00	0.01	0.35	0.35	0.07	0.40	0.40
Sat Flow, veh/h	1781	1870	0	1781	1870	0	1781	1841	1585	1781	1841	1585
Grp Volume(v), veh/h	158	502	0	197	338	0	12	454	196	187	497	155
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	1870	0	1781	1841	1585	1781	1841	1585
Q Serve(g_s), s	5.7	24.3	0.0	7.1	14.3	0.0	0.4	20.1	8.7	6.2	20.8	6.1
Cycle Q Clear(g_c), s	5.7	24.3	0.0	7.1	14.3	0.0	0.4	20.1	8.7	6.2	20.8	6.1
Prop In Lane	1.00		0.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	388	555		284	584		242	637	548	303	738	635
V/C Ratio(X)	0.41	0.91		0.69	0.58		0.05	0.71	0.36	0.62	0.67	0.24
Avail Cap(c_a), veh/h	409	647		310	683		311	637	548	303	738	635
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.0	31.8	0.0	23.3	27.1	0.0	20.7	26.7	22.9	20.1	23.1	18.7
Incr Delay (d2), s/veh	0.7	14.9	0.0	5.9	0.9	0.0	0.1	6.7	1.8	3.8	4.9	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	12.8	0.0	3.3	6.3	0.0	0.2	9.3	3.4	2.6	9.2	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.7	46.7	0.0	29.2	28.0	0.0	20.8	33.4	24.8	23.9	28.0	19.6
LnGrp LOS	C	D		C	C		C	C	C	C	C	B
Approach Vol, veh/h		660	A		535	A		662			839	
Approach Delay, s/veh		40.7			28.4			30.6			25.5	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	37.0	13.6	32.4	5.8	42.2	12.1	33.9				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	6.5	32.5	10.5	32.5	5.0	34.0	8.7	34.3				
Max Q Clear Time (g_c+I1), s	8.2	22.1	9.1	26.3	2.4	22.8	7.7	16.3				
Green Ext Time (p_c), s	0.0	2.4	0.1	1.6	0.0	2.6	0.0	1.8				

Intersection Summary

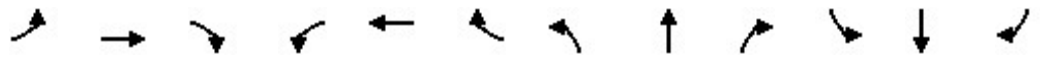
HCM 6th Ctrl Delay	31.1
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

US 78 at Rosebud Multi-Use Development
 1: Cooper Springs Road/Cooper Road & US 78

no-build a.m. with mitigation






























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	232	739	10	19	1664	115	29	15	8	105	17	410
Future Volume (veh/h)	232	739	10	19	1664	115	29	15	8	105	17	410
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	252	803	11	21	1870	129	32	17	9	111	18	432
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.90	0.90	0.90	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	277	2444	1090	434	1876	837	199	244	129	322	47	511
Arrive On Green	0.11	0.69	0.69	0.53	0.53	0.53	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	1781	3554	1585	671	3554	1585	940	1151	609	1167	221	1585
Grp Volume(v), veh/h	252	803	11	21	1870	129	32	0	26	129	0	432
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	671	1777	1585	940	0	1761	1389	0	1585
Q Serve(g_s), s	8.4	8.2	0.2	1.4	47.2	3.8	2.8	0.0	1.1	6.6	0.0	19.1
Cycle Q Clear(g_c), s	8.4	8.2	0.2	1.4	47.2	3.8	10.5	0.0	1.1	7.7	0.0	19.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.35	0.86		1.00
Lane Grp Cap(c), veh/h	277	2444	1090	434	1876	837	199	0	374	369	0	511
V/C Ratio(X)	0.91	0.33	0.01	0.05	1.00	0.15	0.16	0.00	0.07	0.35	0.00	0.85
Avail Cap(c_a), veh/h	277	2444	1090	434	1876	837	199	0	374	369	0	511
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.3	5.7	4.4	10.4	21.2	10.9	35.5	0.0	28.3	31.2	0.0	28.4
Incr Delay (d2), s/veh	31.9	0.1	0.0	0.0	20.0	0.1	1.7	0.0	0.4	2.6	0.0	15.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	2.0	0.0	0.2	20.6	1.1	0.7	0.0	0.5	2.6	0.0	9.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.1	5.7	4.4	10.4	41.2	11.0	37.3	0.0	28.7	33.8	0.0	44.2
LnGrp LOS	E	A	A	B	D	B	D	A	C	C	A	D
Approach Vol, veh/h		1066			2020			58				561
Approach Delay, s/veh		18.6			39.0			33.4				41.8
Approach LOS		B			D			C				D
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		23.6		66.4		23.6	14.4	52.0				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.1		61.9		19.1	9.9	47.5				
Max Q Clear Time (g_c+I1), s		12.5		10.2		21.1	10.4	49.2				
Green Ext Time (p_c), s		0.1		5.5		0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay				33.4								
HCM 6th LOS				C								

US 78 at Rosebud Multi-Use Development

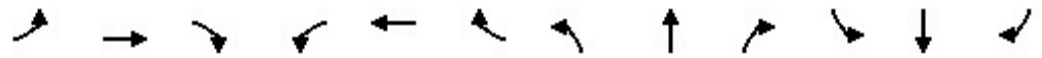
3: Rosebud Road & US 78

no-build a.m. with mitigation

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (veh/h)	11	786	142	118	1382	174	205	513	102	156	363	43
Future Volume (veh/h)	11	786	142	118	1382	174	205	513	102	156	363	43
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1841	1870	1870	1841	1870
Adj Flow Rate, veh/h	12	854	154	136	1589	200	218	546	0	177	412	0
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.94	0.94	0.94	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	2
Cap, veh/h	90	1414	631	291	1583	706	297	585		197	555	
Arrive On Green	0.01	0.40	0.40	0.06	0.45	0.45	0.08	0.32	0.00	0.06	0.30	0.00
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	1841	1585	1781	1841	1585
Grp Volume(v), veh/h	12	854	154	136	1589	200	218	546	0	177	412	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1841	1585	1781	1841	1585
Q Serve(g_s), s	0.4	21.0	7.1	4.8	49.0	8.8	8.3	31.6	0.0	6.5	22.2	0.0
Cycle Q Clear(g_c), s	0.4	21.0	7.1	4.8	49.0	8.8	8.3	31.6	0.0	6.5	22.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	90	1414	631	291	1583	706	297	585		197	555	
V/C Ratio(X)	0.13	0.60	0.24	0.47	1.00	0.28	0.73	0.93		0.90	0.74	
Avail Cap(c_a), veh/h	155	1414	631	374	1583	706	297	585		197	555	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	27.9	26.2	22.1	19.4	30.5	19.4	29.6	36.4	0.0	33.1	34.6	0.0
Incr Delay (d2), s/veh	0.7	0.7	0.2	1.2	23.5	0.2	9.0	23.9	0.0	37.7	8.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	8.2	2.5	1.9	23.6	3.0	4.6	17.3	0.0	5.2	10.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.5	27.0	22.3	20.6	54.0	19.6	38.6	60.3	0.0	70.8	43.3	0.0
LnGrp LOS	C	C	C	C	F	B	D	E		E	D	
Approach Vol, veh/h		1020			1925			764	A		589	A
Approach Delay, s/veh		26.3			48.1			54.1			51.5	
Approach LOS		C			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	39.5	11.3	48.3	12.8	37.7	6.0	53.5				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	6.5	31.0	11.9	42.6	8.3	29.2	5.5	49.0				
Max Q Clear Time (g_c+I1), s	8.5	33.6	6.8	23.0	10.3	24.2	2.4	51.0				
Green Ext Time (p_c), s	0.0	0.0	0.1	5.5	0.0	1.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			44.5									
HCM 6th LOS			D									
Notes												
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

