GRAVES MILL ROAD
CORRIDOR IMPROVEMENT STUDY

City of Lynchburg and Bedford County, Virginia

June 14, 2018

FINAL

Graves Mill Road Corridor Improvement Study

June 14, 2018

Prepared for

Central Virginia Metropolitan Planning Organization

City of Lynchburg

Bedford County

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Note: Public Information Meeting attendee lists (including personal contact information)have been removed to protect privacy.

Introduction

Graves Mill Road, located in the City of Lynchburg and Bedford County, is an important roadway that serves large volumes of commuter traffic, while also providing access to commercial interests. Given 1) heavy traffic demand, 2) proximity to future development potential 3) interchange expressway access, and 4) its status as a key commuter route, the City of Lynchburg, Bedford County, and the Central Virginia Metropolitan Planning Organization (CVMPO) have undertaken a study to develop a plan to address existing and expected future mobility challenges along this important corridor.

The purpose of this study is to investigate existing and future traffic conditions, traffic operations, multimodal features, and safety issues along Graves Mill Road. The results of the investigation will then lead to the development of recommendations that will help to minimize congestion and improve multimodal mobility within the Graves Mill Road corridor. The key steps in the process include:

- **Existing Conditions:** existing traffic conditions as of the date of this study.
- **Future No Build Conditions:** future 2040 traffic demand under existing geometric conditions, plus the addition of any planned transportation related improvements. Future no build establishes a baseline improvements can then be compared against.
- **Future Build Conditions:** recommended improvements, vetted through a public involvement process, that accommodate 2040 traffic demand and address safety issues.
- **Funding and Implementation:** prioritization, strategies and funding opportunities.

Each step in the study informs subsequent steps and allows for the creation of a comprehensive concept plan for the transportation system that may be implemented over time. The results have been shared with the public through an interactive and transparent public engagement process, which is integral to the success of the plan, resulting in recommendations for the benefit of the citizens and businesses in the surrounding study area.

A summary of the recommended projects is included. This information is intended to aid the City, County, and CVMPO with project prioritization and implementation when grant or other funding opportunities arise in the future. It will also help to inform current development and potential development of what future transportation related projects may affect them. Projects should continue to be updated in the future as a tool to track opportunities and needs within the corridor.

Corridor Study Area

This corridor study area extends along Graves Mill Road, from McConville Road at the eastern terminus to Gristmill Drive at the western terminus, a distance of approximately 1.6 miles. **Figure 1** provides an illustration of the study area, as well as the intersections this study examined. The study area includes the following six (6) signalized intersections and two (2) unsignalized intersection:

- Gistmill Drive (signalized)
- Millrace Drive (signalized)
- Millside Drive (unsignalized)
- Old Graves Mill Road (signalized)
- Creekside Drive (signalized)
- US501 eastbound interchange ramps (signalized)
- US501 westbound interchange ramps (signalized)
- McConville Road (unsignalized)

General Description of the Study Area

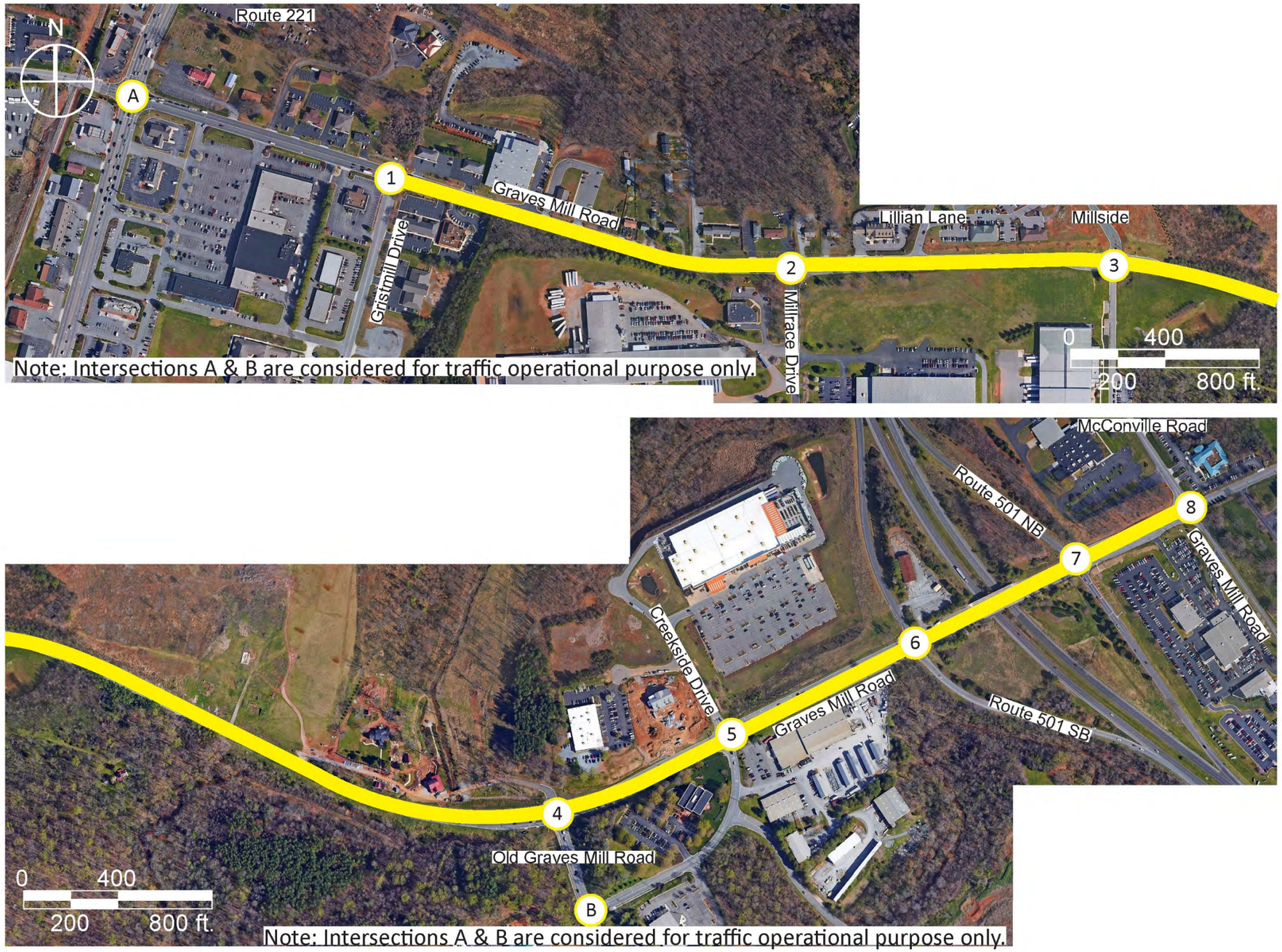
Graves Mill Road is a four-lane undivided roadway from Gristmill Road east to The US 501 Expressway (“501”), where it then becomes a divided four-lane roadway to McConville Road. Graves Mill Road is classified as a minor arterial and designed for “through” and local traffic. The posted speed limited ranges from 35 miles per hour (mph) near Gristmill Road in Bedford County, to 45 mph along the middle section west of Old Graves Mill Road, down to 35 mph east to McConville Road in the City of Lynchburg. The Virginia Department of Transportation (VDOT) reports that the 2016 average daily traffic (ADT) counts are approximately 26,000 vehicles per day (VPD) between 501 and Old Graves Mill Road, and 21,000 VPD west of Old Graves Mill Road. East of the interchange the ADT is 9,100 VPD.

Graves Mill Road is a unique, albeit important transportation facility as it serves many functions and users. It is geographically situated between the 501 to the east and US 221 (“221”) to the west. Collectively, these corridors are critical to the City’s economic health and quality of life. As such, Graves Mill Road serves many purposes including:

- Local residential and shopping access
- School related traffic
- Local and regional truck traffic
- Employment commuting
- Some pedestrian and transit activity
- Local business access
- Emergency and security response

Graves Mill Road must continue to accommodate a wide array of users with varying trip purposes. Maintaining and enhancing traffic flow within the corridor is of crucial importance, as well as balanced multi-modal accessibility. Access to future development should also be planned for and designed to ensure that it does not impede or further restrict traffic flow.

Figure 1 – Study Area



Methodology Overview

This corridor planning study includes a multifaceted approach that consisted of assemblage of relevant plans and studies, detailed field review, crash analysis, development of a traffic model, and assessment of performance measures. Collectively, these elements may uncover existing deficiencies in the network, and provide a baseline on which future conditions can then be established upon.

Relevant Plans and Studies

Relevant studies and plans that have been completed in the study area have been collected and reviewed. The following provides a summary of each:

City Comprehensive Plan – The City of Lynchburg completed a land use and population analysis as part of their Comprehensive Plan. The Graves Mill Road corridor is generally flanked by industrial, commercial and institutional uses, with residential beyond. One important note in the City is the shift in population growth. Over the first decade of the 21st century, the City began to capture a greater share of the region's growth, increasing by a percentage that exceeded every county in the region and the state as a whole – with the highest growth areas in the southern portions of City served by Graves Mill Road.

The City has also developed a *Plan Framework Map* that highlights the City's primary commercial and mixed use corridors. As important local and regional travel routes and commercial destinations, these areas strongly influence the City's accessibility, attractiveness, and economic vitality. This map identifies the Graves Mill Road area as a business/technology and employment growth area.

Rosedale Farms Development – The proposed development is located just west of the existing Home Depot side off of Graves Mill Road in the City of Lynchburg. The proposed site includes three entrance locations on Graves Mill Road – one right in only, one right out only and one full entrance. The site is planned to be constructed in three phases with an ultimate build-out year of 2024. The proposed land uses include a mix of residential, office, retail, grocery, service and restaurant land uses with the potential to generate over 15,000 new daily trips.[1]

Elements at Old Graves Mill Road – The proposed development is located on Old Graves Mill Road, approximately 500' south of Graves Mill Road in the City of Lynchburg. The site will have one entrance to Old Graves Mill Road. The site is currently moving forward with construction and will include a mix of residential and office land uses with the potential to generate over 2,000 new daily trips. While many trips are expected to head south along Old Graves Mill Road, some will travel north to Graves Mill Road to access either US501 or US221.[2]

Field Observations

A detailed field review was conducted on Friday, August 18th. Subsequent field reviews were conducted thereafter as needed. These observations examined traffic patterns and queues for each approach, driver behavior and decision factors, pedestrian use, signage, signal operations and other relevant transportation characteristics. Key observations include:

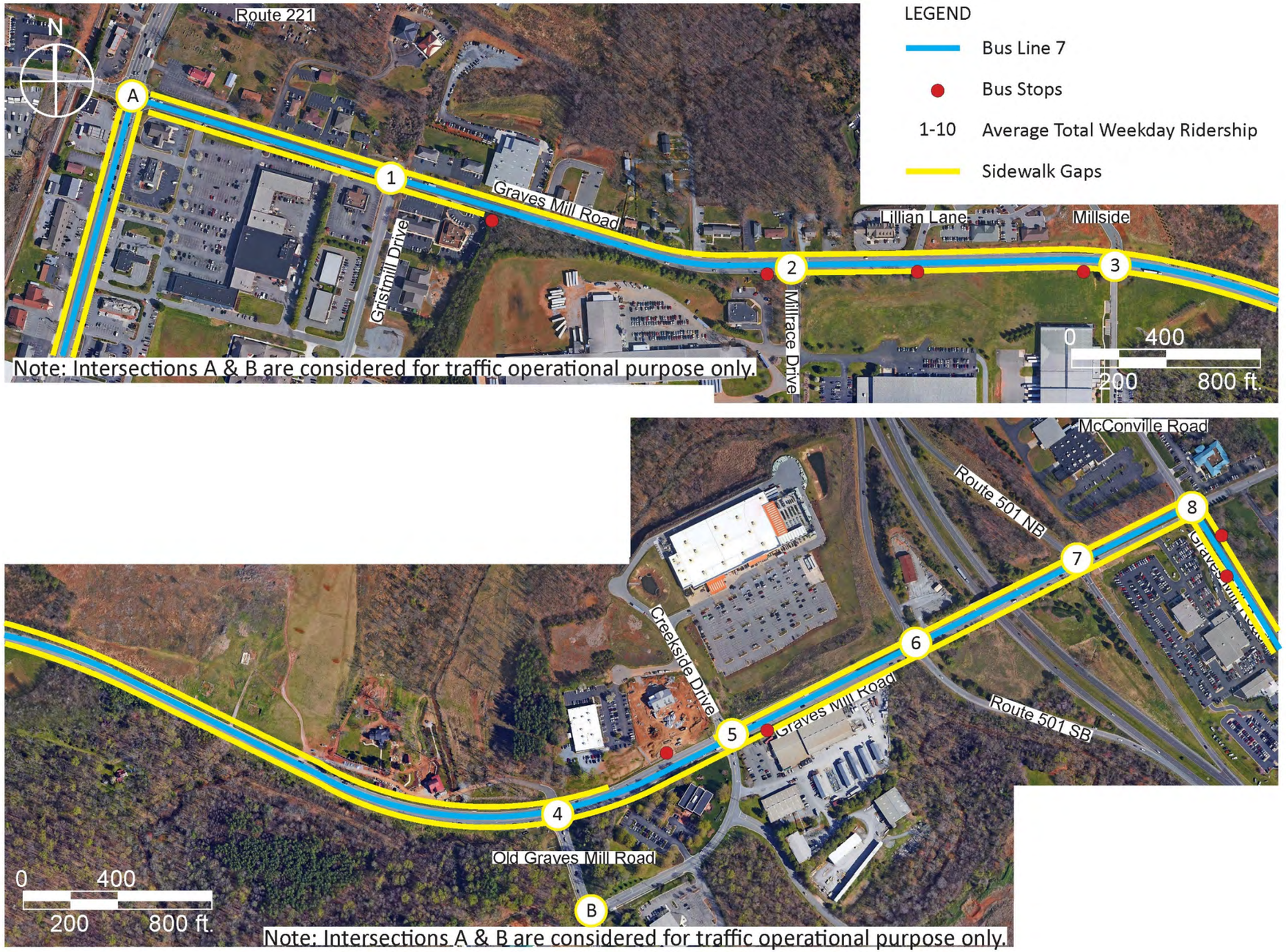
- The intersection of Gristmill Drive experienced a relatively significant amount of westbound queuing (making the left off Graves Mill Road). No dedicated left turn lane is provided; therefore, vehicles are observed queuing back and drivers familiar with the intersection are typically in the right lane well before the approach. This ultimately creates a de facto turn lane and the westbound through movement functions as a single lane.
- Drivers use Gristmill Drive as a bypass for the 221/Graves Mill Road intersection. In fact, based off observations, the majority of drivers using Gristmill Drive did not access the adjacent commercial and business uses during the peak hours.
- Continuing east from Gristmill Drive, traffic demand appeared higher, compared to between Gristmill Drive and 221 (supports the bypass use).
- High speeds were observed (>50 miles per hour) between Millrace Drive and Old Graves Mill Road, even during more congested times of day. This section of Graves Mill Road has fewer driveways and the alignment allows for higher speeds.
- Approaching Old Graves Mill Road and Creekside Drive, lane utilization will need to be a consideration, particularly in the eastbound direction approaching the 501 ramps. Lane bias was observed as queues were substantially longer in the right lane. The eastbound queue in the right lane consistently did not clear the intersection at Creekside Drive. The beginning of this queue was the eastbound right at the 501 southbound ramp.
- Outside of the eastbound movement at the southbound ramp, the remaining approaches appeared to function reasonably well. There was moderate southbound right queuing observed at the 501 southbound ramp, and the eastbound left turn lane backed up to Graves Mill Road at the 501 northbound ramp. The northbound approach off 501 cleared for nearly every cycle though during a short duration, some vehicles appeared to not clear.
- From a signal operations perspective, the timings for the ramp intersections could be improved.
- The four-way stop at McConville Road processed traffic reasonably well, though right at 5:00 PM for the rush it backed up for about a 10-minute period (4 or 5 car queuing).
- The office park east of McConville Road is generally built out; however, there is one large parcel remaining that once developed, could generate more traffic.
- No bicyclists were observed, and only one pedestrian was observed waiting at a bus stop just east of Gristmill Drive. Sidewalks are only installed along Graves Mill Road along the south side east of Gristmill Drive, and along the north side east of Old Graves Mill Road.
- A cluster of bus stop were located along the south side of Graves Mill Road east of Millrace Road. No accommodations (benches, trash cans, pad, shelter) were provided at the stops, only a sign.

Figure 2 illustrates the multimodal conditions along the corridor.

[1] Rosedale Farms Traffic Impact Analysis, November 2013 (revised January 2014).

[2] Elements at Old Graves Mill Road Traffic Impact Analysis, June 2016 (supplemental revision August 2016).

Figure 2 – Multimodal Conditions



Crash Analysis

A crash analysis was performed on the Graves Mill Road study corridor using crash data from the VDOT Roadway Network System (RNS). The crash data covered the period from January 1, 2012 to December 31, 2016 and was used to identify crash patterns based on crash severity, roadway characteristics, and environmental characteristics. The complete crash data is provided in the **Appendix.**

Summary of Corridor Crashes

142 total crashes were reported within the study area over the six-year crash analysis period. Of the reported crashes, 100 involved property damage only and 31 involved injuries. There was one fatality involving an angle collision at Gristmill Drive in 2013. A total summary of the crashes, by type, is shown in **Table 1**.

Table 1 – Corridor Crash Statistics

Year	Rear End	Angle	Fixed Object	Side-swipe	Head On	Other	Deer	Total
2011	11	7	3	1	1	1	1	**25**
2012	9	8	1	2	0	1	0	**21**
2013	9	6	0	0	1	1	1	**18**
2014	11	7	4	1	0	0	0	**23**
2015	14	8	2	1	1	0	0	**26**
2016	15	8	2	2	1	1	0	**29**
Total	**69**	**44**	**12**	**7**	**4**	**4**	**2**	**142**

The total number of crashes by year illustrate an concerning trend. From 2011, the number of crashes occurring along the corridor were steadily reducing, bottoming in 2013. From 2013, the number of crashes began to steadily increase, peaking in 2016 at a rate that significantly outpaces growth in traffic levels. In fact, the number of annual crashes have increased by approximately 60% between 2013 and 2016, while historical traffic indicates traffic levels increased by less than 10%. Unfortunately, this could reflect a national trend and is largely blamed on distracted drivers using cell phones. That, combined with increasing congestion, exacerbates safety conditions.

Corridor Crash Rates

Crash rates can be an effective tool to measure the relative safety at a particular location or segment along a corridor. They account for roadway characteristics such as segment length, number of crashes, and traffic demand; thereby, allowing for a “weighted” comparison of locations. Crash rates are expressed as "crashes per Million Entering Vehicles" (MEV) for intersection locations and as "crashes per Million Vehicle Miles Traveled" (MVMT) for roadway segments. VDOT maintains local (City of Lynchburg) and statewide roadway crash rates by facility type that can be used for comparison. **Table 2** illustrates how individual segments along Graves Mill Road compare to state and local average rates.