US 78 at Rosebud Multi-Use Development
 1: Cooper Springs Road/Cooper Road & US 78

no-build p.m. with mitigation



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	496	1540	55	36	1298	62	45	35	39	98	33	325
Future Volume (veh/h)	496	1540	55	36	1298	62	45	35	39	98	33	325
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	517	1604	57	36	1311	63	52	40	45	100	34	332
Peak Hour Factor	0.96	0.96	0.96	0.99	0.99	0.99	0.87	0.87	0.87	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	545	2464	1099	189	1388	619	173	174	196	249	76	752
Arrive On Green	0.26	0.69	0.69	0.39	0.39	0.39	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	1781	3554	1585	300	3554	1585	1016	804	904	859	351	1585
Grp Volume(v), veh/h	517	1604	57	36	1311	63	52	0	85	134	0	332
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	300	1777	1585	1016	0	1708	1210	0	1585
Q Serve(g_s), s	23.6	25.2	1.1	8.3	35.6	2.5	4.9	0.0	4.1	7.6	0.0	13.9
Cycle Q Clear(g_c), s	23.6	25.2	1.1	8.3	35.6	2.5	16.6	0.0	4.1	11.7	0.0	13.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.53	0.75		1.00
Lane Grp Cap(c), veh/h	545	2464	1099	189	1388	619	173	0	370	325	0	752
V/C Ratio(X)	0.95	0.65	0.05	0.19	0.94	0.10	0.30	0.00	0.23	0.41	0.00	0.44
Avail Cap(c_a), veh/h	558	2505	1117	190	1404	626	173	0	370	325	0	752
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.8	8.6	4.9	21.1	29.4	19.3	42.7	0.0	32.3	36.4	0.0	17.5
Incr Delay (d2), s/veh	25.7	0.6	0.0	0.5	13.0	0.1	4.4	0.0	1.4	3.8	0.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.0	6.8	0.3	0.6	15.9	0.9	1.4	0.0	1.8	3.2	0.0	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.5	9.2	4.9	21.6	42.5	19.4	47.1	0.0	33.7	40.2	0.0	19.3
LnGrp LOS	D	A	A	C	D	B	D	A	C	D	A	B
Approach Vol, veh/h		2178			1410			137				466
Approach Delay, s/veh		19.8			40.9			38.8				25.3
Approach LOS		B			D			D				C
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		26.2		73.8		26.2	30.3	43.6				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		20.5		70.5		20.5	26.5	39.5				
Max Q Clear Time (g_c+I1), s		18.6		27.2		15.9	25.6	37.6				
Green Ext Time (p_c), s		0.1		15.8		0.8	0.2	1.4				
Intersection Summary												
HCM 6th Ctrl Delay				28.1								
HCM 6th LOS				C								

US 78 at Rosebud Multi-Use Development

3: Rosebud Road & US 78

no-build p.m. with mitigation

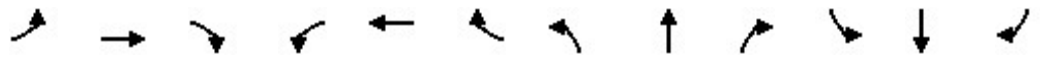
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	1381	191	157	1108	184	177	418	75	248	437	41
Future Volume (veh/h)	60	1381	191	157	1108	184	177	418	75	248	437	41
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1841	1870	1870	1841	1870
Adj Flow Rate, veh/h	61	1409	195	159	1119	186	186	440	0	267	470	0
Peak Hour Factor	0.98	0.98	0.98	0.99	0.99	0.99	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	2
Cap, veh/h	196	1405	627	171	1479	660	261	494		304	571	
Arrive On Green	0.04	0.40	0.40	0.06	0.42	0.42	0.07	0.27	0.00	0.11	0.31	0.00
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	1841	1585	1781	1841	1585
Grp Volume(v), veh/h	61	1409	195	159	1119	186	186	440	0	267	470	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1841	1585	1781	1841	1585
Q Serve(g_s), s	2.2	43.5	9.3	5.9	29.5	8.5	7.9	25.3	0.0	11.6	26.0	0.0
Cycle Q Clear(g_c), s	2.2	43.5	9.3	5.9	29.5	8.5	7.9	25.3	0.0	11.6	26.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	196	1405	627	171	1479	660	261	494		304	571	
V/C Ratio(X)	0.31	1.00	0.31	0.93	0.76	0.28	0.71	0.89		0.88	0.82	
Avail Cap(c_a), veh/h	217	1405	627	171	1479	660	261	494		304	571	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.2	33.3	22.9	26.6	27.4	21.2	30.6	38.7	0.0	27.5	35.2	0.0
Incr Delay (d2), s/veh	0.9	24.6	0.3	49.2	2.3	0.2	8.8	20.9	0.0	23.9	12.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	21.6	3.3	4.5	11.8	3.0	4.1	13.7	0.0	6.6	13.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.1	57.9	23.2	75.8	29.7	21.5	39.3	59.6	0.0	51.4	47.9	0.0
LnGrp LOS	C	F	C	E	C	C	D	E		D	D	
Approach Vol, veh/h		1665			1464			626	A		737	A
Approach Delay, s/veh		52.5			33.6			53.6			49.2	
Approach LOS		D			C			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	34.0	11.0	48.0	12.4	38.6	8.7	50.3				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	12.5	29.5	6.5	43.5	7.9	34.1	5.5	44.5				
Max Q Clear Time (g_c+I1), s	13.6	27.3	7.9	45.5	9.9	28.0	4.2	31.5				
Green Ext Time (p_c), s	0.0	0.5	0.0	0.0	0.0	1.4	0.0	6.1				
Intersection Summary												
HCM 6th Ctrl Delay			46.0									
HCM 6th LOS			D									
Notes												
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Appendix E

Future Intersection Operational Analysis

US 78 at Rosebud Multi-Use Development
 1: Cooper Springs Road/Cooper Road & US 78

future a.m.

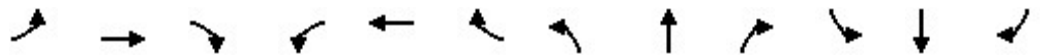


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	232	768	10	22	1710	138	29	15	13	123	17	410
Future Volume (veh/h)	232	768	10	22	1710	138	29	15	13	123	17	410
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	252	835	11	25	1921	155	32	17	14	129	18	432
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.90	0.90	0.90	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	258	2409	1074	424	1876	837	80	211	174	367	14	340
Arrive On Green	0.10	0.68	0.68	0.70	0.70	0.70	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	1781	3554	1585	651	3554	1585	940	949	781	1378	64	1531
Grp Volume(v), veh/h	252	835	11	25	1921	155	32	0	31	129	0	450
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	651	1777	1585	940	0	1730	1378	0	1595
Q Serve(g_s), s	8.6	8.9	0.2	1.1	47.5	3.0	0.0	0.0	1.3	7.4	0.0	20.0
Cycle Q Clear(g_c), s	8.6	8.9	0.2	1.1	47.5	3.0	20.0	0.0	1.3	8.6	0.0	20.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.45	1.00		0.96
Lane Grp Cap(c), veh/h	258	2409	1074	424	1876	837	80	0	384	367	0	354
V/C Ratio(X)	0.98	0.35	0.01	0.06	1.02	0.19	0.40	0.00	0.08	0.35	0.00	1.27
Avail Cap(c_a), veh/h	258	2409	1074	424	1876	837	80	0	384	367	0	354
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.0	6.1	4.7	6.5	13.4	6.8	45.0	0.0	27.7	31.1	0.0	35.0
Incr Delay (d2), s/veh	49.2	0.1	0.0	0.1	27.2	0.1	14.2	0.0	0.4	2.6	0.0	141.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	2.2	0.0	0.1	14.0	0.8	1.0	0.0	0.6	2.6	0.0	21.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	78.2	6.2	4.7	6.6	40.6	6.9	59.2	0.0	28.1	33.8	0.0	176.9
LnGrp LOS	E	A	A	A	F	A	E	A	C	C	A	F
Approach Vol, veh/h		1098			2101			63				579
Approach Delay, s/veh		22.7			37.7			43.9				145.0
Approach LOS		C			D			D				F
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		24.5		65.5		24.5	13.5	52.0				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		20.0		61.0		20.0	9.0	47.5				
Max Q Clear Time (g_c+I1), s		22.0		10.9		22.0	10.6	49.5				
Green Ext Time (p_c), s		0.0		5.8		0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay				49.7								
HCM 6th LOS				D								

US 78 at Rosebud Multi-Use Development

3: Rosebud Road & US 78

future a.m.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	797	142	124	1394	174	205	535	113	156	374	63
Future Volume (veh/h)	28	797	142	124	1394	174	205	535	113	156	374	63
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1841	1870	1870	1841	1870
Adj Flow Rate, veh/h	30	866	154	143	1602	200	218	569	0	177	425	0
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.94	0.94	0.94	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	2
Cap, veh/h	85	1029	183	253	1639	731	327	589		216	546	
Arrive On Green	0.45	0.45	0.45	0.07	0.46	0.46	0.09	0.32	0.00	0.07	0.30	0.00
Sat Flow, veh/h	261	3015	536	1781	3554	1585	1781	1841	1585	1781	1841	1585
Grp Volume(v), veh/h	30	510	510	143	1602	200	218	569	0	177	425	0
Grp Sat Flow(s),veh/h/ln	261	1777	1774	1781	1777	1585	1781	1841	1585	1781	1841	1585
Q Serve(g_s), s	1.7	22.8	22.8	4.5	39.8	7.0	7.7	27.4	0.0	6.2	19.0	0.0
Cycle Q Clear(g_c), s	30.7	22.8	22.8	4.5	39.8	7.0	7.7	27.4	0.0	6.2	19.0	0.0
Prop In Lane	1.00		0.30	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	85	607	606	253	1639	731	327	589		216	546	
V/C Ratio(X)	0.35	0.84	0.84	0.57	0.98	0.27	0.67	0.97		0.82	0.78	
Avail Cap(c_a), veh/h	85	607	606	261	1639	731	327	589		216	546	
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.8	22.4	22.4	20.3	23.8	15.0	21.7	30.1	0.0	24.3	28.9	0.0
Incr Delay (d2), s/veh	2.5	10.3	10.4	2.7	17.1	0.2	5.1	29.6	0.0	21.5	10.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	8.7	8.6	1.8	17.7	2.2	3.4	15.9	0.0	3.7	9.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.3	32.8	32.8	23.0	40.9	15.2	26.9	59.7	0.0	45.7	39.4	0.0
LnGrp LOS	D	C	C	C	D	B	C	E		D	D	
Approach Vol, veh/h		1050			1945			787	A		602	A
Approach Delay, s/veh		33.0			37.0			50.6			41.3	
Approach LOS		C			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	10.7	33.3	10.8	35.2	12.8	31.2		46.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	6.2	28.8	6.7	30.3	8.3	26.7		41.5				
Max Q Clear Time (g_c+I1), s	8.2	29.4	6.5	32.7	9.7	21.0		41.8				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	1.1		0.0				

Intersection Summary

HCM 6th Ctrl Delay	39.1
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

US 78 at Rosebud Multi-Use Development
 2: project east access/Midway Station Access & US 78

future a.m.

Intersection												
Int Delay, s/veh	5.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	898	25	29	1745	3	33	0	21	0	0	0
Future Vol, veh/h	1	898	25	29	1745	3	33	0	21	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	150	0	-	100	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	90	90	90	85	85	85	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	966	27	32	1939	3	39	0	25	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1942	0	0	993	0	0	2002	2974	483	2488	2998	970
Stage 1	-	-	-	-	-	-	968	968	-	2003	2003	-
Stage 2	-	-	-	-	-	-	1034	2006	-	485	995	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	298	-	-	692	-	-	~ 35	14	530	15	13	253
Stage 1	-	-	-	-	-	-	273	330	-	61	103	-
Stage 2	-	-	-	-	-	-	248	102	-	532	321	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	298	-	-	692	-	-	~ 34	13	530	14	12	253
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 34	13	-	14	12	-
Stage 1	-	-	-	-	-	-	272	329	-	61	98	-
Stage 2	-	-	-	-	-	-	237	97	-	505	320	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.2			235.8			0		
HCM LOS							F			A		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	34	530	298	-	-	692	-	-	-
HCM Lane V/C Ratio	1.142	0.047	0.004	-	-	0.047	-	-	-
HCM Control Delay (s)	\$ 378.2	12.1	17.1	-	-	10.5	-	-	0
HCM Lane LOS	F	B	C	-	-	B	-	-	A
HCM 95th %tile Q(veh)	4.1	0.1	0	-	-	0.1	-	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

US 78 at Rosebud Multi-Use Development
 4: Rosebud Road & project north access/Kroger Access

future a.m.