Table 2 – Corridor Crash Rates

Segment	Segment Rate	VA Hwy Rate	Lynchburg Hwy Rate	VA Minor Arterial Rate
Gristmill Dr. to Millrace Dr.	324	Higher	Higher	Higher
Millrace Dr. to Millside	259	Higher	Higher	Higher
Millside to Old Graves Mill Rd.	68	Lower	Lower	Lower
Old Graves Mill Rd. to Creekside Dr.	176	Higher	Higher	Higher
Creekside Dr. to 501 SB Ramps	327	Higher	Higher	Higher
501 SB Ramps to 501 NB Ramps	244	Higher	Higher	Higher
501 NB Ramps to McConville Rd.	274	Higher	Higher	Higher

With the exception of Graves Mill Road between Millside Drive and Old Graves Mill Road, the corridor exhibits crash rates that are higher than state and local average rates. The likely reason the one segment is lower is that there are few driveways limiting vehicle conflict points. **Table 3** summarizes the intersection crash rates along Graves Mill Road.

Table 3 – Intersection Crash Rates

Intersection	Intersection Rate	Rank
Gristmill Drive	**0.23**	**3**
Millrace Drive	**0.28**	**2**
Millside Drive	0.05	8
Old Graves Mill Road	0.10	6
Creekside Drive	**0.40**	**1**
501 SB Ramps	0.09	7
501 NB Ramps	0.11	5
McConville Road	0.11	4

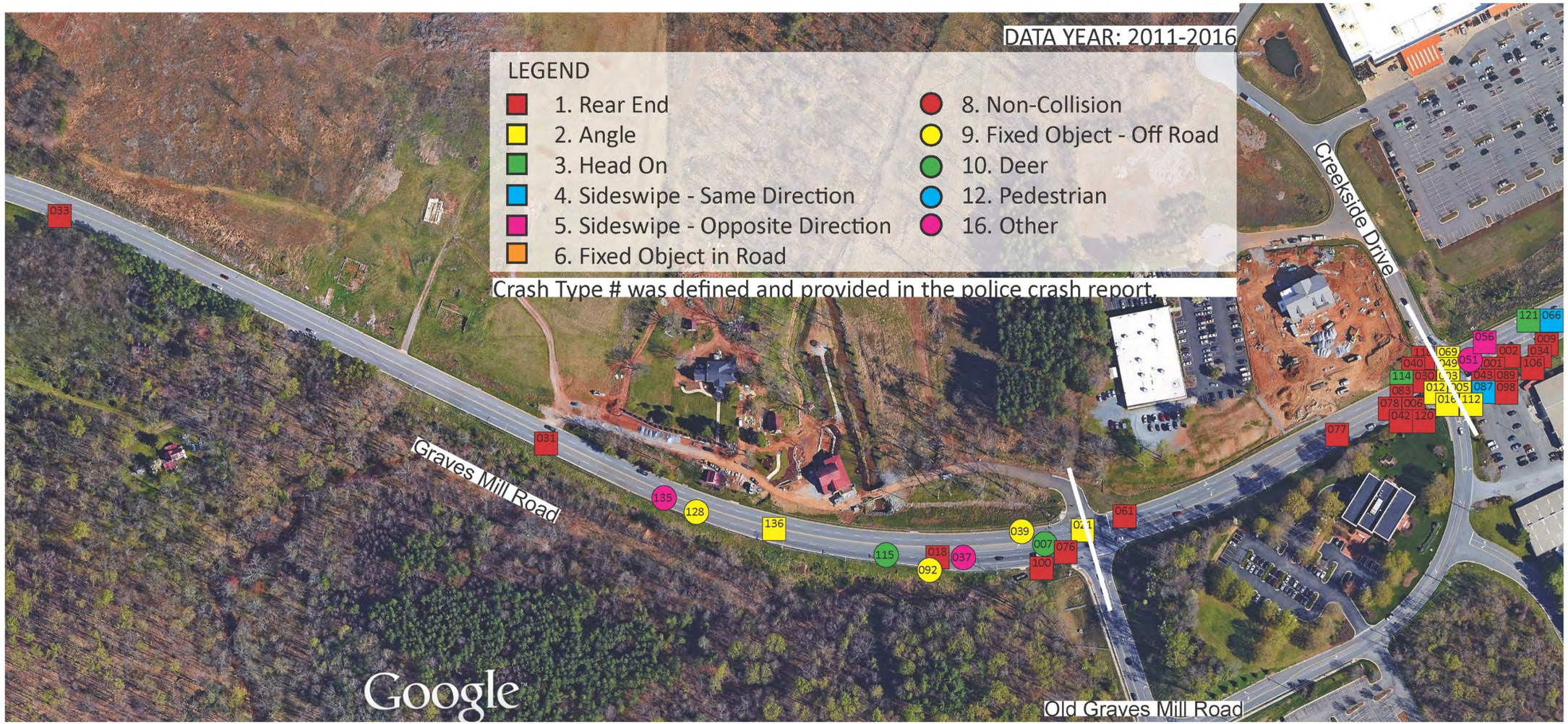
Clearly, the intersections of Creekside Drive, Millrace Drive, and Gristmill Road stand out among the eight (8) intersections. Creekside Drive experiences heavy peak hour congestion and queues consistently extend from the 501 SB ramps, back through the intersection to Old Graves Mill Road. Gristmill Road also experiences heavy peak hour congestion due to the lack of a westbound dedicated left turn lane, plus heavy northbound right turning movements. Millrace Drive stands out because it doesn’t serve a high number of turning movements, but high speed is likely a contributing factor as most of the crashes are rear ends.

The locations of crashes and corridor crash rates are illustrated on **Figures 3** and **4**, respectively. To note, the number identified on Figure 3 for each location is a unique identifier, not the number of crashes.

Figure 3 –Crash Locations

Crash Location Figure Continued

Crash Location Figure Continued



Crash Location Figure Continued

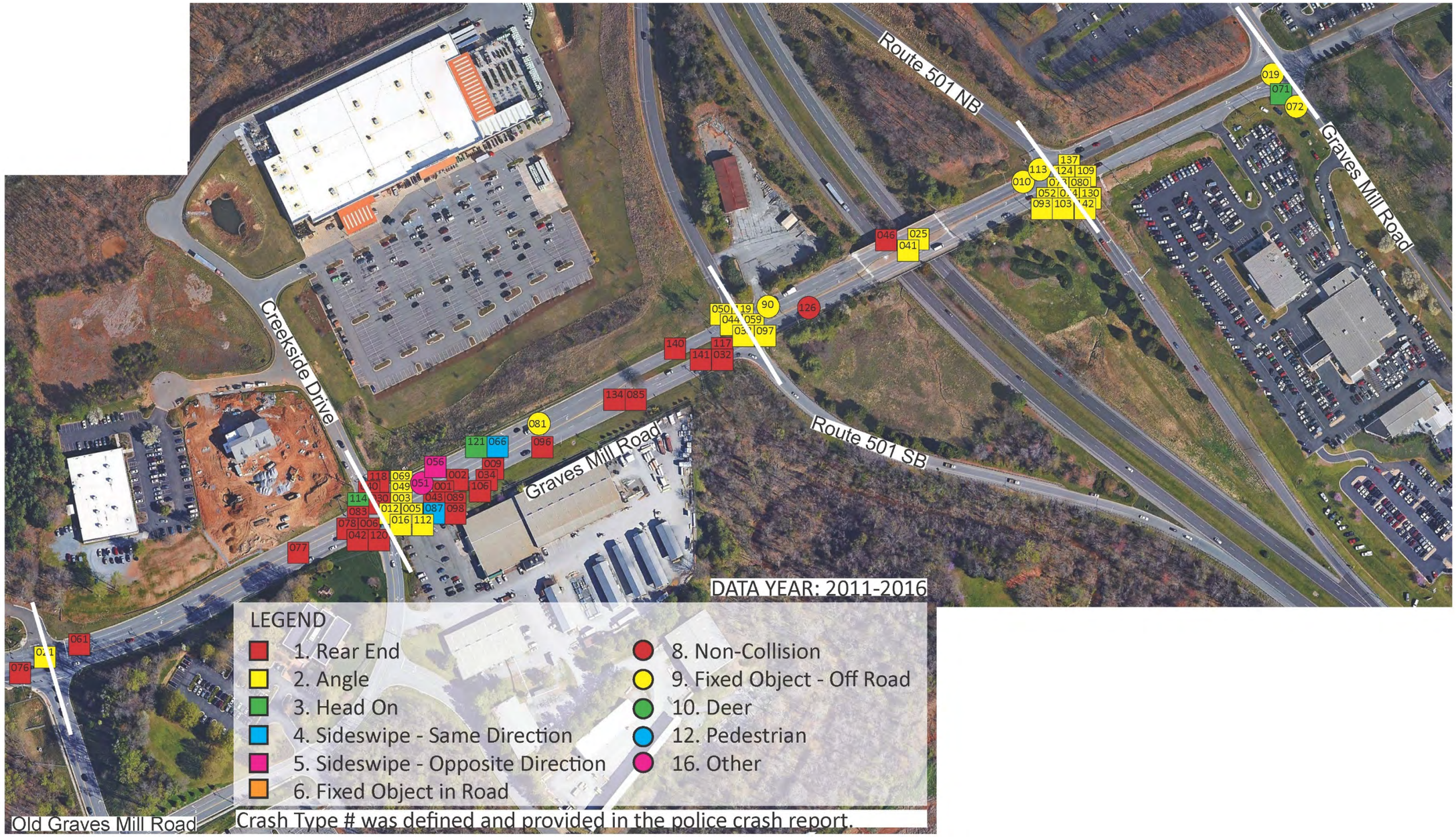
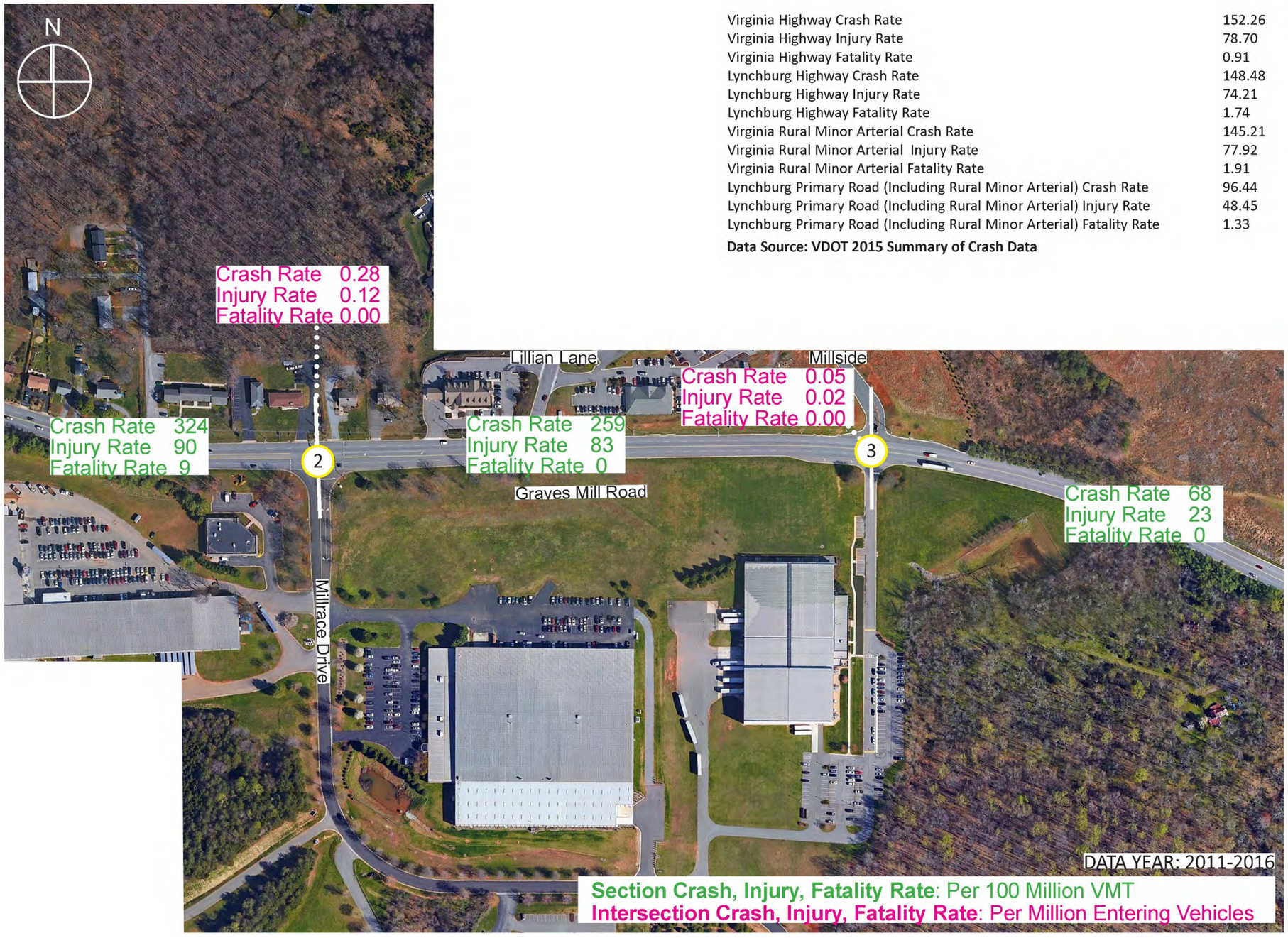


Figure 4 –Corridor Crash Rates

Virginia Highway Crash Rate	152.26
Virginia Highway Injury Rate	78.70
Virginia Highway Fatality Rate	0.91
Lynchburg Highway Crash Rate	148.48
Lynchburg Highway Injury Rate	74.21
Lynchburg Highway Fatality Rate	1.74
Virginia Rural Minor Arterial Crash Rate	145.21
Virginia Rural Minor Arterial Injury Rate	77.92
Virginia Rural Minor Arterial Fatality Rate	1.91
Lynchburg Primary Road (Including Rural Minor Arterial) Crash Rate	96.44
Lynchburg Primary Road (Including Rural Minor Arterial) Injury Rate	48.45
Lynchburg Primary Road (Including Rural Minor Arterial) Fatality Rate	1.33

Data Source: VDOT 2015 Summary of Crash Data

Corridor Crash Rates Figure Continued



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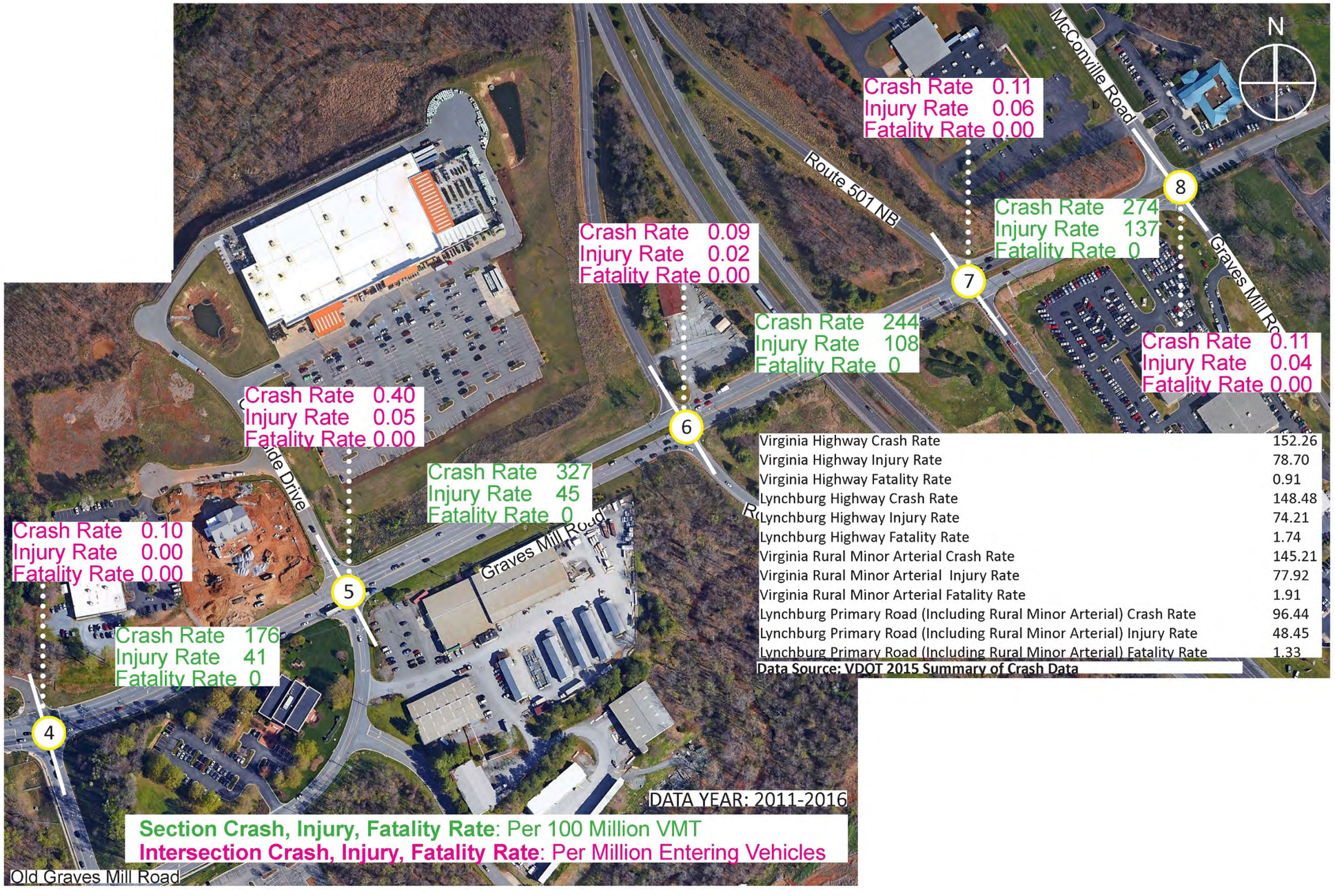

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Data Source: VDOT 2015 Summary of Crash Data

Traffic Analysis

Intersection turning movement counts (TMCs) at each study area intersection were collected on September 6 – 7, 2017 on clear days while local schools were in session. TMCs were collected during the AM peak period from 7:00 – 9:00 AM, and during the PM peak period from 4:00 – 6:00 PM. All traffic counts are provided in the **Appendix**.