Intersection												
Int Delay, s/veh	12.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↕	↗			↕	↗
Traffic Vol, veh/h	29	3	23	52	1	56	27	746	89	15	622	19
Future Vol, veh/h	29	3	23	52	1	56	27	746	89	15	622	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	150	-	-	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	88	88	88	96	96	96	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	4	2	2	4	2
Mvmt Flow	34	4	27	59	1	64	28	777	93	16	662	20

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1606	1620	662	1600	1594	824	682	0	0	870	0	0
Stage 1	694	694	-	880	880	-	-	-	-	-	-	-
Stage 2	912	926	-	720	714	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	85	103	462	85	107	373	911	-	-	775	-	-
Stage 1	433	444	-	342	365	-	-	-	-	-	-	-
Stage 2	328	347	-	419	435	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	67	97	462	74	100	373	911	-	-	775	-	-
Mov Cap-2 Maneuver	67	97	-	74	100	-	-	-	-	-	-	-
Stage 1	420	429	-	331	354	-	-	-	-	-	-	-
Stage 2	263	336	-	378	421	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	68.1		142.2		0.3		0.2	
HCM LOS	F		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	911	-	-	69	462	126	775	-	-
HCM Lane V/C Ratio	0.031	-	-	0.546	0.059	0.983	0.021	-	-
HCM Control Delay (s)	9.1	-	-	107.5	13.3	142.2	9.7	0	-
HCM Lane LOS	A	-	-	F	B	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.3	0.2	6.7	0.1	-	-

US 78 at Rosebud Multi-Use Development
5: Rosebud Road & Bushy Fork Road

future a.m.

Intersection						
Int Delay, s/veh	9.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	13	222	545	13	240	360
Future Vol, veh/h	13	222	545	13	240	360
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	89	89	91	91
Heavy Vehicles, %	2	2	4	2	2	4
Mvmt Flow	16	278	612	15	264	396

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1544	620	0	0	627	0
Stage 1	620	-	-	-	-	-
Stage 2	924	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	126	488	-	-	955	-
Stage 1	536	-	-	-	-	-
Stage 2	387	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	81	488	-	-	955	-
Mov Cap-2 Maneuver	81	-	-	-	-	-
Stage 1	346	-	-	-	-	-
Stage 2	387	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	39.7	0	4.1
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	382	955
HCM Lane V/C Ratio	-	-	0.769	0.276
HCM Control Delay (s)	-	-	39.7	10.2
HCM Lane LOS	-	-	E	B
HCM 95th %tile Q(veh)	-	-	6.3	1.1

US 78 at Rosebud Multi-Use Development
7: project west access & US 78

future a.m.

Intersection						
Int Delay, s/veh	4.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	910	34	16	1765	46	11
Future Vol, veh/h	910	34	16	1765	46	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	150	0	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	90	90	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	978	37	18	1961	54	13

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	1015	0	1995
Stage 1	-	-	-	-	978
Stage 2	-	-	-	-	1017
Critical Hdwy	-	-	4.14	-	6.84
Critical Hdwy Stg 1	-	-	-	-	5.84
Critical Hdwy Stg 2	-	-	-	-	5.84
Follow-up Hdwy	-	-	2.22	-	3.52
Pot Cap-1 Maneuver	-	-	679	-	~ 53
Stage 1	-	-	-	-	325
Stage 2	-	-	-	-	310
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	679	-	~ 52
Mov Cap-2 Maneuver	-	-	-	-	~ 52
Stage 1	-	-	-	-	316
Stage 2	-	-	-	-	310

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	215.1
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	52	525	-	-	679	-
HCM Lane V/C Ratio	1.041	0.025	-	-	0.026	-
HCM Control Delay (s)	263.7	12	-	-	10.4	-
HCM Lane LOS	F	B	-	-	B	-
HCM 95th %tile Q(veh)	4.6	0.1	-	-	0.1	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

US 78 at Rosebud Multi-Use Development
 8: Rosebud Road & project south access

future a.m.

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	2	1	856	695	2
Future Vol, veh/h	7	2	1	856	695	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	70	70	96	96	94	94
Heavy Vehicles, %	2	2	2	4	4	2
Mvmt Flow	10	3	1	892	739	2

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1633	739	741	0	-	0
Stage 1	739	-	-	-	-	-
Stage 2	894	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	111	417	866	-	-	-
Stage 1	472	-	-	-	-	-
Stage 2	399	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	111	417	866	-	-	-
Mov Cap-2 Maneuver	111	-	-	-	-	-
Stage 1	471	-	-	-	-	-
Stage 2	399	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	34.9	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	866	-	133	-	-
HCM Lane V/C Ratio	0.001	-	0.097	-	-
HCM Control Delay (s)	9.2	0	34.9	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

US 78 at Rosebud Multi-Use Development
6: Rosebud Road & Cooper Road

future a.m.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	308	39	116	431	158	55	529	124	73	375	115
Future Volume (veh/h)	135	308	39	116	431	158	55	529	124	73	375	115
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1841	1870	1870	1841	1870
Adj Flow Rate, veh/h	150	342	0	127	474	0	57	551	129	80	412	126
Peak Hour Factor	0.90	0.90	0.90	0.91	0.91	0.91	0.96	0.96	0.96	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	2
Cap, veh/h	265	550		356	547		329	661	569	247	674	580
Arrive On Green	0.07	0.29	0.00	0.07	0.29	0.00	0.04	0.36	0.36	0.05	0.37	0.37
Sat Flow, veh/h	1781	1870	0	1781	1870	0	1781	1841	1585	1781	1841	1585
Grp Volume(v), veh/h	150	342	0	127	474	0	57	551	129	80	412	126
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	1870	0	1781	1841	1585	1781	1841	1585
Q Serve(g_s), s	4.7	12.6	0.0	3.9	19.2	0.0	1.6	21.9	4.5	2.2	14.6	4.4
Cycle Q Clear(g_c), s	4.7	12.6	0.0	3.9	19.2	0.0	1.6	21.9	4.5	2.2	14.6	4.4
Prop In Lane	1.00		0.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	265	550		356	547		329	661	569	247	674	580
V/C Ratio(X)	0.57	0.62		0.36	0.87		0.17	0.83	0.23	0.32	0.61	0.22
Avail Cap(c_a), veh/h	265	732		385	760		363	661	569	268	674	580
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.4	24.4	0.0	18.6	26.8	0.0	16.0	23.4	17.9	17.9	20.7	17.5
Incr Delay (d2), s/veh	2.8	1.2	0.0	0.6	7.7	0.0	0.2	11.8	0.9	0.7	4.1	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	5.4	0.0	1.6	9.2	0.0	0.6	10.6	1.7	0.8	6.3	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.2	25.5	0.0	19.2	34.5	0.0	16.2	35.2	18.8	18.6	24.8	18.3
LnGrp LOS	C	C		B	C		B	D	B	B	C	B
Approach Vol, veh/h		492	A		601	A		737			618	
Approach Delay, s/veh		24.8			31.3			30.9			22.7	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.7	33.2	10.1	28.0	8.1	33.8	10.2	27.9				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.1	28.7	6.9	31.3	5.1	28.7	5.7	32.5				
Max Q Clear Time (g_c+I1), s	4.2	23.9	5.9	14.6	3.6	16.6	6.7	21.2				
Green Ext Time (p_c), s	0.0	1.6	0.0	1.8	0.0	2.1	0.0	2.2				

Intersection Summary

HCM 6th Ctrl Delay	27.7
HCM 6th LOS	C

Notes

Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.