All AM and PM TMCs were totaled by 15-minute and one-hour increments. To be more conservative and ensure operations unique to each intersection are captured, the individual intersection AM and PM peak hour was used for the purposes of this study. For most intersections, the peak hours fell between 7:30 – 8:30 AM, and 5:00 – 6:00 PM, with a few deviating by 15 minutes. Heavy vehicle counts were also collected at each study intersection as part of the data collection process. Heavy vehicle percentages were calculated for each movement at all study area intersections during the AM and PM peak hours. In general, truck percentages on Graves Mill Road ranged from one to two percent. However, individual turning movements experience higher truck percentages at several locations in the corridor due to lower total volume.

The Graves Mill Road corridor contains multiple access points and parking lots located between the study area intersections; therefore, some discontinuity in traffic volumes is expected. To avoid manual adjustments that could potentially over or under-inflate traffic levels, volumes were not balanced for the purposes of this analysis. To note, the peak hours were very consistent along the corridor with only minor fluctuations observed between intersections.

The existing TMCs for the AM and PM peak hours are illustrated on **Figure 5**.

Traffic Model Development

The traffic modeling network was developed using aerial mapping, roadway geometry, traffic, and signal operational information provided by the City. The operational analysis for the study area intersections was completed using Synchro 9.0, a computer-based intersection operations model that replicates procedures from the *Highway Capacity Manual* (HCM) (Transportation Research Board, 2000 and 2010). The program was used to assess existing and future operations of intersections in the study area. At present, the traffic signals are coordinated during the Mid-day peak hour; however, run free during the PM peak. Two measures of effectiveness were selected to measure the quantitative performance of the study area intersections:

- Average vehicle delay by movement, approach, and intersection – measured in seconds per vehicle
- 95th percentile queue length – measured in feet

The signal timing and phasing plans for all signalized intersections were provided by the City of Lynchburg and VDOT.

Performance Measures

To determine lane geometric needs, intersection level of service (LOS) standards have been applied. Intersection LOS is a qualitative measure of vehicular delay and takes into account a number of conditions related to intersection design and traffic volume, and the perception of those conditions by motorists. Ratings range from A to F, with LOS A indicating little or no average delay and LOS F indicating severe average delays. Typically, LOS A-C are considered acceptable ratings for an intersection, while LOS D-F indicate the potential need for improvements. To note, LOS D (and sometimes LOS E), with greater vehicle delay, are often considered acceptable for more urbanized areas because of the accessibility benefits and higher pedestrian interactions that result from increased density. **Table 4** summarizes the LOS criteria, as specified in HCM 2000 and 2010.

Table 4– Level of Service Criteria

Level of Service (LOS)	Signalized Intersection Control Delay (seconds/vehicle)	Unsignalized Intersection Control Delay (seconds/vehicle)
A	0-10	0-10
B	>10-20	> 10-15
C	>20-35	>15-25
D	>35-55	>25-35
E	>55-80	>35-50
F	>80	>50

Source: 2010 Highway Capacity Manual

In addition to LOS, the 95th percentile queue is the probable furthest distance from the stop bar to the back of the last vehicle waiting at an intersection. This queue represents the length of the line of cars that arrive at an intersection when the signal is red combined with vehicles that did not clear the intersection during the previous green light. Comparing the length of this line of vehicles to potential lane lengths available at each intersection provides another measure of how efficiently the intersection is processing traffic demand. **To note, maximum queues (essentially 100 percentile) were occasionally reviewed via traffic model simulation runs, as conditions dictated.**

Existing Traffic Conditions

Traffic operations analyses for existing conditions were conducted using Synchro to evaluate overall performance of the study intersections within the Graves Mill Road corridor.

Delay and LOS

Delay and LOS are reported from the HCM 2010 from *Synchro* for signalized intersections with standard (National Electrical Manufacturers Association (NEMA) phasing and all unsignalized intersections. HCM 2000 methodology results are still used to report signalized intersections with non-NEMA signal phasing. **Figure 6** illustrates the average AM and PM peak hour delay and LOS for each movement for the eight (8) study intersections along the Graves Mill Road corridor. The intersection HCM outputs from Synchro can be found in the **Appendix**.

The results in **Figure 6** indicate that all study area intersections operate at LOS D, or better during both AM and PM peak hours. However, there are individual movements that experience higher delays (LOS E and F) than the overall intersection. These locations include:

- The westbound left at Gristmill Drive experiences high delays and queueing (using simulations and confirmed with field review).
- The eastbound approaches to Old Graves Mill Road and Creekside experience high delays.
- The northbound left at US 501 northbound ramps operates at LOS F during the AM peak (field review supports this, thought duration was short at less than 15 minutes).
- While not formally a study area intersection, queuing at 221 extends nearly back to Gristmill Drive.
- The westbound movement at McConville operates at LOS E during the PM peak (field review supports this, thought duration was short at less than 10 minutes right at 5:00 PM).

Queuing

A queuing analysis was completed for the study intersections during the AM and PM peak hours. Synchro 95th percentile queue lengths in feet were reported for each lane. **Table 5** summarizes the 95th percentile queue lengths during the AM and PM peak hours under existing conditions, compared against the storage length capacity for that particular turning movement.

Table 5– Existing Queuing

INTERSECTION	APPROACH	MOVEMENT	STORAGE LENGTH	AM Peak	PM Peak
				95TH QUEUE	95TH QUEUE
1. Graves Mill/Gristmill	Graves Mill EB	EBT/EBR		165	131
	Graves Mill WB	WBL/WBT		93	#225
	Gristmill NB	NBL		20	33
	Gristmill NB	NBR	130	#367	60
2. Graves Mill/Millrace	Graves Mill EB	EBT/EBR		240	162
	Graves Mill WB	WBL	180	12	9
	Graves Mill WB	WBT		50	106
	Millrace NB	NBL		18	62
	Millrace NB	NBR	190	12	47
3. Graves Mill/Millside	Graves Mill EB	EBL/EBT		0	0
	Graves Mill EB	EBR	110	0	0
	Graves Mill WB	WBL/WBT		0	0
	Graves Mill WB	WBR	110	0	0
	Baush Lomb NB	NBL/NBT/NBR		3	5
	Millside SB	SBL/SBT/SBR		5	18
4. Graves Mill/Old Graves Mill	Graves Mill EB	EBL	200	0	6
	Graves Mill EB	EBT		269	340
	Graves Mill EB	EBR	210	22	43
	Graves Mill WB	WBL	280	95	#321
	Graves Mill WB	WBT/WBR		92	216
	Old Graves Mill NB	NBL/NBT		118	122
	Old Graves Mill NB	NBR		0	0
	Private Entrance SB	SBL/SBT/SBR		0	10
5. Graves Mill/Creekside	Graves Mill EB	EBL	200	17	23
	Graves Mill EB	EBT/EBR		382	#368
	Graves Mill WB	WBL	320	156	99
	Graves Mill WB	WBT		206	296
	Graves Mill WB	WBR	200	11	20
	Connector NB	NBL/NBT		36	72
	Connector NB	NBR	130	219	164
	Creekside SB	SBL	120	54	96
	Creekside SB	SBT/SBR		31	40
6. Graves Mill/Expressway Ramp SB	Graves Mill EB	EBT		115	84
	Graves Mill EB	EBR	180	56	#356
	Graves Mill WB	WBL	200	27	55
	Graves Mill WB	WBT		111	122
	Expressway Ramp SB	SBL/SBT		104	47
	Expressway Ramp SB	SBR	125	93	#256
7. Graves Mill/Expressway Ramp NB	Graves Mill EB	EBL	130	85	78
	Graves Mill EB	EBT		54	32
	Graves Mill WB	WBT		74	117
	Graves Mill WB	WBR	120	7	32
	Expressway Ramp NB	NBL		#329	#330
	Expressway Ramp NB	NBL/NBT/NBR	300	#245	#322
8. Graves Mill/McConville	Graves Mill EB	EBL/EBT		198	45
	Graves Mill EB	EBR		55	48
	Nationwide WB	WBL/WBT/WBR		15	215
	Graves Mill NB	NBL/NBT/NBR		85	230
	McConville SB	SBL/SBT		10	5
	McConville SB	SBR	125	30	33

"#" means volumes exceeds capacity and queueing may be longer.

From **Table 5** it can be observed that the turn-lane storages fall short of accommodating back of queues for several locations and thru movement queuing can be extensive. These locations include:

- The westbound left queuing at Gristmill Drive is ~350' during the PM peak (when an isolated simulation was run). Queues for the northbound right extend over 350' during the AM peak.
- Eastbound thru queuing at Millrace extends ~250' during the AM peak.
- The westbound left at Old Graves Mill Road extends beyond the available storage during the PM peak. The eastbound thru queuing extends over 300' during the PM peak.
- Eastbound thru queuing at Creekside Drive extends over 350' during the AM and PM peak. There is lane bias occurring at the locations as most drivers merge into the outside lane; therefore, actual queuing is longer and spills back to Old Graves Mill Road. Northbound right queuing extends over 200' during the AM peak.
- Eastbound right queuing at the 501 southbound ramps extends over 350' during the PM peak. The southbound right queues extend over 250' during the PM peak, as well.
- ***Collective*** eastbound queuing beginning at the 501 southbound ramps extends back over 1,000' during the PM peak.
- The northbound left/shared queuing at the 501 northbound ramps extends over 325" during the AM and PM peak.

To note, the 95th percentile queue length is the queue length that has a 5% probability of being exceeded during the analysis peak hours. Therefore, there are times when a maximum queue may exceed the available storage length capacity. Field observations are generally consistent with the 95th percentile queueing as reported; however, there were intermittent queues observed that extended further than reported.

Turn Warrants

VDOT turn lane warrants were evaluated for several of the study intersections for existing conditions. The turn lane warrant forms per the VDOT Road Design Manual were examined in this study and provided in the **Appendix**. Based on VDOT criteria, a turn lane is warranted for the eastbound right to Millrace Drive under existing traffic conditions. **Table 6** summarizes the results.

Table 6– Existing Turn Warrants

Intersection	Turning Movement	Existing Turn Lane Warrant	
		AM	PM
Graves Mill/Millrace	Eastbound Right	Full-width Turn Lane and Taper Required	Taper Required
Graves Mill/Millside	Eastbound Left	No Left Turn Storage Lane Required	No Left Turn Storage Lane Required
Graves Mill/Millside	Westbound Left	No Left Turn Storage Lane Required	No Left Turn Storage Lane Required

Figure 5 – Existing (2017) Traffic Volumes

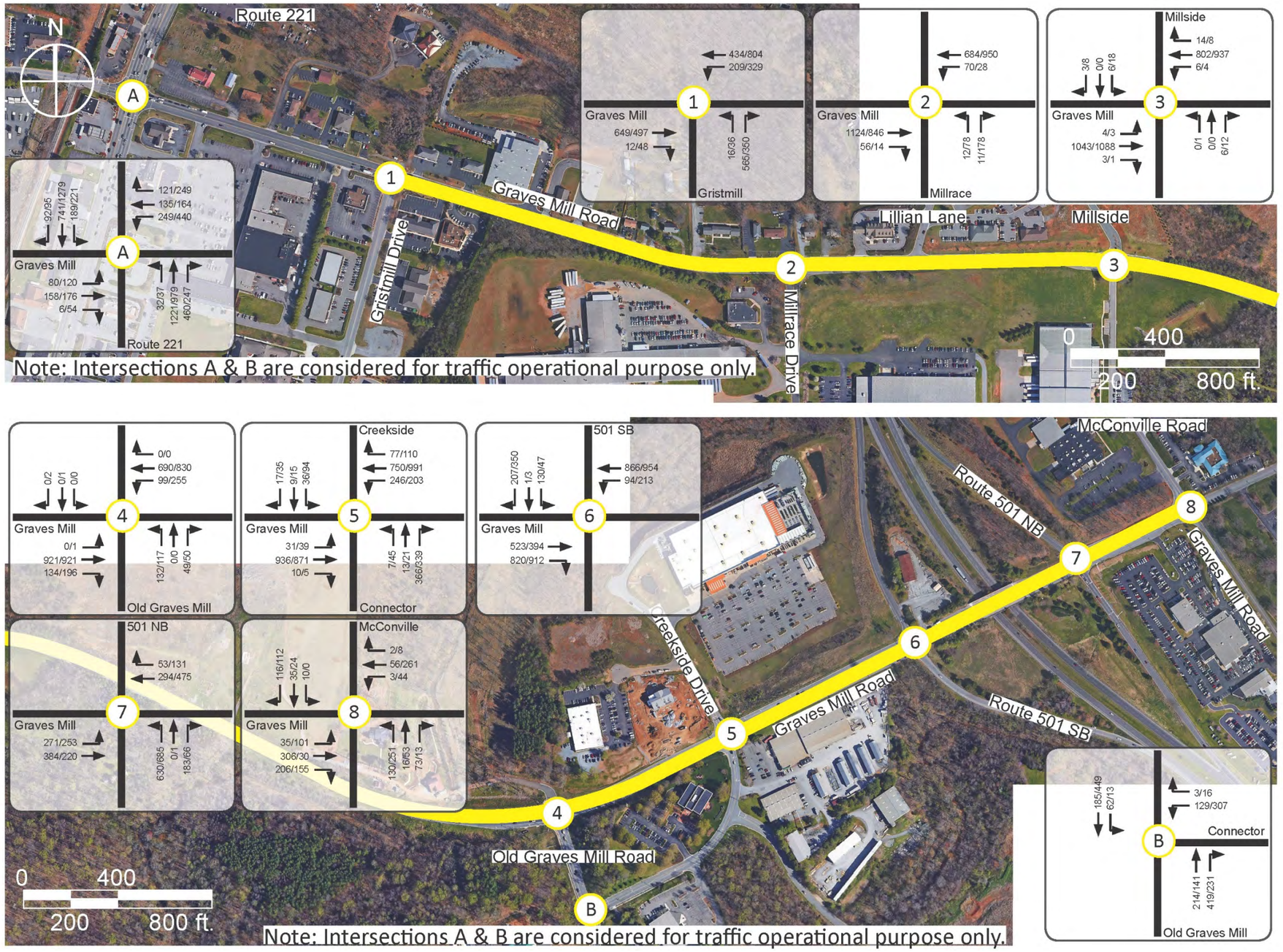
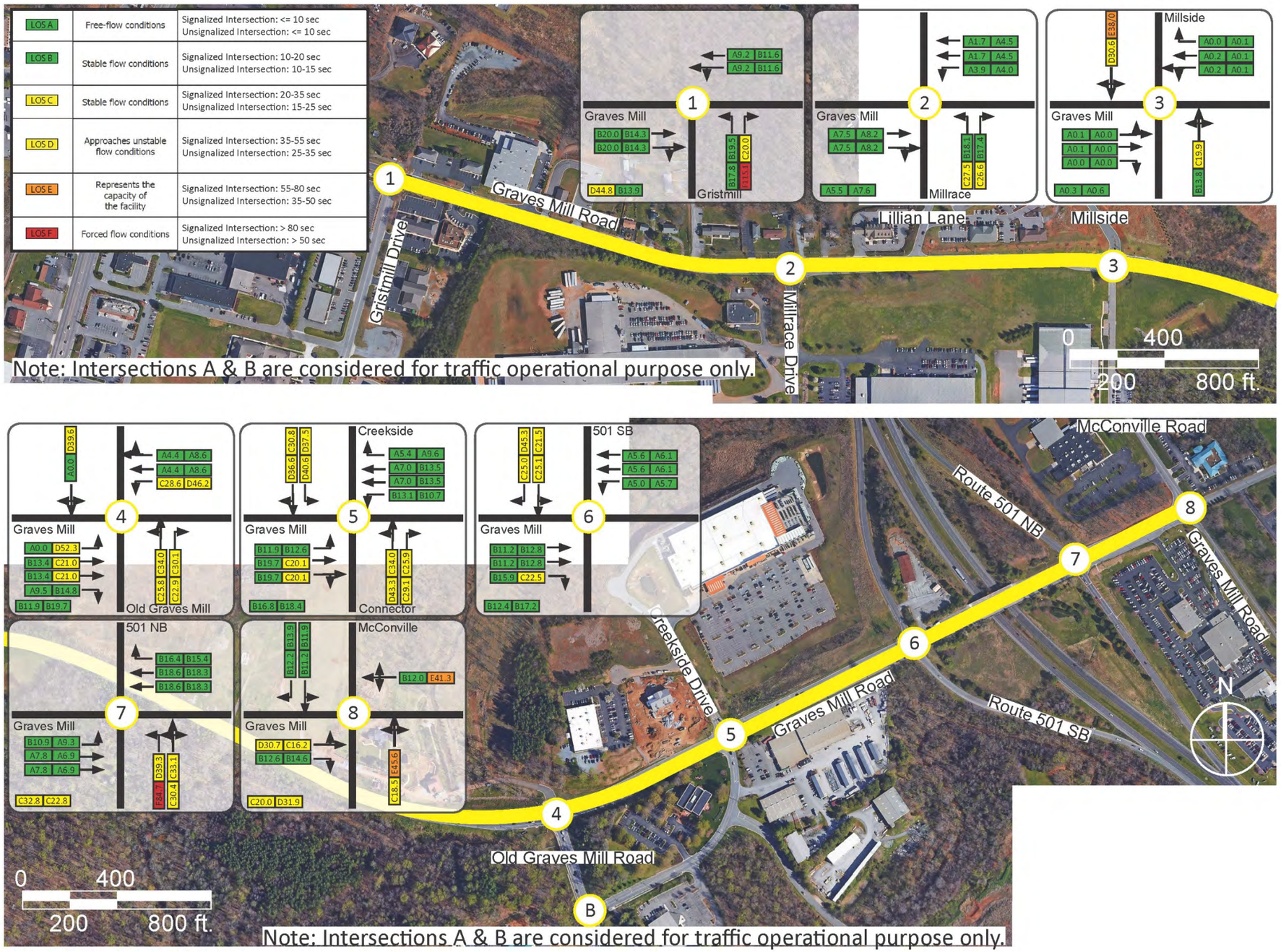


Figure 6 – Existing (2017) LOS and Delay



Traffic Forecasting

Project level traffic forecasting is an essential part of the corridor planning process. Transportation investments can be very large and will typically be in service for many years; therefore, future traffic projections will help to ensure these investments not only serve near-term traffic demand, but longer-term demand. Multiple sources were reviewed to determine an appropriate growth rate for a 23-year time horizon (2017 to 2040) including:

- Existing traffic demand
- Historical traffic demand
- Land use context using transportation analysis zones (TAZs)
- VDOT Statewide Planning System (SPS)
- Travel demand model (TDM) projections
- Planned development

The traffic projections methodology will be applied to existing traffic counts to develop traffic volumes for use in the analysis of future conditions for the study corridor. A technical memorandum detailing the methodology is provided in the **Appendix**. Based on:

1) TAZ, SPS, and TDM linear growth rates that range from 0.5% to 2.0% annually (1.25% average rate),
2) new traffic anticipated from Rosedale Farms and Elements at Old Graves Mill Road, and
3) 1.25% annual historical growth likely to continue that is unrelated to planned developments,

a **1.25% annual background growth rate, plus the site generated traffic from the planned developments** will be used to forecast 2040 projections. The 1.25% linear rate has been applied to all existing – or "background" – traffic counts collected in the study area that is unrelated to traffic generated specifically by developments proposed along Graves Mill Road. Then, site generated trips from each of the two (2) developments has been applied. To note, trips from Rosedale Farms will be distributed west through the study area based on existing travel patterns. With the application of a 1.25% rate, plus the addition of the site generated trips, the effective annual growth rate along the corridor is approximately 2% in the morning peak, and 2.5% in the evening peak.