US 78 at Rosebud Multi-Use Development
 1: Cooper Springs Road/Cooper Road & US 78

future p.m.


























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑	↗	↘	↗	↘	↘	↗	↘
Traffic Volume (veh/h)	496	1604	55	46	1353	98	45	35	48	136	33	325
Future Volume (veh/h)	496	1604	55	46	1353	98	45	35	48	136	33	325
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	517	1671	57	46	1367	99	52	40	55	139	34	332
Peak Hour Factor	0.96	0.96	0.96	0.99	0.99	0.99	0.87	0.87	0.87	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	543	2468	1101	181	1375	613	72	154	211	292	32	314
Arrive On Green	0.26	0.69	0.69	0.77	0.77	0.77	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	1781	3554	1585	281	3554	1585	1016	713	981	1301	149	1458
Grp Volume(v), veh/h	517	1671	57	46	1367	99	52	0	95	139	0	366
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	281	1777	1585	1016	0	1694	1301	0	1608
Q Serve(g_s), s	24.2	27.1	1.1	5.5	37.7	1.6	0.0	0.0	4.7	9.9	0.0	21.6
Cycle Q Clear(g_c), s	24.2	27.1	1.1	5.5	37.7	1.6	21.6	0.0	4.7	14.6	0.0	21.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.58	1.00		0.91
Lane Grp Cap(c), veh/h	543	2468	1101	181	1375	613	72	0	365	292	0	347
V/C Ratio(X)	0.95	0.68	0.05	0.25	0.99	0.16	0.72	0.00	0.26	0.48	0.00	1.06
Avail Cap(c_a), veh/h	548	2477	1105	181	1375	613	72	0	365	292	0	347
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.5	8.8	4.8	7.5	11.2	7.1	50.0	0.0	32.6	38.7	0.0	39.2
Incr Delay (d2), s/veh	26.7	0.7	0.0	0.7	22.8	0.1	47.2	0.0	1.7	5.5	0.0	63.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.2	7.3	0.3	0.3	8.2	0.5	2.2	0.0	2.1	3.5	0.0	14.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.2	9.6	4.9	8.3	34.0	7.2	97.2	0.0	34.3	44.2	0.0	103.1
LnGrp LOS	E	A	A	A	C	A	F	A	C	D	A	F
Approach Vol, veh/h		2245			1512			147				505
Approach Delay, s/veh		20.2			31.4			56.6				86.9
Approach LOS		C			C			E				F
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		26.1		73.9		26.1	30.7	43.2				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		21.3		69.7		21.3	26.5	38.7				
Max Q Clear Time (g_c+I1), s		23.6		29.1		23.6	26.2	39.7				
Green Ext Time (p_c), s		0.0		16.6		0.0	0.1	0.0				
Intersection Summary												
HCM 6th Ctrl Delay				32.9								
HCM 6th LOS				C								

US 78 at Rosebud Multi-Use Development

3: Rosebud Road & US 78

future p.m.

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	101	1406	191	170	1132	184	177	437	85	248	463	79
Future Volume (veh/h)	101	1406	191	170	1132	184	177	437	85	248	463	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1841	1870	1870	1841	1870
Adj Flow Rate, veh/h	103	1435	195	172	1143	186	186	460	0	267	498	0
Peak Hour Factor	0.98	0.98	0.98	0.99	0.99	0.99	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	2
Cap, veh/h	193	1313	176	177	1851	826	201	438		261	503	
Arrive On Green	0.14	0.14	0.14	0.06	0.52	0.52	0.07	0.24	0.00	0.11	0.27	0.00
Sat Flow, veh/h	412	3148	423	1781	3554	1585	1781	1841	1585	1781	1841	1585
Grp Volume(v), veh/h	103	803	827	172	1143	186	186	460	0	267	498	0
Grp Sat Flow(s),veh/h/ln	412	1777	1794	1781	1777	1585	1781	1841	1585	1781	1841	1585
Q Serve(g_s), s	24.6	41.7	41.7	5.6	22.7	6.4	7.1	23.8	0.0	10.6	27.0	0.0
Cycle Q Clear(g_c), s	36.9	41.7	41.7	5.6	22.7	6.4	7.1	23.8	0.0	10.6	27.0	0.0
Prop In Lane	1.00		0.24	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	193	741	748	177	1851	826	201	438		261	503	
V/C Ratio(X)	0.53	1.08	1.10	0.97	0.62	0.23	0.92	1.05		1.02	0.99	
Avail Cap(c_a), veh/h	193	741	748	177	1851	826	201	438		261	503	
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	47.1	43.1	43.1	24.6	16.9	13.0	31.4	38.1	0.0	28.2	36.2	0.0
Incr Delay (d2), s/veh	2.8	58.3	65.4	59.0	0.6	0.1	42.4	56.7	0.0	62.0	38.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	31.5	33.3	4.9	8.0	2.0	5.6	17.0	0.0	8.9	16.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.9	101.4	108.6	83.6	17.5	13.1	73.8	94.8	0.0	90.2	74.2	0.0
LnGrp LOS	D	F	F	F	B	B	E	F		F	E	
Approach Vol, veh/h		1733			1501			646	A		765	A
Approach Delay, s/veh		101.8			24.6			88.8			79.8	
Approach LOS		F			C			F			E	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	15.1	28.3	10.4	46.2	11.6	31.8		56.6				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.6	23.8	5.9	41.7	7.1	27.3		52.1				
Max Q Clear Time (g_c+I1), s	12.6	25.8	7.6	43.7	9.1	29.0		24.7				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0		8.9				
Intersection Summary												
HCM 6th Ctrl Delay				71.4								
HCM 6th LOS				E								
Notes												
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

US 78 at Rosebud Multi-Use Development
 2: project east access/Midway Station Access & US 78

future p.m.

Intersection												
Int Delay, s/veh	66.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	1655	58	56	1362	8	62	0	59	9	0	19
Future Vol, veh/h	13	1655	58	56	1362	8	62	0	59	9	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	150	0	-	100	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	99	99	99	99	99	99	85	85	85	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	1672	59	57	1376	8	73	0	69	12	0	24

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1384	0	0	1731	0	0	2500	3196	836	2352	3247	688
Stage 1	-	-	-	-	-	-	1698	1698	-	1490	1490	-
Stage 2	-	-	-	-	-	-	802	1498	-	862	1757	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	491	-	-	360	-	-	~ 15	10	310	19	9	389
Stage 1	-	-	-	-	-	-	96	146	-	130	186	-
Stage 2	-	-	-	-	-	-	344	184	-	316	137	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	491	-	-	360	-	-	~ 12	8	310	13	7	389
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 12	8	-	13	7	-
Stage 1	-	-	-	-	-	-	94	142	-	127	157	-
Stage 2	-	-	-	-	-	-	271	155	-	239	133	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.7	\$ 1498.6	288.4
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	12	310	491	-	-	360	-	-	38
HCM Lane V/C Ratio	6.078	0.224	0.027	-	-	0.157	-	-	0.945
HCM Control Delay (s)	\$ 2905.8	19.9	12.5	-	-	16.9	-	-	288.4
HCM Lane LOS	F	C	B	-	-	C	-	-	F
HCM 95th %tile Q(veh)	10.3	0.8	0.1	-	-	0.6	-	-	3.5

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

US 78 at Rosebud Multi-Use Development
 4: Rosebud Road & project north access/Kroger Access

future p.m.