Figure 7 illustrates the future TMCs for the eight (8) study intersections along the Graves Mill Road corridor.

Future No Build Traffic Conditions

No-build traffic conditions were analyzed to evaluate the results of future (2040) traffic demand on the existing roadway network. The intent of the no-build conditions analysis is to provide a general understanding of the baseline future traffic conditions that may then be used to evaluate the effectiveness of potential future improvement strategies.

The existing conditions Synchro models were used as a basis to develop the no-build models. Because this is a future scenario, planned and approved projects identified through previous efforts that are anticipated along the corridor would need consideration. Within the study area, a new signalized intersection has been included to serve the planned Rosedale mixed use development. Outside of the study area, improvements at 221 are also being planned to include dual westbound left turn lanes. These geometric modifications were included in the model. The same measures of effectiveness used to evaluate existing conditions were used to measure the quantitative performance under no-build conditions.

Delay and LOS

Delay and LOS are reported from the HCM 2010 from Synchro for signalized intersections with standard NEMA phasing and all unsignalized intersections. HCM 2000 methodology results are still used to report signalized intersections with non-NEMA signal phasing. **Figure 8** summarizes the average AM and PM peak hour delay and LOS for each movement for the eight (8) study intersections along the Graves Mill Road corridor. The intersection HCM outputs from Synchro can be found in the **Appendix**.

The results in **Figure 8** indicate that under future traffic conditions, six of the nine study area intersections will operate at LOS E and F during at least one peak hour. High delays experienced for individual movements are only exacerbated under no build. Notable locations include:

- Gristmill Drive will operate at LOS F for both peak hours.
- Because traffic demand has increased since the last study was completed for the Rosedale mixed use development, key inbound/outbound movements will operate at LOS F during both peak hours under the previous configuration (not illustrated on the figures but included in the modeling).
- The eastbound thru movements at Old Graves Mill Road and Creekside Drive will operate at LOS E and F for both peak hours.
- Key 501 off-ramp movements will operate at LOS E and F for both peak hours.
- The stop controlled intersection at McConville Road will operate at LOS F for both peak hours.
- While not formally a study area intersection, multiple movements at 221.

Queuing

A queuing analysis was completed for the study intersections during the AM and PM peak hours. Synchro 95th percentile queue lengths in feet were reported for each lane. **Table 7** summarizes the 95th percentile queue lengths during the AM and PM peak hours under no build conditions, compared against the storage length capacity for that particular turning movement.

Table 7– Future (2040) No Build Queuing

INTERSECTION	APPROACH	MOVEMENT	STORAGE LENGTH	AM Peak	PM Peak
				95TH QUEUE	95TH QUEUE
1. Graves Mill/Gristmill	Graves Mill EB	EBT/EBR		384	397
	Graves Mill WB	WBL/WBT		#407	#850
	Gristmill NB	NBL		27	82
	Gristmill NB	NBR	130	#1007	#902
2. Graves Mill/Millrace	Graves Mill EB	EBT/EBR		342	575
	Graves Mill WB	WBL	180	48	16
	Graves Mill WB	WBT		3	430
	Millrace NB	NBL		35	88
	Millrace NB	NBR	190	23	134
3. Graves Mill/Millside	Graves Mill EB	EBL/EBT		0	0
	Graves Mill EB	EBR	110	0	0
	Graves Mill WB	WBL/WBT		3	3
	Graves Mill WB	WBR	110	0	0
	Baush Lomb NB	NBL/NBT/NBR		0	23
	Millside SB	SBL/SBT/SBR		0	98

4. Graves Mill/Old Graves Mill	Graves Mill EB	EBL	200	0	1
	Graves Mill EB	EBT		389	#974
	Graves Mill EB	EBR	210	22	112
	Graves Mill WB	WBL	280	#269	#705
	Graves Mill WB	WBT/WBR		16	196
	Old Graves Mill NB	NBL/NBT		228	290
	Old Graves Mill NB	NBR		0	6
	Private Entrance SB	SBL/SBT/SBR		0	14
5. Graves Mill/Creekside	Graves Mill EB	EBL	200	7	14
	Graves Mill EB	EBT/EBR		#750	164
	Graves Mill WB	WBL	320	226	252
	Graves Mill WB	WBT		88	210
	Graves Mill WB	WBR	200	4	5
	Connector NB	NBL/NBT		49	#197
	Connector NB	NBR	130	#597	#647
	Creekside SB	SBL	120	#102	#248
	Creekside SB	SBT/SBR		44	70
6. Graves Mill/Expressway Ramp SB	Graves Mill EB	EBT		78	108
	Graves Mill EB	EBR	180	#340	#1698
	Graves Mill WB	WBL	200	31	77
	Graves Mill WB	WBT		311	372
	Expressway Ramp SB	SBL/SBT		#238	96
	Expressway Ramp SB	SBR	125	#383	#826
7. Graves Mill/Expressway Ramp NB	Graves Mill EB	EBL	130	#393	#452
	Graves Mill EB	EBT		94	56
	Graves Mill WB	WBT		#235	442
	Graves Mill WB	WBR	120	40	117
	Expressway Ramp NB	NBL		#645	#804
	Expressway Ramp NB	NBL/NBT/NBR	300	484	#713
8. Graves Mill/McConville	Graves Mill EB	EBL/EBT		380	73
	Graves Mill EB	EBR		85	80
	Nationwide WB	WBL/WBT/WBR		20	433
	Graves Mill NB	NBL/NBT/NBR		130	463
	McConville SB	SBL/SBT		13	8
	McConville SB	SBR	125	43	53

"#" means volumes exceeds capacity and queueing may be longer.

From **Table 7** it can be observed that the turn-lane storages fall short of accommodating back of queues for several locations and thru movement queuing can be extensive. These locations include:

- The westbound left queuing at Gristmill Drive is ~675' during the PM peak (no storage provided). Queues for the northbound right extend ~625' during the AM peak.
- Eastbound thru queuing at Millrace extends ~550' during the AM peak.
- Westbound thru queuing at Rosedale extends ~550' during the PM peak. The eastbound and southbound left queuing extends beyond the proposed storage.
- The westbound left at Old Graves Mill Road extends beyond the available storage during the PM peak. The eastbound thru queuing extends over 750' during the PM peak.
- Eastbound thru queuing at Creekside Drive extends over 750' during the AM and PM peak. There is lane bias occurring at the locations as most drivers merge into the outside lane; therefore, actual queuing is longer and spills back through Old Graves Mill Road (continuous queue). Northbound right queuing extends over 525' during the AM peak.
- Eastbound right queuing at the 501 southbound ramps extends over 900' during the PM peak. The southbound right queues extend over 425' during the PM peak, as well.
- The northbound left/shared queuing at the 501 northbound ramps extends over 500" during the AM and PM peak.
- Queuing for the approach movements at McConville Road extend over 350' during the AM and PM peak.

To note, the 95th percentile queue length is the queue length that has a 5% probability of being exceeded during the analysis peak hours. Therefore, there are times when a maximum queue may exceed the available storage length capacity. Field observations are generally consistent with the 95th percentile queueing as reported; however, there were intermittent queues observed that extended further than reported.

Turn Warrants

VDOT turn lane warrants were evaluated for several of the study intersections for existing conditions. The turn lane warrant forms per the VDOT Road Design Manual were examined in this study and provided in the **Appendix**. Based on FHWA and VDOT criteria, a turn lane is warranted for each location under future no build traffic conditions. **Table 8** summarizes the results. Note that the storage length is in addition to the deceleration and transition distance requirements.

Table 8– Future No Build Turn Warrants

Intersection	Turning Movement	2040 No Build Turn Lane Warrant	
		AM	PM
Graves Mill/Millrace	Eastbound Right	Full-width Turn Lane and Taper Required	Taper Required
Graves Mill/Millside	Eastbound Left	No Left Turn Storage Lane Required	50' Left Turn Storage Lane Required
Graves Mill/Millside	Westbound Left	100' Left Turn Storage Lane Required	125' Left Turn Storage Lane Required

Figure 7 – Future (2040) Traffic Volumes

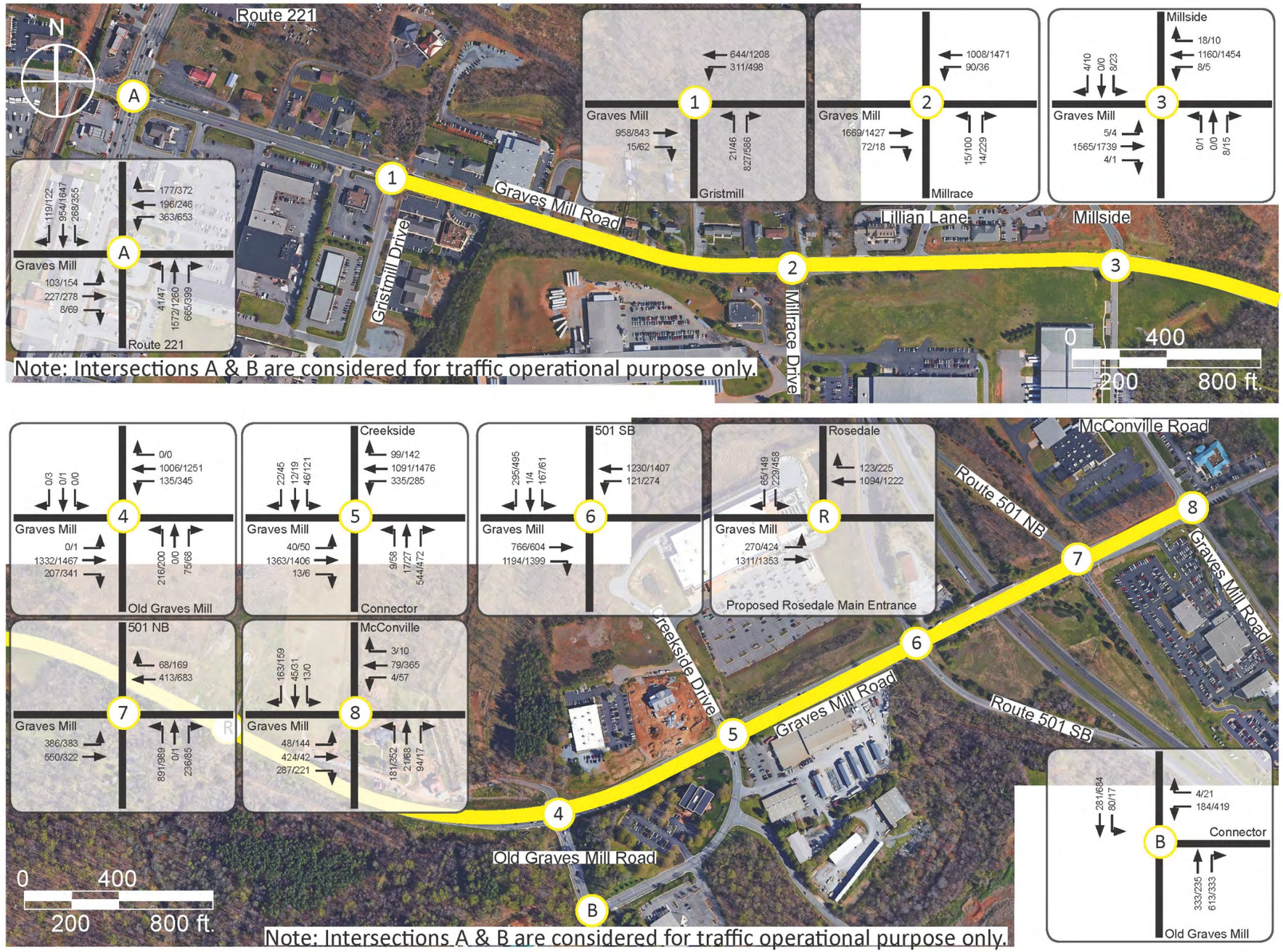
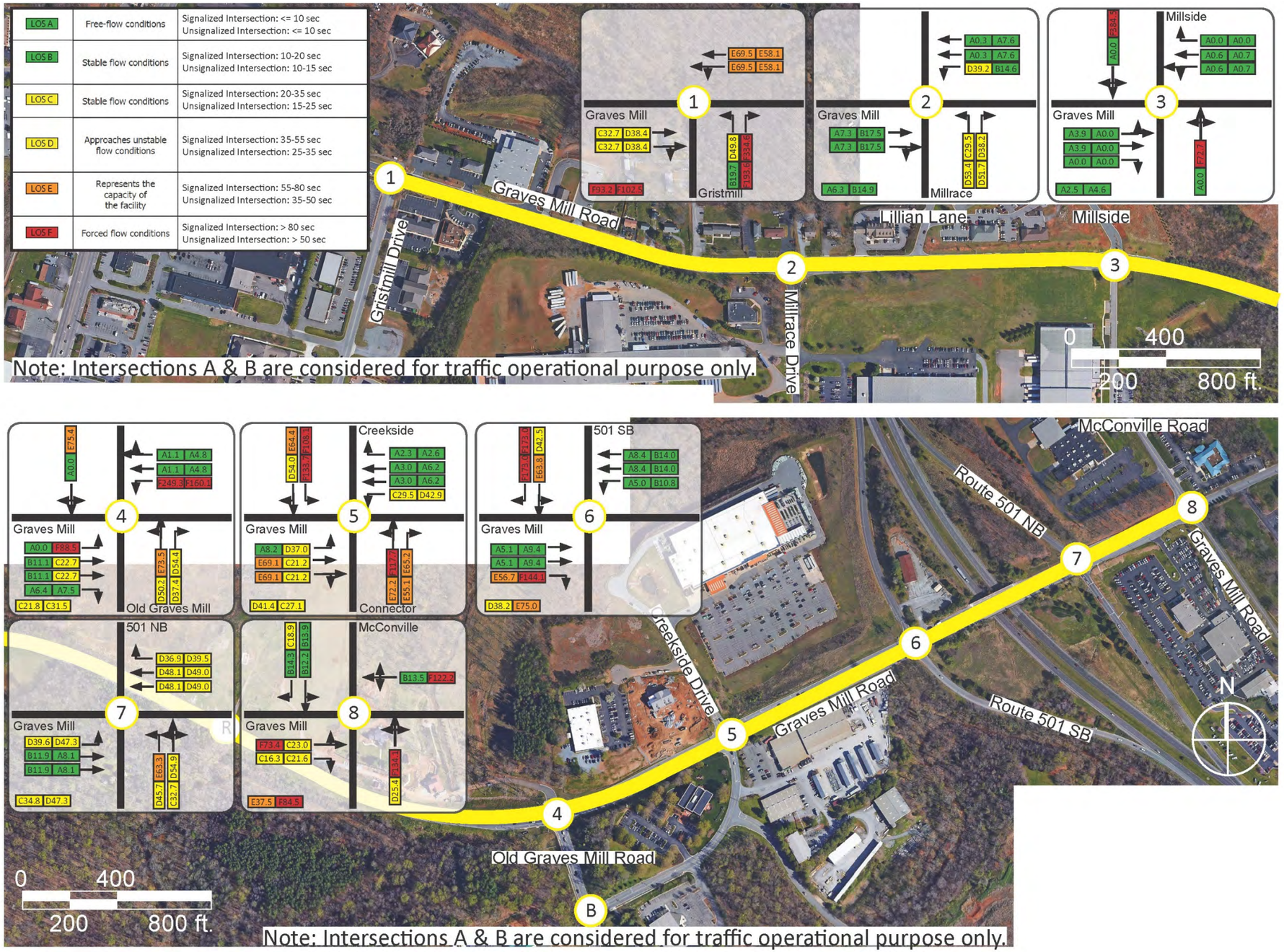


Figure 8 – Future (2040) LOS and Delay



Public Informational Meeting #1

Improvement projects were developed to address safety, geometric, and operational deficiencies along the Graves Mill Road corridor identified in the existing and no-build analyses, as well as during the community meeting

A first public meeting for the Graves Mill Road Corridor Study was held on Tuesday, December 12, 2017 at the Lynchburg Humane Society in Lynchburg, Virginia. The meeting was organized as an open-house format and was open to the general public from 4:00 – 6:30 pm. Advertisement for the meeting included:

- Mail-outs to residents and businesses near the study area approximately two weeks in advance of the meeting
- Deployment of variable message signs on Graves Mill Road approximately one week in advance of the meeting
- Press release
- Advertisement via social media
- Advertisement via local news agencies
- Notice included on the project website (www.gravesmillplan.com)

The goal of this meeting was for the public to 1) learn about the study, 2) review information about the corridor, and 3) share comments regarding concerns, opportunities, and improvement ideas. Attendees were encouraged to provide feedback and offer suggestions that would help to inform the project development process. Representatives from the Virginia Department of Transportation (VDOT), City of Lynchburg, Bedford County, Virginia's Region 2000 Local Government Council, and project consultants were available to explain materials, answer questions, and record feedback. Information boards were set up in the meeting space that presented the following subjects:

- Welcome and purpose of the meeting
- Information about the study
- Summary of existing and future traffic conditions
- Crash data (six years)
- Summary of multimodal conditions (sidewalks, transit stops, etc.)
- General information on innovative intersection ideas applicable to the corridor

In addition to the information boards, large table-top maps of the corridor were available for attendees to gather around and mark-up. Comment sheets were also made available for participants. The meeting was attended by approximately 50 people (that signed in), including business owners/representatives along the corridor. There were also several local news organizations that covered the meeting (WDBJ7, NewsAdvance, WSLS, and WLNI).

A consistent flow of attendees began right at 4:00 PM and continued through approximately 6:00 PM. Representatives were provided sufficient time to walk attendees through the study and answer questions, as needed. Several news organization interviews were provided by the public and agency representatives. Overall, attendees were very pleased City officials were attempting to stay in front of potential growth that could exceed 50% over the next 20 years. In additional to managing traffic congestion, attendees were also pleased attention was being paid to transit, pedestrian and bicycle accommodations along the corridor. It was further suggested by multiple attendees the City (or other agencies) undergo a study along Old Graves Mill Road between Graves Mill Road and Timberlake Road.

Specific Public Comments

The following public comments were **written on comment sheets** that were provided at the meeting, or **emailed via the project website** (specific identifying information has been removed, and at times, comments are paraphrased):

I was not able to attend the meeting. One suggestion (and it might be a long shot) is to have Graves Mill Road 3 lanes each way. However, a more feasible suggestion would be signage. An issue with accidents in Lynchburg is the lack of signs. People from out of town that use Graves Mill to go to the expressway merge over at the very end and back end or swipe other cars. Every street that intersects with the expressway should have a sign like the one on Timberlake Rd. I have heard from transportation officials that "signs are expensive" but this is one of the key reasons for congestion from 3-6pm weekdays.

I have lived in this area since 1976. There used to be little traffic even though it was a cut thru. Now, I can hardly get out of my street. The traffic from Timberlake Road is awful. From McConville Rd to 221 there are too many lights & way too much traffic. Traffic isn't flowing, a light needs to be at Nationwide Dr., that "annex" is a nightmare, it's like crossing 3 lanes & you take your life in your hands using it. People block that light at Bella Rosa. Lots of times it turns green but you can't go because of cars blocking it. People fly from 221 to just get to the exit for the expressway. There are lots of things that can be done to help traffic.

I was not able to attend the meeting, and I don't know if a stop light at Lillian Ln or Millside Center is part of the discussion, but there are currently a lot of senior citizens that are trying to access this area of Graves Mill with no safe and/or easy way to do it. I'm not sure if a turn lane in this stretch or a stop light is a good solution, but if there is a master plan being developed, I think something like this would be quite helpful.

Has any thought been given to a roundabout at the intersection of Graves Mill Rd. and McConville Rd.? With Lynchburg's consideration of roundabouts throughout the City, this seems to me to be one place that one would work well. The four-way stop is confusing at best and dangerous at worst, especially during times of heavy traffic.

Sync lights so the thru traffic doesn't have to stop at every light.

Plan a stop light for the Bella Rose community development.

Do not add sidewalks directly beside the road. Needs separation by 3' – 5' from road. The same goes for bike lanes.

Road milling contributes to uneven lanes and vehicles crashing.

Add lights so they are on both sides of the road.

Keep speed limit at 45 mph.

Access to highway is currently acceptable.

Roundabout absolutely needed at McConville Rd.

My concerns relate to Old Graves Mill Road. As the area has grown, there has been a tremendous increase in traffic on Old Graves Mill Road between Timberlake Road and Graves Mill Road. Old Graves Mill needs traffic control to better manage cars and commercial truck traffic. Sidewalks throughout the section should also be installed. Old Graves Mill Road is also too narrow and has not been updated since it was originally designed as a rural road.

I attended the recent public meeting at the Lynchburg Humane Society which presented the Graves Mill Road Plan. I was disappointed that the Plan did not include a study of Old Graves Mill Road between Timberlake Road and Graves Mill Road. As a homeowner off Old Graves Mill road, I have no choice but the travel this section of road daily and am increasingly concerned whether this section of road can safely handle traffic. Recent years have seen a marked increase in traffic along Old Graves Mill Road as more drivers use it as a short cut to and from the Graves Mill Road and Timberlake Road areas. Recent development of the Old Graves Mill Road and Graves Mill Road areas has also dramatically added to this traffic. The planned development of this corridor in the near future will surely further increase traffic on Old Graves Mill Road. As you know, the section of Old Graves Mill Road north of Timberlake Road still has a narrow section without shoulders or sidewalks that dates back to an earlier and rural age. In addition, there is considerable commercial truck traffic to and from the Tomahawk Industrial Park not to speak of the number of school buses that pick up children throughout this neighborhood. All this makes for periods of heavy, unregulated traffic that result in the neighbors having difficulty turning onto Old Graves Mill Road from side streets and driveways. Also, please note that the speed limit of 35 MPH is routinely and grossly exceeded. I personally have had cars pass me on Old Graves Mill Road while I am driving the speed limit! I hope that you, VDOT and Lynchburg engineers find my concern warrant further interest. Specifically, I hope that consideration will be given to regulating traffic flow with a stoplight at the intersection of Tomahawk Industrial Park and Old Graves Mill Road. I believe that a traffic light at that intersection would greatly add to the safety along this stretch of road.

A technical memorandum summarizing comments **written on table top maps** that were provided at the meeting, or **on blank note boards** located between the informational boards, sign-in sheets, and a summary of news coverage is provided in the **Appendix**.

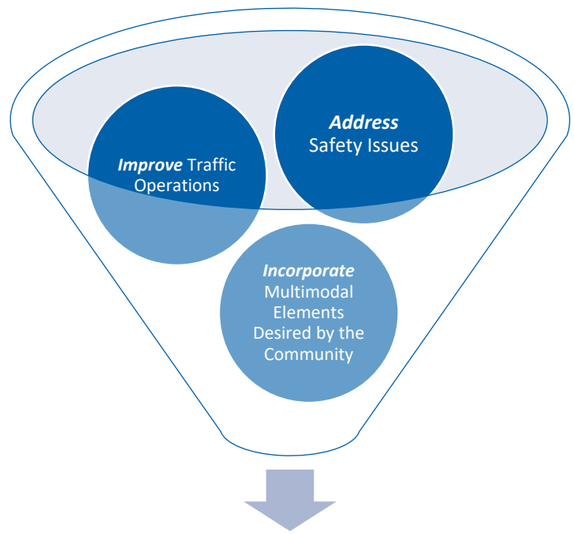
Project Development, Screening and Analysis

Now that a baseline of future conditions has been established to evaluate the effectiveness of potential future improvement strategies, the concept development phase can proceed. The following efforts, beginning with no build, were undertaken to ensure the most effective concepts and ideas were advanced as part of the final corridor plan:

- Completion of no build – determined operational and safety needs.
- Held community meeting #1 – uncovered additional needs and community desires, including multimodal elements.
- Developed numerous preliminary concepts and ideas to address those needs.
- Screened numerous concepts (linework for right-of-way assessment, planning level cost screening, operational analysis).

Figure 9 illustrates the project development goals.

Figure 9 – Project Development Goals



Preliminary Concepts and Ideas

A comprehensive list of preliminary concepts and ideas were developed based on analysis results, safety considerations, and input from public and agency partners. In fact, multiple ad hoc meetings were held with the City to coordinate project efforts and results shared during the January CVMPO TCC meeting.

The no build traffic models were used as a basis for screening concepts and ideas. Each was analyzed independently, though the no build models do include signal coordination and projects were “optimized” and compared against conflicting movements to ensure indirect negative impacts did not occur.

The complete list of all concepts and ideas are shown in **Table 9**.

Table 9 – Comprehensive Project Screening Results

Intersection	Graves Mill Road Corridor Study - Preliminary Screening		
	Issues	**Options Considered**	**Advance?**
Gristmill Drive	Under future no build, heavy WB queuing (over 600' during the PM), and LOS F conditions for the intersection and WB and NB movements. Drivers utilize Gristmill as a 221 by-pass option.	Signal Optimization/Coordination.	Yes
		Restripe NB approach to shared left/right and right.	Yes
		Add WBL dedicated turn lane only.	No
		Add WBL dedicated turn lane, plus reduce eastbound approach to single lane.	No
		Add WBL dedicated turn lane, plus reduce eastbound approach to single lane, plus add an eastbound right turn pocket.	No
		Add WBL and remark NBL to shared left/right.	No
		Add WBL dedicated turn lane, plus additional NBR turn lane and implement overlap phasing	Yes
		Add an additional NBR turn lane so configuration is shared left/right and dedicated right.	No
		Add WB left turn lane, modify NBR to free flow (maintain NBL), and remove an EBT lane (provide EBR turn pocket).	No
		WBL permitted only phase was tested.	N/A
Millrace Drive	Under future no build, all movements operate at LOS C, or better. However, eastbound queues extend over 400'. EBR right turn warrant under future conditions.	Signal Optimization/Coordination.	Yes
		Add EBR turn lane (warranted).	Yes
		Remove WBL protected phase (it's currently protected/permitted).	No
Millside Drive	NBL and SBL operate at LOS F under future conditions due to free flow conditions on Graves Mill. Volume does not meet signal warrants (<100 for the left across). Crash frequency is relatively low (only two crashes over six years). Meets EBL and WBL turn warrants under future conditions.	Implement rcut. This would require widening out Graves Mill to accommodate the treatments (no existing median).	No
		Install EB and WB left turn lanes.	Yes
Rosedale Site Entrance	The new intersection has been included under future no build in support of the Rosedale mixed use development. The background, no build configuration was based off the previous TIA. However, new data and growth factors suggest the recommended configuration is not adequate. The single EBL turn lane is LOS F and impacts the WBT (LOS E). The SBL from the site is also a LOS F.	Signal Optimization/Coordination.	Yes
		Provide dual EBL turn lanes only.	No
		Provide dual SBL turn lanes only.	No
		Provide dual EBL and SBL turn lanes.	Yes
		Implement a Green T intersection, maintaining a single EBL turn lane.	No
Old Graves Mill Road	Under future conditions heavy EB queuing and WBL queue extends beyond available storage.	Signal Optimization/Coordination.	Yes
		Extend WBL turn lane to the furthest extent feasible.	No
		Add another WBL turn lane. This would require widening Old Graves Mill Road to accommodate two southbound lanes.	Yes

		Implement protected/permitted phasing for the WBL, with flashing yellow arrow.	Yes
Creekside Drive	The NB and SBL movements operate at LOS E/F due to priority given to Graves Mill Road. The NBR experiences ~325' of queuing under future conditions.	Signal Optimization/Coordination.	Yes
		Add an additional NBR turn lane.	Yes
US 501 SB Ramps	With corridor improvement as noted above, the SBR movement is improved to LOS D with queuing ~275'. To note, without the additional thru lane that drops at the ramp, the EBR and SBR movements operate at LOS F with extensive queuing. The options reflect no implementation of the thru lane.	Signal Optimization/Coordination.	Yes
		Provide dual SBR turn lanes (controlled).	No
		Provide channelized SBR free flow.	Yes
		Add an additional EB right turn lane, providing dual controlled turning lanes. Maintain two thru lanes.	No
		Restripe EB approach to a single thru, and dual rights.	No
		Reconfigure approach to a single through lane and dual eastbound, controlled rights. Convert the existing right turn lane to a travel lane by extending back to Creekside Drive. The US 501 southbound ramp will then be widened to accommodate two lanes that will merge to a single lane, before merging on to US 501.	Yes
		Provide EBR channelized free flow lane that would merge with other ramp traffic. This option would require widening out the ramp's entrance and still maintain two lanes to 501 SB. Two EBR free flow lanes would require a three-lane ramp; therefore, not considered.	No
Old Graves Mill, Creekside, and 501 SB Ramps	Heavy future EB congestion pushes the LOS to E for the EBT movements. The WBL is LOS E/F for each intersection. EB queuing extends back ~800' from Old Graves Mill during the PM peak. This queue continues eastward to the SB ramp. WB progression appears to be managed reasonably well.	Signal Optimization	Yes
		Install an additional EB thru lane that begins just west of Old Graves Mill and continues east to the 501 SB ramps.	Yes
US 501 NB Ramps	The NB off-ramp movement operates at LOS F under future conditions. EBL queue extends beyond available storage.	Signal Optimization	Yes
		Implement a Diverging Diamond Interchange	Yes
		Provide a dedicated NBR turn lane to help manage queuing.	No
		Extend EBL turn lane to the furthest extent feasible.	Yes
McConville Road	Multiple approaches operate at LOS F	Install a single lane roundabout with no slip lanes.	Yes
		Signalization.	N/A

Through this iterative process, list of alternative concepts and ideas were screened down to a short list of potential improvements at each intersection based on safety, operations, ease of implementation, and feedback from the community. However, the number of projects needed to help improve operations and safety along the corridor is still more than could reasonably be funded, considering other local and regional project needs. Therefore, a phasing plan was developed that allocated projects by priority. The priorities include:

Short-Term Recommendations: These recommendations reflect short-term improvements uncovered through the study efforts that can be completed and funded directly by the City, or funded through a grant opportunity such as Highway Safety Improvement Program (HSIP) funds. These recommendations can be implemented in less than five (5) years and typically cost less than $1 million.

Priority I Projects: These recommended projects are the primary improvements determined through this study's efforts. They exhibit ***existing*** safety and operational challenges that are only exacerbated with future growth. These locations were also a focal point during the public meetings. The Priority I projects will be considered for the VDOT Six-Year Improvement Plan, and other regional and local transportation plans.

Priority II Projects: These recommendations are secondary improvements that were determined as part of the ***future*** conditions analysis and offer support to Priority 1 projects. Typically, existing conditions don't warrant them – at least not on a consistent basis; however, as growth occurs and Priority I projects are implemented, Priority II projects should be revisited.

Priority III Projects: Building on Priority II Projects, these recommended improvements will be needed if a ***maximum*** buildout and growth scenario occurs along the corridor. Priority III projects should be monitored over time as conditions dictate.

Based on the screening results, a final set of projects was selected to share with the public at the second community meeting. More detailed design, cost estimates, and schedule estimates were then developed for these selected "final" improvement projects. **Table 10** summarizes the draft project list shared with the public during community meeting #2.

Table 10 – Draft Project Summary (Pre Final Public Meeting)

Summary of Projects for Public Review
Short-Term Recommendations
Restripe northbound approach on Gristmill Drive to shared left/right and right.
Convert the protected westbound left from Graves Mill Road to Old Graves Mill Road to a protected-permissive left using a flashing yellow arrow (a critical gap analysis would need to be completed prior to implementation).
Implement coordinated and adaptive control measures at all signalized intersections from Gristmill Drive through the interchange (adaptive control HSIP grant application in progress per date of this report).
Extend eastbound and westbound left turn lanes for the two 501 ramp intersections by approximately 75' each.
Priority I Projects
Gristmill Drive
Widen Graves Mill Road to accommodate a single westbound left turn lane (with protected-permissive left using a flashing yellow arrow).
Widen Gristmill Drive to accommodate dual northbound right turn lanes and implement overlap signal phasing.
Provide a pedestrian crossing and countdown signal across Gristmill Drive. If sidewalks are implemented along the north side of Graves Mill Road (which would likely require additional right of way), then pedestrian crossings across Graves Mill Road could be installed at that time.
501 Southbound Ramps
Reconfigure eastbound approach to a single thru lane and dual, controlled rights. Convert the existing right turn lane to a travel lane by extending back to Creekside Drive.
Widen the southbound on-ramp to accommodate two lanes that will merge to a single lane, before merging on to US 501.
Provide a channelized southbound right, free flow lane. The lane will end as a dedicated right turn lane at Creekside Drive.
Priority II Projects
Multiple Intersections
Provide an additional eastbound thru lane beginning ~500' west of Old Graves Mill Road and terminating at the new lane provided as part of the Priority I projects at US 501 southbound ramp intersection.
Creekside Drive
Widen the connector at Creekside Drive to accommodate dual northbound right turn lanes and maintain overlap phasing. Install pedestrian crossings and countdown pedestrian signal heads to improve multimodal conditions.
McConville Road
Install a single lane roundabout to replace the four-way stop. Consider an eastbound right slip lane.
Priority III Projects
501 Interchange
Construct a diverging diamond interchange to improve safety and better manage traffic flow for the northbound and southbound 501 ramps and Graves Mill Road. The new interchange will support – and expand upon priority I and II projects.
Millrace Drive
Provide an eastbound right turn lane (warranted via traffic existing and future demand).
Modify future access and bring two access points along the north side into the traffic signal.
Old Graves Mill Road
Widen Graves Mill Road to accommodate dual westbound left turn lanes. This will require an additional receiving lane on Old Graves Mill Road.
Install pedestrian crossings and countdowns.
Development Driven Projects
Complete sidewalks along Graves Mill Road as part of the Rosedale mixed use development.
As an alternative to sidewalks, consider a multiuse path that could be extended to each end of Graves Mill Road (decision between sidewalks and multiuse paths should be based on public input, and other plans that may have developed by the time implementation is imminent).
Improve roadway lighting between Millside Drive and McConville Road. An initial effort could be accomplished through incorporating these elements as part of the frontage improvements resulting from the Rosedale mixed use development.
Prioritize transit stops for better accommodations as part of the next GLTC Transit Development Plan.
Rosedale site entrance at Graves Mill Road should consist of dual eastbound left turn lanes and dual southbound left turn lanes, in addition to a single westbound right turn lane and single southbound right turn lane.
The potential roundabout at McConville Road could be programmed as additional development occurs along Nationwide Drive.

Public Information Meeting #2

A public meeting for the Graves Mill Road Corridor Study was held on Monday, April 23, 2018 at the Lynchburg Humane Society in Lynchburg, Virginia. The meeting was organized as an open-house format and was open to the general public from 4:00 – 6:00 pm. Advertisement for the meeting included:

- Mail-outs to residents and businesses near the study area approximately two weeks in advance of the meeting
- Deployment of variable message signs on Graves Mill Road approximately one week in advance of the meeting
- Press release
- Advertisement via social media
- Advertisement via local news agencies
- Notice included on the project website (www.gravesmillplan.com)

The goal of this meeting was for the public to **1) learn more about the study and progress to date, 2) review draft short- and long-term roadway improvements, and 3) share comments and thoughts on bicycle and pedestrian needs.** Attendees were encouraged to provide feedback and offer suggestions that would help to inform the project development process. Representatives from the Virginia Department of Transportation (VDOT), City of Lynchburg, Virginia's Region 2000 Local Government Council, and project consultants were available to explain materials, answer questions, and record feedback. Information boards were set up in the meeting space that presented the following subjects:

- Welcome and purpose of the meeting
- Information about the study
- Priority I recommendations
- Priority II recommendations
- Priority III recommendations
- Information on roundabout and diverging diamond interchanges
- Overview of existing multimodal conditions

In addition to the information boards, posters illustrating existing and future traffic conditions, and historical crash data that were shared at the first meeting were also available for review on surrounding tables. Large table-top maps of the corridor were available for attendees to gather around and mark-up regarding multimodal needs and desires. Comment sheets were also made available for participants. The meeting was attended by approximately 30 people (that signed in), including business owners/representatives along the corridor. Local news organizations covered the first meeting extensively, and gathered information via the project website and Virginia's Region 2000 Local Government Council for meeting #2.

A consistent flow of attendees began right at 4:00 PM and continued through approximately 5:30 PM. Representatives were provided sufficient time to walk attendees through the study recommendations and answer questions, as needed. Overall, attendees were very pleased of the recommendations presented and that transportation representatives were attempting to stay in front of potential growth that could exceed 50% over the next 20 years. One key topic that was discussed included project implementation and funding opportunities. While some focus was paid to transit, pedestrian and bicycle accommodations along the corridor, the majority of attention was on the draft recommendations. To note, this was consistent with the first meeting, as many participants recognize this is a higher speed, cut-through road. However, multimodal recommendations included additional sidewalks, signalized pedestrian crossings, a multiuse path along one side off the road, and enhanced transit stop amenities.

It was further suggested, in this meeting and at the first, that City (or other agencies) undergo a study along Old Graves Mill Road between Graves Mill Road and Timberlake Road.