Intersection												
Int Delay, s/veh	67.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↕	↗			↕	↗
Traffic Vol, veh/h	40	2	59	103	2	50	53	616	120	19	742	48
Future Vol, veh/h	40	2	59	103	2	50	53	616	120	19	742	48
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	150	-	-	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	88	88	88	98	98	98	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	4	2	2	4	2
Mvmt Flow	47	2	69	117	2	57	54	629	122	20	773	50

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1641	1672	773	1672	1661	690	823	0	0	751	0	0
Stage 1	813	813	-	798	798	-	-	-	-	-	-	-
Stage 2	828	859	-	874	863	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	80	96	399	~ 76	97	445	807	-	-	858	-	-
Stage 1	372	392	-	380	398	-	-	-	-	-	-	-
Stage 2	365	373	-	344	372	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	63	86	399	~ 56	87	445	807	-	-	858	-	-
Mov Cap-2 Maneuver	63	86	-	~ 56	87	-	-	-	-	-	-	-
Stage 1	347	375	-	355	371	-	-	-	-	-	-	-
Stage 2	295	348	-	270	356	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	75.4	\$ 690.7	0.7	0.2
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	807	-	-	64	399	78	858	-	-
HCM Lane V/C Ratio	0.067	-	-	0.772	0.174	2.258	0.023	-	-
HCM Control Delay (s)	9.8	-	-	158.9	15.9	\$ 690.7	9.3	0	-
HCM Lane LOS	A	-	-	F	C	F	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	3.5	0.6	16.3	0.1	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

US 78 at Rosebud Multi-Use Development
5: Rosebud Road & Bushy Fork Road

future p.m.

Intersection						
Int Delay, s/veh	6.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	196	528	24	190	626
Future Vol, veh/h	19	196	528	24	190	626
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	94	94	95	95
Heavy Vehicles, %	2	2	4	2	2	4
Mvmt Flow	21	220	562	26	200	659

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1634	575	0	0	588
Stage 1	575	-	-	-	-
Stage 2	1059	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	111	518	-	-	987
Stage 1	563	-	-	-	-
Stage 2	333	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	75	518	-	-	987
Mov Cap-2 Maneuver	75	-	-	-	-
Stage 1	383	-	-	-	-
Stage 2	333	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	37.8	0	2.2
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	340	987
HCM Lane V/C Ratio	-	-	0.711	0.203
HCM Control Delay (s)	-	-	37.8	9.6
HCM Lane LOS	-	-	E	A
HCM 95th %tile Q(veh)	-	-	5.2	0.8

US 78 at Rosebud Multi-Use Development
7: project west access & US 78

future p.m.

Intersection						
Int Delay, s/veh	38.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	1683	87	34	1407	69	44
Future Vol, veh/h	1683	87	34	1407	69	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	150	0	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	99	99	99	99	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1700	88	34	1421	81	52

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	1788	0	2479
Stage 1	-	-	-	-	1700
Stage 2	-	-	-	-	779
Critical Hdwy	-	-	4.14	-	6.84
Critical Hdwy Stg 1	-	-	-	-	5.84
Critical Hdwy Stg 2	-	-	-	-	5.84
Follow-up Hdwy	-	-	2.22	-	3.52
Pot Cap-1 Maneuver	-	-	342	-	~ 24
Stage 1	-	-	-	-	133
Stage 2	-	-	-	-	413
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	342	-	~ 22
Mov Cap-2 Maneuver	-	-	-	-	~ 22
Stage 1	-	-	-	-	120
Stage 2	-	-	-	-	413

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	\$ 967.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	22	304	-	-	342	-
HCM Lane V/C Ratio	3.69	0.17	-	-	0.1	-
HCM Control Delay (s)	\$ 1572.6	19.3	-	-	16.7	-
HCM Lane LOS	F	C	-	-	C	-
HCM 95th %tile Q(veh)	10.3	0.6	-	-	0.3	-

Notes
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

US 78 at Rosebud Multi-Use Development
 8: Rosebud Road & project south access

future p.m.

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	↔
Traffic Vol, veh/h	3	1	2	786	895	6
Future Vol, veh/h	3	1	2	786	895	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	98	98	96	96
Heavy Vehicles, %	2	2	2	4	4	2
Mvmt Flow	4	1	2	802	932	6























Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1738	932	938	0	-	0
Stage 1	932	-	-	-	-	-
Stage 2	806	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	96	323	730	-	-	-
Stage 1	383	-	-	-	-	-
Stage 2	439	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	96	323	730	-	-	-
Mov Cap-2 Maneuver	96	-	-	-	-	-
Stage 1	381	-	-	-	-	-
Stage 2	439	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	37.3	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	730	-	116	-	-
HCM Lane V/C Ratio	0.003	-	0.041	-	-
HCM Control Delay (s)	9.9	0	37.3	-	-
HCM Lane LOS	A	A	E	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

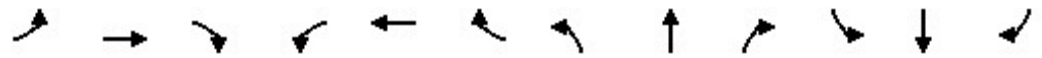
US 78 at Rosebud Multi-Use Development
6: Rosebud Road & Cooper Road

future p.m.

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	447	29	208	321	144	12	475	209	176	510	146
Future Volume (veh/h)	141	447	29	208	321	144	12	475	209	176	510	146
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1841	1870	1870	1841	1870
Adj Flow Rate, veh/h	158	502	0	219	338	0	12	495	218	187	543	155
Peak Hour Factor	0.89	0.89	0.89	0.95	0.95	0.95	0.96	0.96	0.96	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	2
Cap, veh/h	397	553		296	598		208	629	542	271	728	627
Arrive On Green	0.08	0.30	0.00	0.11	0.32	0.00	0.01	0.34	0.34	0.07	0.40	0.40
Sat Flow, veh/h	1781	1870	0	1781	1870	0	1781	1841	1585	1781	1841	1585
Grp Volume(v), veh/h	158	502	0	219	338	0	12	495	218	187	543	155
Grp Sat Flow(s),veh/h/ln	1781	1870	0	1781	1870	0	1781	1841	1585	1781	1841	1585
Q Serve(g_s), s	5.8	24.6	0.0	8.0	14.3	0.0	0.4	23.0	10.0	6.3	24.0	6.2
Cycle Q Clear(g_c), s	5.8	24.6	0.0	8.0	14.3	0.0	0.4	23.0	10.0	6.3	24.0	6.2
Prop In Lane	1.00		0.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	397	553		296	598		208	629	542	271	728	627
V/C Ratio(X)	0.40	0.91		0.74	0.56		0.06	0.79	0.40	0.69	0.75	0.25
Avail Cap(c_a), veh/h	416	639		306	674		276	629	542	271	728	627
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.2	32.2	0.0	23.4	26.8	0.0	21.8	28.2	23.9	21.6	24.6	19.2
Incr Delay (d2), s/veh	0.6	15.5	0.0	8.9	0.8	0.0	0.1	9.6	2.2	7.3	6.8	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	13.0	0.0	3.9	6.3	0.0	0.2	11.0	3.9	2.9	10.9	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.8	47.7	0.0	32.2	27.7	0.0	21.9	37.8	26.1	28.9	31.5	20.2
LnGrp LOS	C	D		C	C		C	D	C	C	C	C
Approach Vol, veh/h		660	A		557	A		725			885	
Approach Delay, s/veh		41.5			29.5			34.0			28.9	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	37.0	14.5	32.6	5.9	42.1	12.2	34.9				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	6.5	32.5	10.5	32.5	5.0	34.0	8.7	34.3				
Max Q Clear Time (g_c+I1), s	8.3	25.0	10.0	26.6	2.4	26.0	7.8	16.3				
Green Ext Time (p_c), s	0.0	2.2	0.0	1.5	0.0	2.3	0.0	1.8				
Intersection Summary												
HCM 6th Ctrl Delay			33.3									
HCM 6th LOS			C									
Notes												
Unsignalized Delay for [EBR, WBR] is excluded from calculations of the approach delay and intersection delay.												