Specific Public Comments

The following public comments were **written on comment sheets** that were provided at the meeting, or **emailed via the project website** (specific identifying information has been removed, and at times, comments are paraphrased):

Please address no turn lanes from Graves Mill Road to Lillian. There are many rear end accidents that occur.

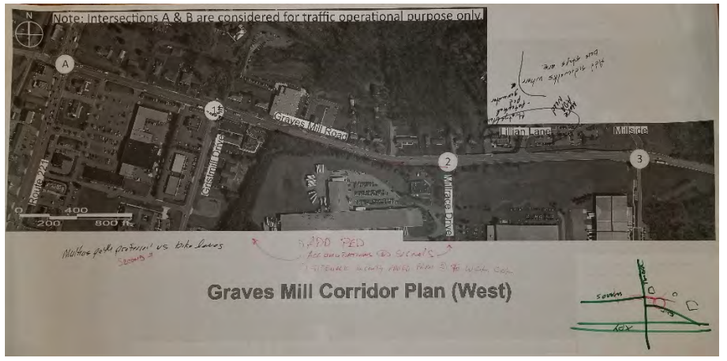
Very difficult to make a left across Graves Mill Road from Lillian during rush hour.

The connector between Old Graves Mill Road and Graves Mill Road is a concern.

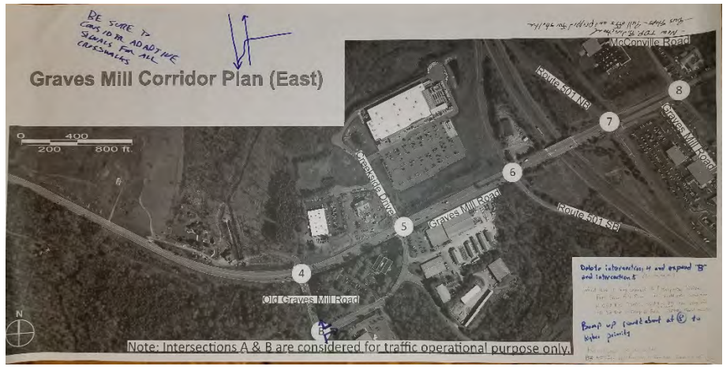
Need a center turn lane on the western side of the project (west of Millside Drive).

Are there any current plans to connect all the sidewalks on Old Graves Mill Rd from humane society to Timberlake Road? A lot of pedestrians walk towards Kroger etc. and there are no sidewalks to accommodate.

The following images depict public comments **provided on table top maps** located between the informational boards. A summary is provided under each.



The comments on this map indicate a greater desire for a multiuse path along portions of Graves Mill Road when compared to a sidewalk. This was a common theme heard from participants as residents feel it would be more utilized because it can also accommodate bikes. In addition to a multiuse path, enhanced pedestrian accommodations should be provided, including ADA. To note, intersection #1 includes a pedestrian crossing and signal as part of the study's Priority I recommendations.



The following comments were noted on the table top map above:

- Be sure to consider adaptive signals. To note, the City has applied for adaptive signal technology that covers the eastern intersections of Graves Mill Road.
- Consider connecting Enterprise Drive with Graves Mill Road. This would ease conditions from Old Graves Mill Road to 221. It would also add relief to Enterprise Drive.
- Bump up the roundabout priority.

Final Recommendations

Following the community meeting #2, the project list was updated to include the ideas/concerns raised by the public that address operational, safety, and multimodal needs along the corridor. A draft final project list and report was then shared with the CVMPO TCC for final comment and review. Once comments were included, a final project list was established and shared with the Planning Commission and City Council for approval. **Table 11** summarizes the final projects, aggregated by priority and mode, with consideration given to development driven projects. Illustrative project sheets and are provided in the **Appendix**.

Table 11 – Final Project List

Summary of Projects
Short-Term Recommendations
Restripe northbound approach on Gristmill Drive to shared left/right and right.
Convert the protected westbound left from Graves Mill Road to Old Graves Mill Road to a protected-permissive left using a flashing yellow arrow (a critical gap analysis would need to be completed prior to implementation).
Implement coordinated and adaptive control measures at all signalized intersections from Gristmill Drive through the interchange (adaptive control HSIP grant application in progress per date of this report).
Extend eastbound and westbound left turn lanes for the two 501 ramp intersections by approximately 75’ each.
Priority I Projects
Gristmill Drive
Widen Graves Mill Road to accommodate a single westbound left turn lane (protected-permissive left using a flashing yellow arrow.
Widen Gristmill Drive to accommodate dual northbound right turn lanes and implement overlap phasing.
Provide a pedestrian crossing and countdown signal across Gristmill Drive. If sidewalks are implemented along the north side of Graves Mill Road (which would likely require additional right of way), then pedestrian crossings across Graves Mill Road could be installed at that time.
501 Southbound Ramps
Reconfigure eastbound approach to a single thru lane and dual, controlled rights. Convert the existing right turn lane to a travel lane by extending back to Creekside Drive.
Widen the southbound on-ramp to accommodate two lanes that will merge to a single lane, before merging on to US 501.
Provide a channelized southbound right, free flow lane. The lane will end as a dedicated right turn lane at Creekside Drive.
Conduct a study to implement flashing yellow arrows to mitigate angle crashes occurring at the interchange ramp intersections.
Priority II Projects
Creekside Drive
Widen the connector at Creekside Drive to accommodate dual northbound right turn lanes and maintain overlap phasing. Install pedestrian crossings and countdowns to improve multimodal conditions.
McConville Road
Install a single lane roundabout to replace the four-way stop. Maintain the eastbound right slip lane. Install sidewalks and pedestrian crossings to better accommodate multimodal activity, particularly to/from the businesses along Nationwide Drive.
Millrace Drive
Provide an eastbound right turn lane. Modify future access and bring two access points along the north side into signalization.
Millrace Drive to Millside Drive
Provide a landscaped median with left turn lanes at key locations in general compliance with VDOT access management standards. These locations should include Lillian Lane and Millside Drive. This will require the widening of Graves Mill Road between the two intersections to accommodate the landscaped median. Include a multiuse path or sidewalk along the south side of Graves Mill Road as part of the widening that connects with the existing sidewalk to the west, and potential sidewalk included as part of the Rosedale development to the east. Consider extending the landscaped median through the proposed traffic signal serving the Rosedale development since Graves Mill Road would require widening as part of that traffic signal installation as well.
Priority III Projects
Old Graves Mill Road to Creekside Drive
Provide an additional eastbound thru lane beginning at least 500’ west of Old Graves Mill Road and terminating at the new lane provided as part of the Priority I projects at US 501 southbound ramp intersection. Install sidewalks where appropriate to better accommodate multimodal activity.
Old Graves Mill Road
Widen Graves Mill Road to accommodate dual westbound left turn lanes. This will require an additional receiving lane on Old Graves Mill Road southbound. Install pedestrian crossings and countdowns.
501 Interchange
Construct a diverging diamond interchange (DDI) to better manage traffic flow for the northbound and southbound 501 ramps and Graves Mill Road. The new interchange will support – and expand upon Priority I and II projects. The project would align with the existing bridge replacement; therefore, the new bridge should also be wide enough to accommodate a multiuse path or sidewalk. The DDI is slated as a Priority III project because it aligns with the bridge replacement. However, if it’s determined the bridge should be replaced sooner, or if a Smart Scale grant application opportunity arises, this concept could jump to a higher priority.
Development Driven Projects
Complete sidewalks along Graves Mill Road as part of the Rosedale mixed use development (development frontage along the north and south side of Graves Mill Road – crossing at the proposed traffic signal).

As an alternative to sidewalks, consider a multiuse path that could be extended to each end of Graves Mill Road (decision between sidewalks and multiuse paths should be based on public input, and other plans that may have developed by the time implementation is imminent).
Improve roadway lighting between Millside Drive and McConville Road. An initial effort could be accomplished through incorporating these elements as part of the frontage improvements resulting from the Rosedale mixed use development.
Prioritize transit stops for better accommodations as part of the next GLTC Transit Development Plan.
Rosedale site entrance at Graves Mill Road should consist of dual eastbound left turn lanes and dual southbound left turn lanes, in addition to a single westbound right turn lane and single southbound right turn lane. Install pedestrian crossings and countdowns to improve multimodal conditions to connect potential sidewalks/multiuse paths as noted.
The potential roundabout at McConville Road could be programmed as additional development occurs along Nationwide Drive.

Other Considerations

Graves Mill Road must continue to accommodate a wide array of users with varying trip purposes. Maintaining and enhancing traffic flow within the corridor is of crucial importance, as well as balanced multi-modal accessibility. Access to future development should also be planned for and designed to ensure that it does not impede or further restrict traffic flow and is in general compliance with VDOT access management standards. As new development occurs, curb cuts should be minimized and cross parcel access shall be provided to avoid adding unnecessary short trips to Graves Mill Road. A design traffic study should accompany any widening project to ensure appropriate access management standards are adhered to, promoting safe and efficient multimodal activity.

Cost Estimates

Cost estimates for the Priority I concepts have been developed using the latest VDOT unit costs and summarized in **Table 12** and **13**. Cost estimates for the remaining priority projects will be developed as needed moving forward. While not indicated on the concept sheets, the cost estimates also include replacing/providing pedestrian signal heads with modern countdown pedestrian signal heads as needed. The cost allocations are also included in the **Appendix**.

Table 12 – Gristmill Drive Cost Estimates

Description	Total
Preliminary Engineering	$430,568
Construction	$2,289,807
Right of Way and Utilities	$132,632
Grand Total	**$2,853,007**

Source: EPR, PC, May 2018

Table 13 – Eastbound Right Turn Lane Extension and US 501 SB Ramp Widening Cost Estimates

Description	Total
Preliminary Engineering	$697,821
Construction	$4,993,528
Right of Way and Utilities	$473,149
Grand Total	**$6,164,498**

Source: EPR, PC, May 2018

Funding Opportunities

Table 14 – Smart Scale Funding

Smart Scale	
Purpose	SMART SCALE is a statewide program that intends to distribute funding based on a standard and objective evaluation of projects that will determine to how effectively they help the state achieve its transportation goals.
Funding	There are two main pathways to funding within the SMART SCALE process—the construction District Grant Program (DGP) and the High Priority Projects Program (HPPP). A project applying to funds from the DGP is prioritized with projects from the same construction district. A project applying for funds from the HPPP is prioritized with projects statewide. The CTB then makes a final decision on which projects to fund.
Eligible Projects	Projects must address improvements to a Corridor of Statewide Significance, Regional Network, or Urban Development Area (UDA). Project types can include highway improvements such as widening, operational improvements, access management, and intelligent transportation systems, transit and rail capacity expansion, and transportation demand management including park and ride facilities.
Eligible Applicants	Projects may be submitted by regional entities including MPOS and PDCs, along with public transit agencies, counties, cities, and towns that maintain their own infrastructure. Projects pertaining to UDAs can only be submitted by localities.
Evaluation Criteria	There are five factors evaluated for all projects: Safety, Congestion Mitigation, Accessibility, Environmental Quality, and Economic Development. MPOs with a population greater than 200,000 are also evaluated by land use policy consistency.
Website	http://www.vasmartscale.org/

Table 15 – Highway Safety Improvement Funding

Highway Safety Improvement Program (HSIP)	
Purpose	Established by the federal transportation legislation MAP-21, this program is structured and funded to make significant progress in reducing highway fatalities and injuries on all public roads.
Funding	The Federal share for highway safety improvements is 90%, with certain types of projects (including, as relevant to this study, maintaining retro-reflectivity of pavement markings and the installation of traffic signs) eligible to be funded at 100%. If project cost is higher than what was originally submitted, the project manager and sponsor will be responsible for identifying sources for funding those estimates.
Eligible Projects	Projects involve the identification of high-crash spots or corridor segments, an analysis of crash trends and existing conditions, and the prioritization and scheduling of improvement projects.
Eligible Applicants	Local governments, VDOT District and Regional Staff.
Evaluation Criteria	• Evaluated on a statewide basis rather than on a local or district basis. • Locations or corridors where a known “substantive safety” problem exists as indicated by location-specific data on severe crashes, and where it is determined that the specific project action can with confidence produce a measurable and significant reduction in the number and/or consequences of severe crashes. • To achieve the maximum benefit, the focus of the program is on cost- effective use of funds allocated for safety improvements. • Priority will be given to projects having higher total number of deaths and serious injuries.
Website	http://www.virginiadot.org/business/ted_app_pro.asp

Table 16 – Transportation Alternatives Funding

Transportation Alternatives Program (TAP)	
Purpose	This program is intended to help local sponsors fund community based projects that expand non-motorized travel choices and enhance the transportation experience by improving the cultural, historical, and environmental aspects of transportation infrastructure. It focuses on providing pedestrian and bicycle facilities and other community improvements.
Funding	TAP is not a traditional grant program and funds are only available on a reimbursement basis. It is therefore important to have the necessary funding available to pay for services and materials until appropriate documentation can be submitted and processed for reimbursement. The program will allow a maximum federal reimbursement of 80% of the eligible project costs and requires a 20% local match.
Eligible Projects	• Pedestrian and bicycle facilities such as sidewalks, bike lanes, and shared use paths • Pedestrian and bicycle safety and educational activities such as classroom projects, safety handouts and directional signage for trails (Safe Routes to School) • Preservation of abandoned railway corridors such as the development of a rails-to-trails facility
Eligible Applicants	Any local governments, regional transportation authorities, transit agencies, natural resource or public land agencies, school districts, local educational agencies, or school, tribal government, and any other local or regional government entity with responsibility for oversight of transportation or recreation trails.

Transportation Alternatives Program (TAP)	
Evaluation Criteria	• Number of federal enhancement categories • Inclusion in a state, regional, or local plan • Public/private venture-cooperation (multi-jurisdictional) • Total cost and matching funds in excess of minimum • Demonstrable need, community improvement • Community support and public accessibility • Compatibility with adjacent land use • Environmental and ecological benefits • Historic criteria met, significant aesthetic value to be achieved and visibility from a public right of way • Economic impact and effect on tourism
Website	http://www.virginiadot.org/business/prenhancegrants.asp

Table 17 – Revenue Share Funding

VDOT Revenue Share Program	
Purpose	This program provides additional funding for use by a county, city, or town to construct, reconstruct, improve, or maintain the highway systems within such county, city, or town and for eligible rural additions in certain counties of the Commonwealth. Locality funds are matched, dollar for dollar, with state funds, with statutory limitations on the amount of state funds authorized per locality.
Funding	Application for program funding must be made by resolution of the governing body of the jurisdiction requesting funds. Project funding is allocated by resolution of the CTB. Project costs are divided equally between the Revenue Share Fund and locality funding.
Eligible Projects	• Supplemental funding for projects listed in the adopted in the six-year plan • Construction, reconstruction, or improvement projects not including in the adopted six-year plan • Improvements necessary for the specific subdivision streets otherwise eligible for acceptance into the secondary system for maintenance (rural additions) • Maintenance projects consistent with the department's operating policies • New hardsurfacing (paving) • New roadway • Deficits on completed construction, reconstruction, or improvement projects
Eligible Applicants	Any county, city, or town in the Commonwealth
Evaluation Criteria	• Priority 1: Construction projects that have previously received Revenue Sharing funding • Priority 2: Construction projects that meet a transportation need • Priority 3: Projects that address deficient pavement resurfacing and bridge rehabilitation • Priority 4: All other projects
Website	http://www.virginiadot.org/business/local-assistance-access-programs.asp#Revenue_Sharing

Table 18 – Maintenance Funding

VDOT Road Maintenance
The VDOT Road Maintenance category of funding covers a wide variety of maintenance and operations activities. Road maintenance funds comprise the majority of VDOT's scheduled funding (versus new construction). Road maintenance funding addresses needs having to do with pavement management, signals, pavement markings, signs, stripes, guardrails, and ITS (Intelligent Transportation Systems) assets that are considered to be of critical safety and operational importance. Maintenance funding also addresses operation services comprising ordinary and preventative maintenance work such as cleaning ditches, washing bridge decks, patching pot-holes, debris removal, snow and ice removal, emergency response, incident management, mowing, and equipment management.

Table 19 – Proffer Funding

Development Proffer	
Purpose	Developer contributions, known as proffers, provide one potential source of funding for capital facilities. Proffers are typically cash amounts, dedicated land, and/or in-kindservices that are voluntarily granted to the locality to partially offset future capital facility costs associated with specific land developments. Recent legislation has limited the ability of local governments to receive proffers, but through the rezoning process developers may still consider proffering infrastructure improvements under the current legislation.
Funding	The cost of the program can be partially financed with developer contributions.
Eligible Projects	• Rezoning requests that permit residential and/or commercial uses in accordance with State enabling legislation • Limited to offsetting impacts that are directly attributable to new development • To "accept" a proffer, a locality should have completed an exhaustive study to document the real project costs
Eligible Applicants	Any property owners or developers seeking a rezoning.

Table 20 – BUILD Funding

Better Utilizing Investments to Leverage Development (BUILD) Transportation Discretionary Grants (Previously TIGER)	
Purpose	The BUILD Transportation grants replace the pre-existing Transportation Investment Generating Economic Recovery (TIGER) grant program. As the Administration looks to enhance America's infrastructure, FY 2018 BUILD Transportation grants are for investments in surface transportation infrastructure and are to be awarded on a competitive basis for projects that will have a significant local or regional impact.
Funding	Since 2009, the Program has provided a combined $5.6 billion to 463 projects in all 50 states, the District of Columbia, Puerto Rico, Guam, the Virgin Island. The Consolidated Appropriations Act of 2018 made available $1.5 billion for National Infrastructure Investments, through September 30, 2020.
Eligible Projects	BUILD funding can support roads, bridges, transit, rail, ports or intermodal transportation.
Eligible Applicants	BUILD can provide capital funding directly to any public entity, including municipalities, counties, port authorities, tribal governments, MPOs, or others in contrast to traditional Federal programs which provide funding to very specific groups of applicants (mostly State DOTs and transit agencies).
Evaluation Criteria	Projects for BUILD will be evaluated based on merit criteria that include safety, economic competitiveness, quality of life, environmental protection, state of good repair, innovation, partnership, and additional non-Federal revenue for future transportation infrastructure investments.
Website	https://www.transportation.gov/BUILDgrants

Appendix List

Letter	Description
Appendix A	Project Summary Sheets
Appendix B	Detailed Crash Data
Appendix C	Raw Traffic Counts
Appendix D	Traffic Forecasting Memorandum
Appendix E	Public Meeting Summaries
Appendix F	HCM and Queuing Reports
Appendix G	Turn Lane Warrants
Appendix H	Project Cost Estimates

Appendix A

Project Summary Sheets

GRAVES MILL ROAD CORRIDOR STUDY

Priority I Projects:

Key improvements for locations that exhibit existing safety and operational challenges that are intensified with future growth. These locations were also a focal point during the first public meeting. The Priority I projects will be considered for the VDOT Six-Year Improvement Plan, and other regional and local transportation plans.

Location: US 501 Southbound Ramp Intersections

Existing Conditions

- Queuing for the eastbound right extends back through Creekside Drive, primarily during the PM peak.
- Lane bias becomes an issue west of Creekside Drive. The eastbound queue in the right lane consistently does not clear the intersection at Creekside Drive.
- Moderate southbound right queuing for the off-ramp occurs during both peaks.

2040 No Build Conditions (Coordinated Network Implemented)

- Eastbound queuing and delays increase substantially, extending back well beyond Old Graves Mill Road.
- Unable to clear the intersection for multiple cycle lengths.
- Safety conditions likely to deteriorate due to congestion and "queue jumping" from lane bias.
- Southbound right will experience significant delays and queuing on the off-ramp.

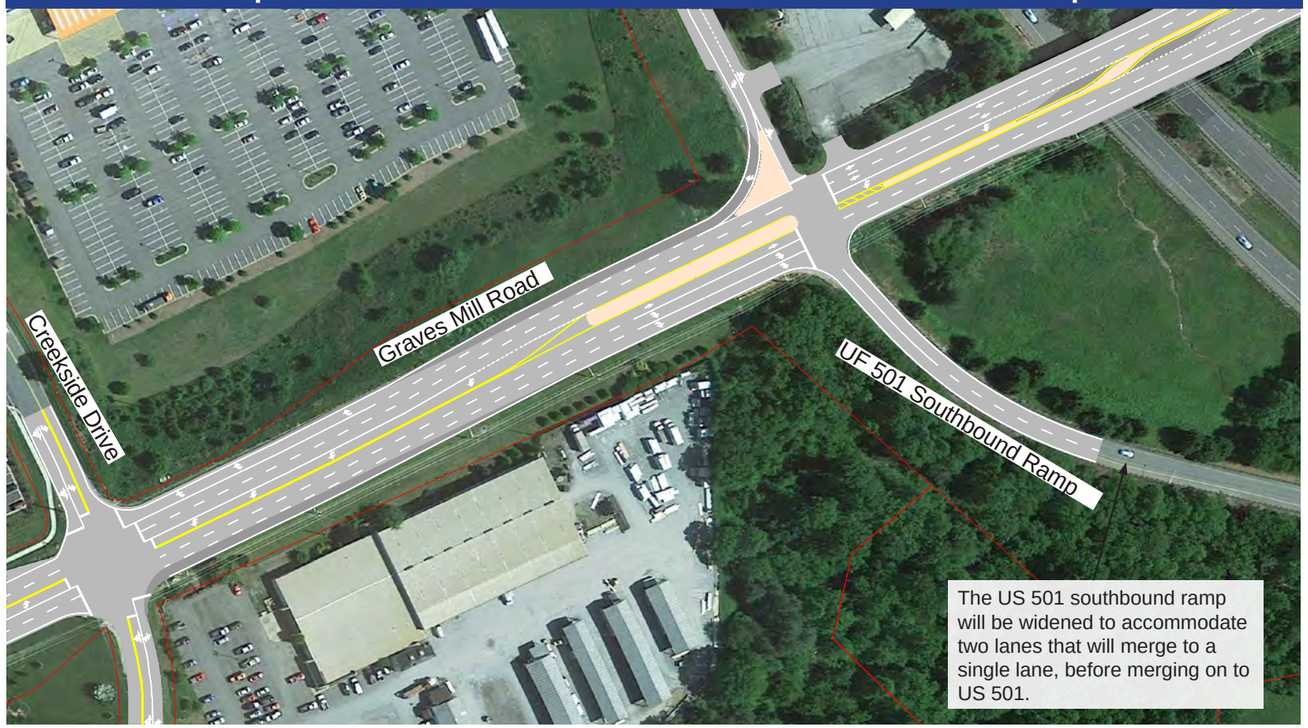
Project Description

- Reconfigure eastbound approach to a single thru lane and dual, controlled rights. Convert the existing right turn lane to a travel lane by extending back to Creekside Drive.
- Widen the southbound on-ramp to accommodate two lanes that will merge to a single lane, before merging on to US 501.
- Provide a channelized southbound right, free flow lane. The lane will end as a dedicated right turn lane at Creekside Drive.

Planning Level Costs

Phase	Six Year Improvement Program
Preliminary Engineering	$ 697,821
ROW/Utility	$ 473,149
Construction	$ 4,993,528
Total Costs	**$ 6,164,498**

Improvement Recommendations at US 501 Southbound Ramp



Level of Service (Delay in Seconds)				
Intersection	2040 No Build		2040 Build	
	AM	PM	AM	PM
Eastbound Right	E (56.7)	F (144.1)	A (<5.0)	A (<5.0)
Southbound Right	F (173.0)	F (173.0)	A (<5.0)	A (<5.0)
Overall*	D (38.2)	E (75.0)	A (9.3)	A (<5.0)

* Represents the intersection's average delay.

95th Percentile Queuing (in Feet)				
Intersection	2040 No Build		2040 Build	
	AM	PM	AM	PM
Eastbound Right	340'	1,698'	<50'	<50'
Southbound Right	383'	826'	Free Flow	Free Flow
Overall*	1,381'	3,177'	981'	278'

*Represents the sum of all approach queues.

Project Benefits

- Substantial reduction in movement delay and overall delay.
- Overall queues are reduced by over 30 percent for the AM peak, and over 90 percent for the PM peak.
- Better lane management improves safety conditions and reduces lane bias; thereby reducing eastbound queuing at Creekside Drive and Old Graves Mill Road.

GRAVES MILL ROAD CORRIDOR STUDY

Priority I Projects: Key improvements for locations that exhibit existing safety and operational challenges that are intensified with future growth. These locations were also a focal point during the first public meeting. The Priority I projects will be considered for the VDOT Six-Year Improvement Plan, and other regional and local transportation plans.

Location: Gristmill Drive

Existing Conditions

- Gristmill Drive functions as a cut-through to avoid US 221 at Graves Mill Road.
- At times, unable to clear westbound movement in a single cycle length.
- Lack of a dedicated westbound left turn lane (shared thru-left) creates heavy queuing during the PM peak.
- Northbound right is consistent and heavy due to cut-through traffic, generating lengthy queues during the AM peak.

2040 No Build Conditions (Coordinated Network Implemented)

- Queuing and delays increase substantially.
- Unable to clear the intersection for multiple cycle lengths.
- Safety conditions likely to deteriorate due to congestion and increased driver frustration.

Project Description

- Widen Graves Mill Road to accommodate a single westbound left turn lane (protected-permissive phasing).
- Widen Gristmill Drive to accommodate dual northbound right turn lanes (overlap phasing).
- Provide a pedestrian crossing and countdown timer across Gristmill Drive. If sidewalks are eventually implemented along the north side of Graves Mill Road, then pedestrian crossings could be installed at that time.

Level of Service (Delay in Seconds)				
Intersection	2040 No Build		2040 Build	
	AM	PM	AM	PM
Westbound Approach	F (122.8)	F (195.0)	D (41.8)*	B (17.6)*
Northbound Right	F (193.6)	F (>200.0)	D (45.2)	D (45.1)
Overall**	F (107.8)	F (164.9)	C (26.4)	B (18.0)

*New westbound left turn lane. Approach for AM is B (14.4) and for PM is A (7.0).

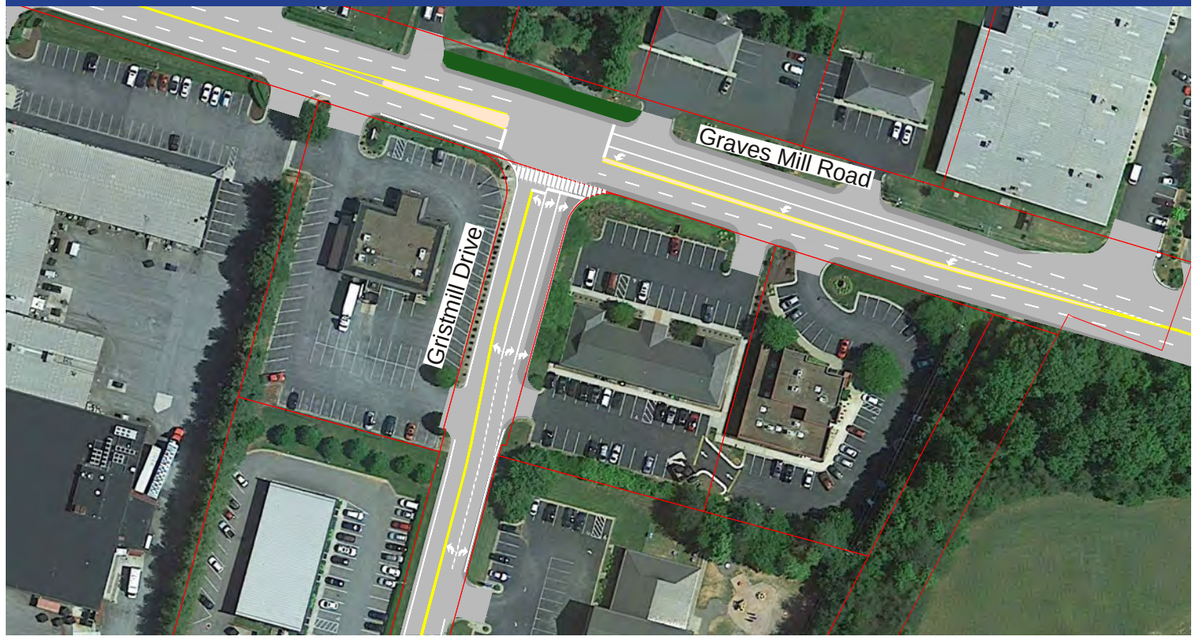
**Represents the intersection's average delay.

95th Percentile Queuing (in Feet)				
Intersection	2040 No Build		2040 Build	
	AM	PM	AM	PM
Westbound Approach	596'	1,397'	230'*	206'*
Northbound Right	1,007'	902'	352'	269'
Overall**	1,955'	2,467'	991'	992'

*New westbound left turn lane. Thru movement approach for AM is <50' and for PM is 51'.

**Represents the sum of all approach queues.

Improvement Recommendations at Graves Mill Road/Gristmill Drive

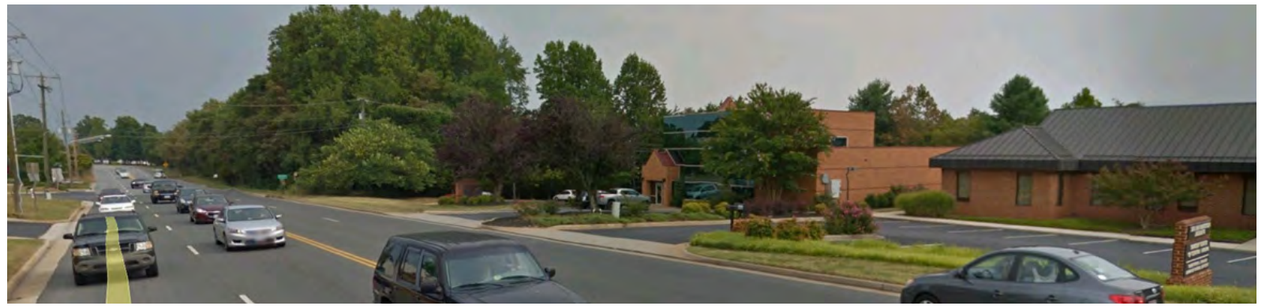


Planning Level Costs

Phase	Six Year Improvement Program
Preliminary Engineering	$ 430,568
ROW/Utility	$ 132,632
Construction	$ 2,289,807
Total Costs	**$ 2,853,007**

Project Benefits

- Substantial reduction in movement delay and overall delay.
- Overall queues are reduced by over 50 percent for both peak hours.
- Better lane management improves safety conditions.



GRAVES MILL ROAD CORRIDOR STUDY

Priority II Projects: Secondary improvements that were determined as part of the future conditions analysis, and offer support to Priority 1 projects. These projects are more targeted and may eventually be considered for regional and local transportation plans.

Creekside Drive

Issues

- Under future conditions, northbound right operates at LOS E (LOS F for shared thru/left movement)
- Under future conditions, queuing for the northbound right exceed 600'.

Project Description

- Widen the connector at Creekside Drive to accommodate dual northbound right turn lanes.
- Install pedestrian crossings and countdowns.

Operations

Level of Service (Delay in Seconds)					
	2040 with only Priority I Projects			2040 with Priority II Project	
	AM	PM		AM	PM
NB Left/Through	E (72.0)	F (117.8)	NB Left/Through	D (51.4)	E (78.1)
NB Right	E (55.2)	E (65.2)	NB Right	C (31.8)	D (44.2)
Overall	D (40.9)	C (27.2)	Overall	C (21.2)	C (21.3)

95th Percentile Queuing in Feet					
	2040 with only Priority I Projects			2040 with Priority II Project	
	AM	PM		AM	PM
NB Left/Through	49	197	NB Left/Through	49	197
NB Right	596	647	NB Right	234	285
Overall	2031	1904	Overall	1677	1434

Sketch Concept

McConville Road

Issues

- Under future conditions, extensive queuing occurs, primarily with movements associated with Nationwide Drive.
- Under future conditions, several movements will operate at LOS F, including the overall intersection during the PM peak.

Project Description

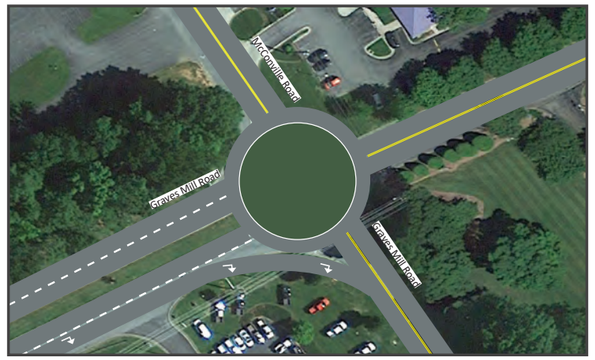
- Install a full size roundabout with a raised island.
- Maintain the eastbound right slip lane.

Operations

Level of Service (Delay in Seconds)					
	2040 with only Priority I Projects			2040 with Priority II Project	
	AM	PM		AM	PM
EB Left/Through	F (73.4)	C (23.0)	EB Left/Through	A (9.5)	A (5.5)
WB	B (13.5)	F (122.2)	WB	A (5.8)	D (33.8)
NB	D (25.4)	F (134.1)	NB	B (14.7)	B (11.5)
Overall	E (37.5)	F (84.5)	Overall	A (8.1)	C (16.2)

95th Percentile Queuing in Feet					
	2040 with only Priority I Projects			2040 with Priority II Project	
	AM	PM		AM	PM
EB Left/Through	380	73	EB Left/Through	75	25
WB	20	433	WB	0	225
NB	130	463	NB	75	75
Overall	671	1110	Overall	200	375

Sketch Concept



Millrace Drive

Issues

- Under future conditions, the eastbound right meets turn lane warrants, per VDOT standards.

Project Description

- Provide an eastbound right turn lane.
- Maintain existing access, but consider bringing north side driveway into signalization.

Operations

Level of Service (Delay in Seconds)		
	2040 with Priority II Project	
	AM	PM
EB Through	A (5.2)	B (13.2)
EB Right	A (2.4)	A (8.9)
Overall	A (4.9)	B (14.0)

95th Percentile Queuing in Feet		
	2040 with Priority II Project	
	AM	PM
EB Through	362	553
EB Right	2	7
Overall	469	1258

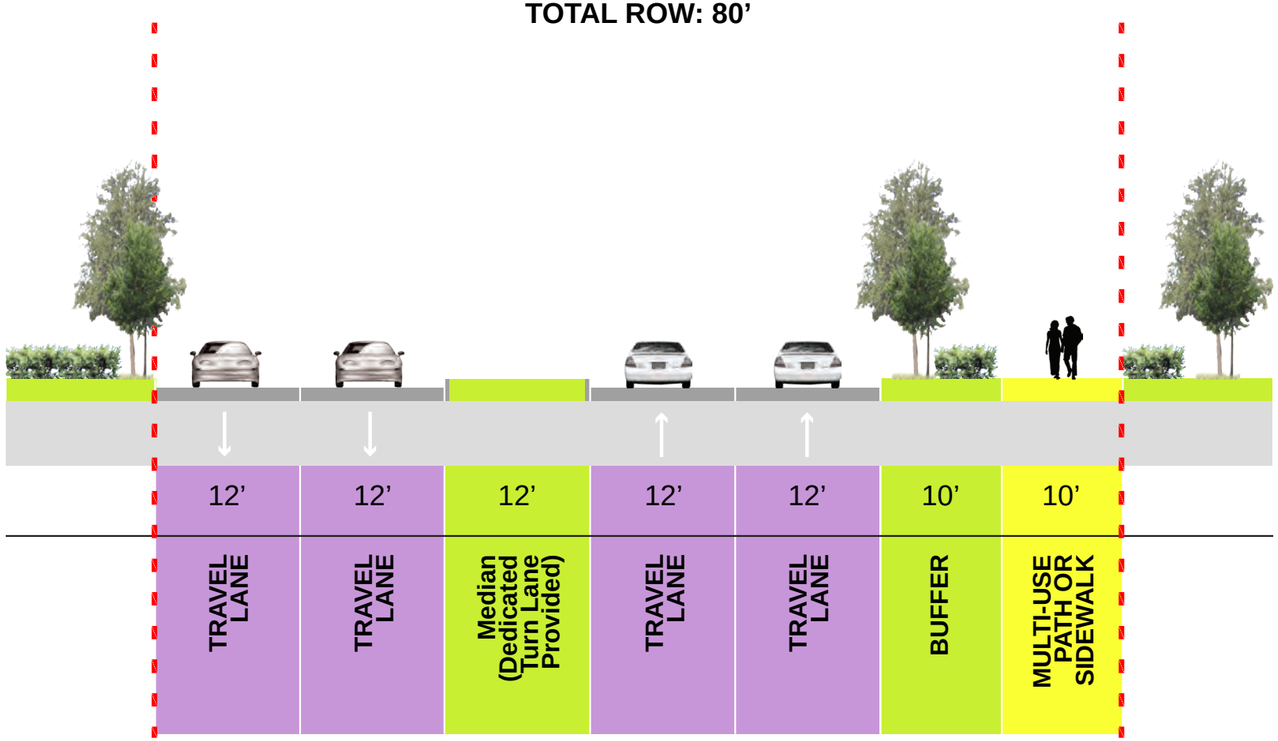
Sketch Concept

GRAVES MILL ROAD CORRIDOR STUDY

Priority II Projects: Secondary improvements that were determined as part of the future conditions analysis, and offer support to Priority 1 projects. These projects are more targeted and may eventually be considered for regional and local transportation plans.