US 78 at Rosebud Multi-Use Development
 1: Cooper Springs Road/Cooper Road & US 78

future a.m. with mitigation



























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	232	768	10	22	1710	138	29	15	13	123	17	410
Future Volume (veh/h)	232	768	10	22	1710	138	29	15	13	123	17	410
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	252	835	11	25	1921	155	32	17	14	129	18	432
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.90	0.90	0.90	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	276	2444	1090	424	1876	837	184	201	166	322	40	511
Arrive On Green	0.11	0.69	0.69	0.53	0.53	0.53	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	1781	3554	1585	651	3554	1585	940	949	781	1165	190	1585
Grp Volume(v), veh/h	252	835	11	25	1921	155	32	0	31	147	0	432
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	651	1777	1585	940	0	1730	1355	0	1585
Q Serve(g_s), s	8.5	8.6	0.2	1.7	47.5	4.6	2.8	0.0	1.3	7.9	0.0	19.1
Cycle Q Clear(g_c), s	8.5	8.6	0.2	1.7	47.5	4.6	12.0	0.0	1.3	9.2	0.0	19.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.45	0.88		1.00
Lane Grp Cap(c), veh/h	276	2444	1090	424	1876	837	184	0	367	363	0	511
V/C Ratio(X)	0.91	0.34	0.01	0.06	1.02	0.19	0.17	0.00	0.08	0.41	0.00	0.85
Avail Cap(c_a), veh/h	276	2444	1090	424	1876	837	184	0	367	363	0	511
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.4	5.7	4.4	10.4	21.3	11.1	36.9	0.0	28.4	31.9	0.0	28.4
Incr Delay (d2), s/veh	32.4	0.1	0.0	0.1	27.2	0.1	2.1	0.0	0.5	3.3	0.0	15.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	2.1	0.0	0.2	22.6	1.4	0.7	0.0	0.6	3.0	0.0	9.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.8	5.8	4.4	10.5	48.4	11.2	39.0	0.0	28.9	35.3	0.0	44.2
LnGrp LOS	E	A	A	B	F	B	D	A	C	D	A	D
Approach Vol, veh/h		1098			2101			63				579
Approach Delay, s/veh		18.4			45.2			34.0				41.9
Approach LOS		B			D			C				D
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		23.6		66.4		23.6	14.4	52.0				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.1		61.9		19.1	9.9	47.5				
Max Q Clear Time (g_c+I1), s		14.0		10.6		21.1	10.5	49.5				
Green Ext Time (p_c), s		0.1		5.8		0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay				36.9								
HCM 6th LOS				D								

US 78 at Rosebud Multi-Use Development

3: Rosebud Road & US 78

future a.m. with mitigation

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	797	142	124	1394	174	205	535	113	156	374	63
Future Volume (veh/h)	28	797	142	124	1394	174	205	535	113	156	374	63
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1841	1870	1870	1841	1870
Adj Flow Rate, veh/h	30	866	154	143	1602	200	218	569	0	177	425	0
Peak Hour Factor	0.92	0.92	0.92	0.87	0.87	0.87	0.94	0.94	0.94	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	2
Cap, veh/h	107	1394	622	281	1525	680	306	605		201	583	
Arrive On Green	0.03	0.39	0.39	0.06	0.43	0.43	0.08	0.33	0.00	0.07	0.32	0.00
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	1841	1585	1781	1841	1585
Grp Volume(v), veh/h	30	866	154	143	1602	200	218	569	0	177	425	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1841	1585	1781	1841	1585
Q Serve(g_s), s	1.2	23.5	7.8	5.5	51.5	9.9	9.3	36.0	0.0	7.9	24.6	0.0
Cycle Q Clear(g_c), s	1.2	23.5	7.8	5.5	51.5	9.9	9.3	36.0	0.0	7.9	24.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	107	1394	622	281	1525	680	306	605		201	583	
V/C Ratio(X)	0.28	0.62	0.25	0.51	1.05	0.29	0.71	0.94		0.88	0.73	
Avail Cap(c_a), veh/h	134	1394	622	347	1525	680	306	605		201	583	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.9	29.3	24.5	21.8	34.3	22.4	29.9	39.1	0.0	32.0	36.4	0.0
Incr Delay (d2), s/veh	1.4	0.9	0.2	1.4	37.5	0.2	7.6	24.5	0.0	33.1	7.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	9.5	2.8	2.2	28.0	3.5	4.8	19.6	0.0	5.2	11.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.3	30.2	24.8	23.3	71.8	22.6	37.5	63.7	0.0	65.0	44.2	0.0
LnGrp LOS	C	C	C	C	F	C	D	E		E	D	
Approach Vol, veh/h		1050			1945			787	A		602	A
Approach Delay, s/veh		29.4			63.2			56.4			50.3	
Approach LOS		C			E			E			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.4	43.9	12.1	51.6	13.8	42.5	7.7	56.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	7.9	37.6	12.0	44.5	9.3	36.2	5.0	51.5				
Max Q Clear Time (g_c+I1), s	9.9	38.0	7.5	25.5	11.3	26.6	3.2	53.5				
Green Ext Time (p_c), s	0.0	0.0	0.1	5.6	0.0	1.6	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			52.1									
HCM 6th LOS			D									
Notes												
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

US 78 at Rosebud Multi-Use Development
 5: Rosebud Road & Bushy Fork Road

future a.m. with mitigation

Intersection						
Int Delay, s/veh	8.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Traffic Vol, veh/h	13	222	545	13	240	360
Future Vol, veh/h	13	222	545	13	240	360
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	89	89	91	91
Heavy Vehicles, %	2	2	4	2	2	4
Mvmt Flow	16	278	612	15	264	396

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1544	620	0	0	627
Stage 1	620	-	-	-	-
Stage 2	924	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	126	488	-	-	955
Stage 1	536	-	-	-	-
Stage 2	387	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	91	488	-	-	955
Mov Cap-2 Maneuver	91	-	-	-	-
Stage 1	388	-	-	-	-
Stage 2	387	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	36.8	0	4.1
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	393	955
HCM Lane V/C Ratio	-	-	0.747	0.276
HCM Control Delay (s)	-	-	36.8	10.2
HCM Lane LOS	-	-	E	B
HCM 95th %tile Q(veh)	-	-	6	1.1

US 78 at Rosebud Multi-Use Development
 1: Cooper Springs Road/Cooper Road & US 78

future p.m. with mitigation



























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	496	1604	55	46	1353	98	45	35	48	136	33	325
Future Volume (veh/h)	496	1604	55	46	1353	98	45	35	48	136	33	325
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	517	1671	57	46	1367	99	52	40	55	139	34	332
Peak Hour Factor	0.96	0.96	0.96	0.99	0.99	0.99	0.87	0.87	0.87	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	543	2472	1102	183	1407	627	123	153	210	252	48	744
Arrive On Green	0.25	0.70	0.70	0.79	0.79	0.79	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	1781	3554	1585	281	3554	1585	1016	713	981	870	222	1585
Grp Volume(v), veh/h	517	1671	57	46	1367	99	52	0	95	173	0	332
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	281	1777	1585	1016	0	1694	1091	0	1585
Q Serve(g_s), s	23.4	27.0	1.1	5.1	34.7	1.5	5.0	0.0	4.7	11.7	0.0	14.1
Cycle Q Clear(g_c), s	23.4	27.0	1.1	5.1	34.7	1.5	21.5	0.0	4.7	16.4	0.0	14.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.58	0.80		1.00
Lane Grp Cap(c), veh/h	543	2472	1102	183	1407	627	123	0	363	299	0	744
V/C Ratio(X)	0.95	0.68	0.05	0.25	0.97	0.16	0.42	0.00	0.26	0.58	0.00	0.45
Avail Cap(c_a), veh/h	547	2512	1121	186	1439	642	123	0	363	299	0	744
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.7	8.8	4.8	6.8	9.9	6.4	47.5	0.0	32.7	39.4	0.0	17.8
Incr Delay (d2), s/veh	26.8	0.7	0.0	0.7	17.2	0.1	10.2	0.0	1.7	7.9	0.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.2	7.3	0.3	0.3	6.8	0.5	1.6	0.0	2.1	4.5	0.0	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.5	9.5	4.8	7.5	27.1	6.6	57.8	0.0	34.4	47.3	0.0	19.8
LnGrp LOS	E	A	A	A	C	A	E	A	C	D	A	B
Approach Vol, veh/h		2245			1512			147				505
Approach Delay, s/veh		19.9			25.2			42.7				29.2
Approach LOS		B			C			D				C
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		26.0		74.0		26.0	30.0	44.1				
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		20.3		70.7		20.3	25.7	40.5				
Max Q Clear Time (g_c+l1), s		23.5		29.0		18.4	25.4	36.7				
Green Ext Time (p_c), s		0.0		16.8		0.4	0.1	2.8				
Intersection Summary												
HCM 6th Ctrl Delay				23.6								
HCM 6th LOS				C								

US 78 at Rosebud Multi-Use Development

3: Rosebud Road & US 78

future p.m. with mitigation

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	101	1406	191	170	1132	184	177	437	85	248	463	79
Future Volume (veh/h)	101	1406	191	170	1132	184	177	437	85	248	463	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1841	1870	1870	1841	1870
Adj Flow Rate, veh/h	103	1435	195	172	1143	186	186	460	0	267	498	0
Peak Hour Factor	0.98	0.98	0.98	0.99	0.99	0.99	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	2
Cap, veh/h	215	1404	626	186	1450	647	224	464		269	528	
Arrive On Green	0.03	0.26	0.26	0.06	0.41	0.41	0.07	0.25	0.00	0.11	0.29	0.00
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1781	1841	1585	1781	1841	1585
Grp Volume(v), veh/h	103	1435	195	172	1143	186	186	460	0	267	498	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1781	1841	1585	1781	1841	1585
Q Serve(g_s), s	3.4	39.5	9.9	5.8	28.1	7.9	7.4	24.9	0.0	10.9	26.4	0.0
Cycle Q Clear(g_c), s	3.4	39.5	9.9	5.8	28.1	7.9	7.4	24.9	0.0	10.9	26.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	215	1404	626	186	1450	647	224	464		269	528	
V/C Ratio(X)	0.48	1.02	0.31	0.92	0.79	0.29	0.83	0.99		0.99	0.94	
Avail Cap(c_a), veh/h	231	1404	626	186	1450	647	224	464		269	528	
HCM Platoon Ratio	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	21.5	36.8	25.9	24.0	25.8	19.8	29.4	37.3	0.0	27.0	34.8	0.0
Incr Delay (d2), s/veh	1.6	29.8	0.3	45.0	3.0	0.2	22.3	39.8	0.0	53.0	27.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	22.7	3.6	4.4	11.1	2.7	4.5	15.7	0.0	8.3	15.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.1	66.6	26.2	69.0	28.8	20.1	51.7	77.1	0.0	80.0	62.1	0.0
LnGrp LOS	C	F	C	E	C	C	D	E		E	E	
Approach Vol, veh/h		1733			1501			646	A		765	A
Approach Delay, s/veh		59.5			32.3			69.8			68.3	
Approach LOS		E			C			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.4	29.7	10.9	44.0	11.9	33.2	9.6	45.3				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	10.9	25.2	6.4	39.5	7.4	28.7	6.0	39.9				
Max Q Clear Time (g_c+I1), s	12.9	26.9	7.8	41.5	9.4	28.4	5.4	30.1				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.1	0.0	5.2				
Intersection Summary												
HCM 6th Ctrl Delay			53.6									
HCM 6th LOS			D									
Notes												
Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

US 78 at Rosebud Multi-Use Development
5: Rosebud Road & Bushy Fork Road

future p.m. with mitigation

Intersection						
Int Delay, s/veh	5.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	196	528	24	190	626
Future Vol, veh/h	19	196	528	24	190	626
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	94	94	95	95
Heavy Vehicles, %	2	2	4	2	2	4
Mvmt Flow	21	220	562	26	200	659

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1634	575	0	0	588
Stage 1	575	-	-	-	-
Stage 2	1059	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	111	518	-	-	987
Stage 1	563	-	-	-	-
Stage 2	333	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	88	518	-	-	987
Mov Cap-2 Maneuver	88	-	-	-	-
Stage 1	449	-	-	-	-
Stage 2	333	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	32.8	0	2.2
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	362	987
HCM Lane V/C Ratio	-	-	0.667	0.203
HCM Control Delay (s)	-	-	32.8	9.6
HCM Lane LOS	-	-	D	A
HCM 95th %tile Q(veh)	-	-	4.6	0.8