Location	Issues	Project Description	Operations
Millrace Drive to Millside Drive	▪ Numerous accidents clustered near the Lillian Lane intersection. ▪ Difficulty making an eastbound left and southbound left. ▪ High speeds and steeper grade along this portion of Graves Mill Road. ▪ Under future conditions, the eastbound and westbound left movements at Millside Drive meet turn lane warrants, per VDOT standards.	▪ Provide a landscaped median with left turn lanes between Millrace Drive and Millside Drive. ▪ The landscaped median would connect with the westbound left at Millrace Drive and support the potential Millside Drive improvements as dedicated left turn lanes. ▪ The improvement would require widening Graves Mill Road to accommodate the additional lane. ▪ The project would be enhanced by a multiuse path or sidewalk along the south side of Graves Mill Road (previous multimodal recommendation).	▪ The landscaped median should help to reduce the occurrence of rear-end crashes associated with eastbound and westbound lefts. ▪ if full access opening is not considered for the landscaped median, northbound and southbound lefts could make u-turns at the nearest signalized intersection.

TOTAL ROW: 80’



GRAVES MILL ROAD CORRIDOR STUDY

Priority III Projects: Building on Priority II Projects, these recommended improvements will be needed if a maximum buildout and growth scenario occurs along the corridor. Priority III projects should be monitored over time as conditions dictate.

Location

Old Graves Mill Road and Creekside Drive

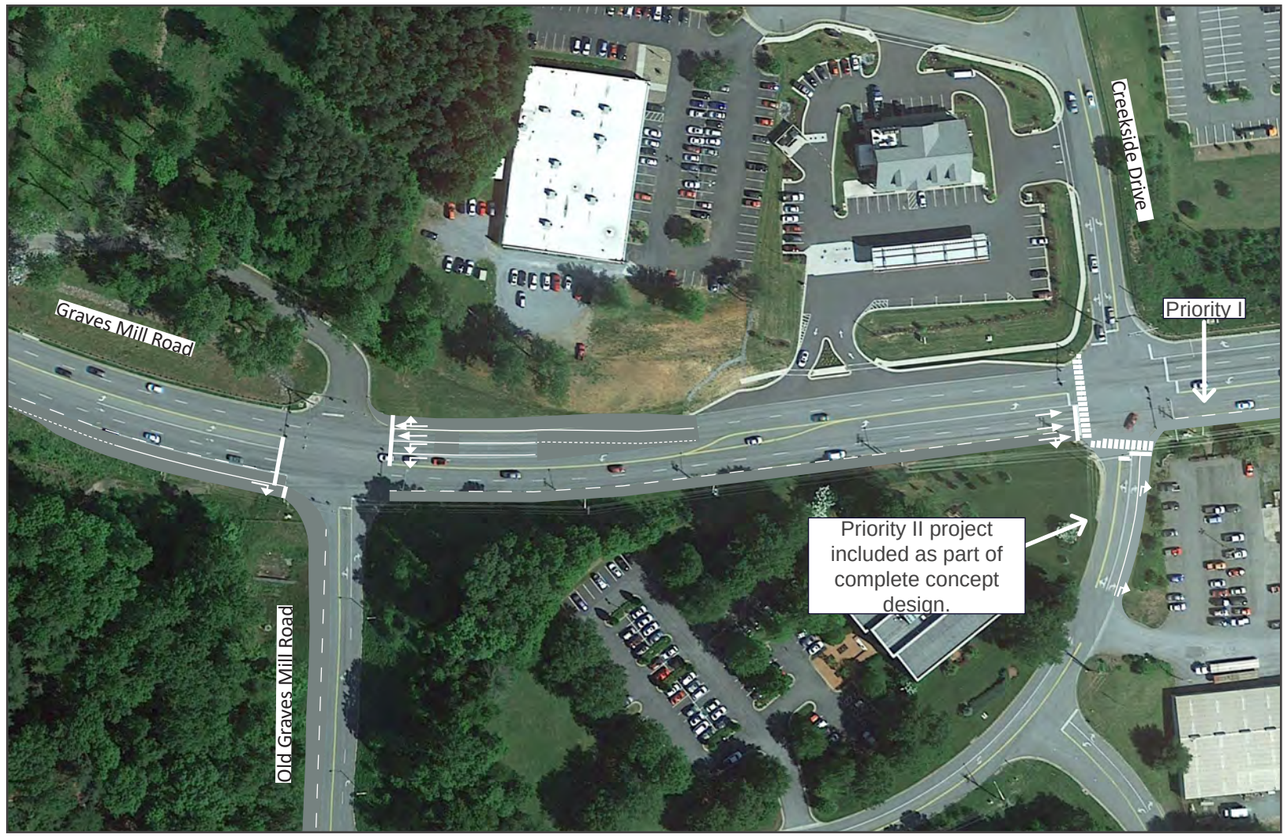
Issues

- Under future conditions, heavy eastbound movement results in long delays, particularly for westbound left movements (priority given to Graves Mill Road).
- Lane bias may remain an issue with only two lanes.
- Eastbound queuing over 1,000' at Old Graves Mill Road.
- Queues extends beyond available storage for several left turn lanes.

Project Description

- Provide an additional eastbound through lane, beginning west of Old Graves Mill Road and connecting with the Priority I lane addition at Creekside Drive.
- Provide dual westbound left turn lanes at Old Graves Mill Road. This will require two receiving lanes on Old Graves Mill Road.
- The additional northbound right at Creekside Drive included as part of complete concept.

Sketch Concept



Note: Future study needed to identify appropriate intersection for Old Graves Mill Road and Connector Road.

Operations

Level of Service (Delay in Seconds)					
	2040 with only Priority I Projects			2040 with Priority II Project	
Old Graves Mill Road	AM	PM		AM	PM
EB Approach	A (8.6)	C (23.5)	EB Approach	A (6.7)	B (14.3)
WB Left	F (248.5)	F (164.9)	WB Left	D (45.9)	D (51.5)
WB Approach	C (30.5)	D (40.3)	WB Approach	A (6.7)	B (15.9)
Overall	C (20.8)	C (34.2)	Overall	B (10.6)	B (19.0)
	2040 with only Priority I Projects			2040 with Priority II Project	
Creekside Drive	AM	PM		AM	PM
EB Approach	B (19.3)	B (15.6)	EB Approach	B (12.2)	B (17.0)
Overall	C (21.2)	C (21.3)	Overall	B (18.1)	B (19.8)

95th Percentile Queuing in Feet					
	2040 with only Priority I Projects			2040 with Priority II Project	
Old Graves Mill Road	AM	PM		AM	PM
EB Approach	283	1088	EB Approach	161	441
WB Left	268	706	WB Left	96	236
WB Approach	284	956	WB Approach	112	485
Overall	795	2354	Overall	501	1236
	2040 with only Priority I Projects			2040 with Priority II Project	
Creekside Drive	AM	PM		AM	PM
EB Approach	754	176	EB Approach	314	154
Overall	1677	1434	Overall	1237	1357

GRAVES MILL ROAD CORRIDOR STUDY

Priority III Projects: DDI at US 501

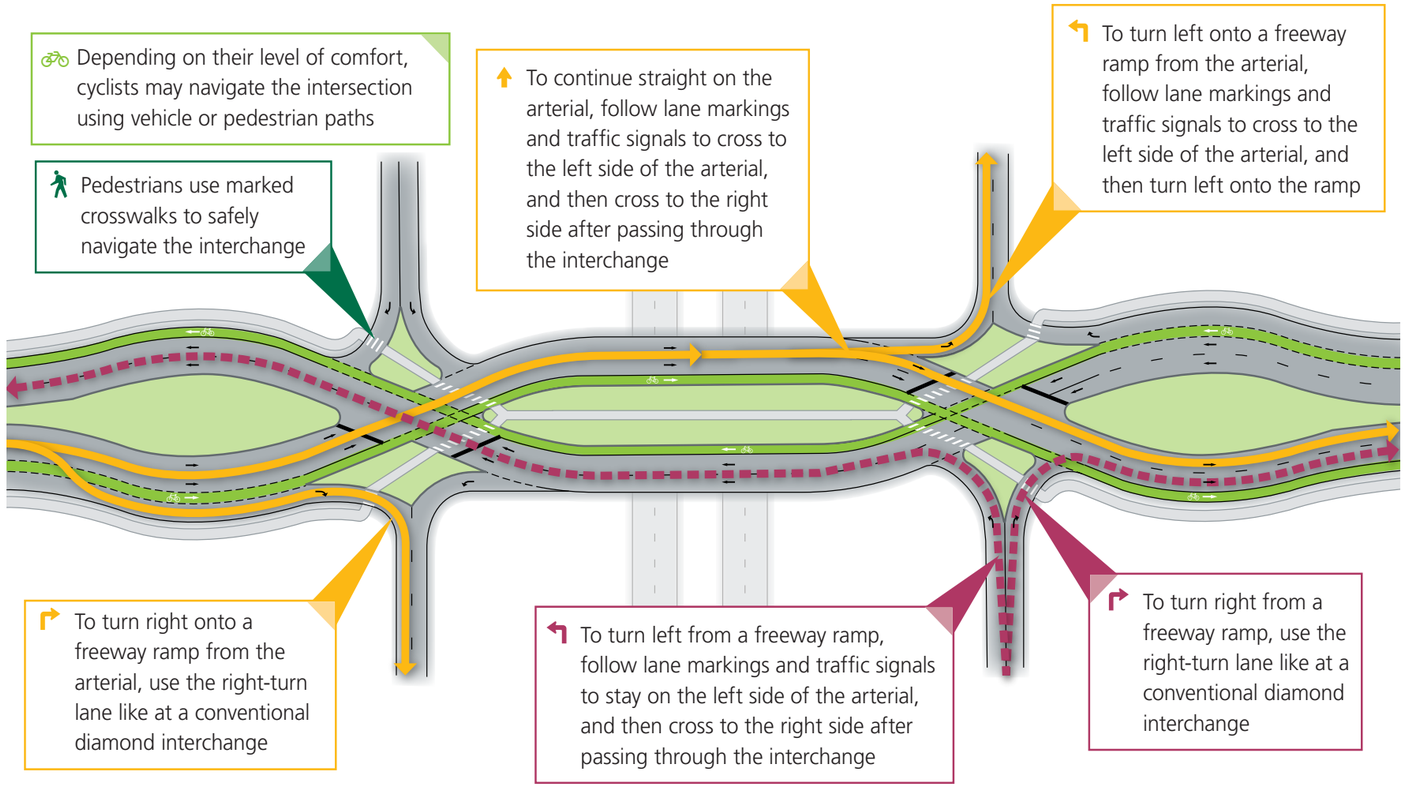
Building on Priority II Projects, these recommended improvements will be needed if a maximum buildout and growth scenario occurs along the corridor. Priority III projects should be monitored over time as conditions dictate.

Diverging Diamond Interchange (DDI)

What are the benefits of a DDI?

- **Improved safety:** Reduces the number of points where vehicles may cross paths
- **Increased efficiency:** Crossovers can operate with only two traffic signal phases, which allows the interchange to handle a greater volume of traffic and operate with less delay
- **Easier access to freeway:** Design allows traffic to enter and exit the freeway without crossing opposing lanes of traffic
- **Cost effective:** Since there are no left-turn lanes on the arterial, a DDI can have a narrower cross section and may be more cost effective than a retrofit or new interchange construction

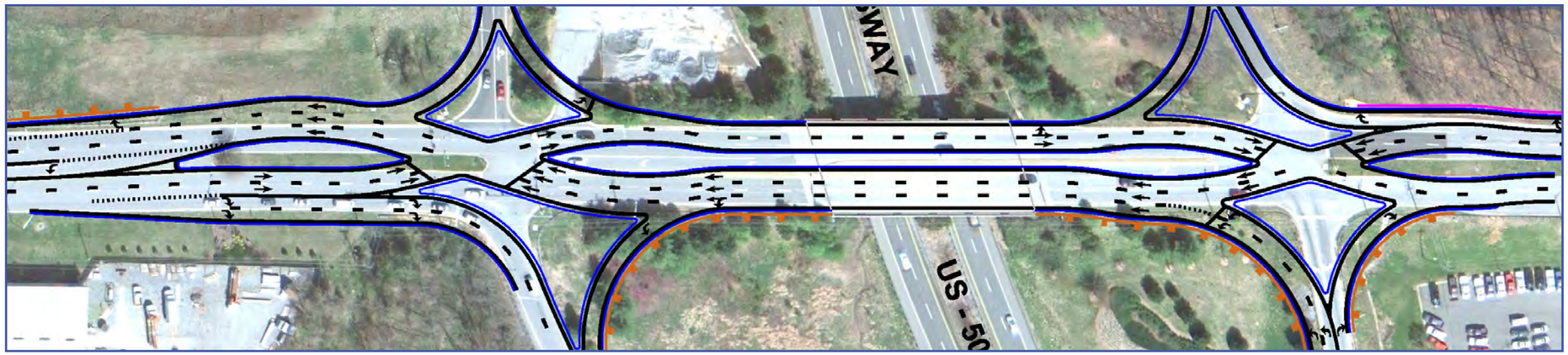
Visit www.virginiadot.org/innovativeintersections to learn more.



Note: For simplicity, only two directions of traffic are shown. Opposing traffic follows similar routes. Diagram not to scale.

Concept at US 501 Interchange

- Preliminary results suggest the DDI offers the greatest reduction in delay and queuing, when compared to more conventional designs.
- Would likely be implemented when the Graves Mill Road / US 501 interchange bridge needs replacing.
- Because the bridge would be replaced, ensure the new one is also wide enough to accommodate a multiuse path or sidewalk.
- Need for additional analysis to advance the concept further.



Appendix B

Detailed Crash Data

ID	DOCUMENT	DATE	DAY OF WEEK	Time	TYPE	SEVERITY	LIGHT CONDITIO	ROADWAY COND	Alcohol?	Unbelted?	Speeding?	Bike?	Ped?	Vehicle#
13	110910421	2/10/2011	Thursday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	UNBELTED	N	N	N	3
18	110875284	3/6/2011	Sunday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	2. Wet	N	N	SPEED	N	N	2
23	110905042	3/28/2011	Monday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
31	111465069	5/20/2011	Friday	3PM TO 6PM	1. Rear End	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
34	111665057	6/6/2011	Monday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
35	111665064	6/9/2011	Thursday	6AM TO 9AM	1. Rear End	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
40	111875090	6/23/2011	Thursday	12PM TO 3PM	1. Rear End	B.Visible Injury	2. Daylight	2. Wet	N	N	N	N	N	2
64	112715136	9/23/2011	Friday	6AM TO 9AM	1. Rear End	PDO.Property Damage Only	1. Dawn	2. Wet	N	N	N	N	N	2
77	113215143	11/4/2011	Friday	12PM TO 3PM	1. Rear End	C.Non-Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	3
83	113405052	11/26/2011	Saturday	6PM TO 9PM	1. Rear End	PDO.Property Damage Only	4. Darkness - Ro	1. Dry	ALCOHOL	N	SPEED	N	N	2
88	120055214	12/30/2011	Friday	3AM TO 6AM	1. Rear End	PDO.Property Damage Only	4. Darkness - Ro	1. Dry	N	N	N	N	N	3
7	110875193	1/14/2011	Friday	9PM TO 12AM	10. Deer	PDO.Property Damage Only	4. Darkness - Ro	1. Dry	N	N	N	N	N	1
51	112145181	7/29/2011	Friday	12PM TO 3PM	16. Other	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	1
3	110875164	1/3/2011	Monday	12PM TO 3PM	2. Angle	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	SPEED	N	N	3
12	110875249	2/7/2011	Monday	12PM TO 3PM	2. Angle	PDO.Property Damage Only	2. Daylight	1. Dry	N	UNBELTED	N	N	N	2
14	110940575	2/16/2011	Wednesday	3PM TO 6PM	2. Angle	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
25	110975034	3/30/2011	Wednesday	9AM TO 12PM	2. Angle	C.Non-Visible Injury	2. Daylight	2. Wet	N	N	N	N	N	2
41	111795195	6/23/2011	Thursday	3PM TO 6PM	2. Angle	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
59	112505259	8/30/2011	Tuesday	9AM TO 12PM	2. Angle	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
69	112925085	10/11/2011	Tuesday	12PM TO 3PM	2. Angle	PDO.Property Damage Only	2. Daylight	2. Wet	N	N	N	N	N	2
71	113050147	10/19/2011	Wednesday	6PM TO 9PM	3. Head On	PDO.Property Damage Only	5. Darkness - Ro	2. Wet	N	N	N	N	N	2
87	120055183	12/21/2011	Wednesday	3PM TO 6PM	4. Sideswipe - Same Direction	PDO.Property Damage Only	4. Darkness - Ro	2. Wet	N	N	N	N	N	2
19	110875371	3/10/2011	Thursday	6AM TO 9AM	9. Fixed Object - Off Road	B.Visible Injury	1. Dawn	2. Wet	N	UNBELTED	N	N	N	1
81	113275143	11/16/2011	Wednesday	6PM TO 9PM	9. Fixed Object - Off Road	PDO.Property Damage Only	4. Darkness - Ro	2. Wet	N	N	N	N	N	1
86	120055181	12/18/2011	Sunday	9PM TO 12AM	9. Fixed Object - Off Road	PDO.Property Damage Only	4. Darkness - Ro	1. Dry	N	N	N	N	N	1

ID	DOCUMENT	DATE	DAY OF WEEK	Time	TYPE	SEVERITY	LIGHT CONDITION	ROADWAY COND	Alcohol?	Unbelted?	Speeding?	Bike?	Ped?	Vehicle#
116	121105138	4/14/2012	Saturday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
118	121155121	4/19/2012	Thursday	6AM TO 9AM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
133	121645385	6/12/2012	Tuesday	3PM TO 6PM	1. Rear End	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
134	121725127	6/13/2012	Wednesday	3PM TO 6PM	1. Rear End	C.Non-Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
138	121945145	7/5/2012	Thursday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	4
1	122295210	8/14/2012	Tuesday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
2	122295211	8/14/2012	Tuesday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
6	122505171	8/25/2012	Saturday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	2. Wet	N	N	N	N	N	2
17	123065198	10/26/2012	Friday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
135	121805064	6/15/2012	Friday	6AM TO 9AM	16. Other	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	3
104	120685097	3/2/2012	Friday	12PM TO 3PM	2. Angle	PDO.Property Damage Only	2. Daylight	2. Wet	N	N	N	N	N	2
110	120875179	3/26/2012	Monday	9PM TO 12AM	2. Angle	PDO.Property Damage Only	4. Darkness - Road L	2. Wet	N	N	N	N	N	2
111	120965082	3/29/2012	Thursday	6AM TO 9AM	2. Angle	B.Visible Injury	4. Darkness - Road L	1. Dry	N	N	N	N	N	4
130	121655192	6/7/2012	Thursday	6PM TO 9PM	2. Angle	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
137	121885072	6/30/2012	Saturday	12PM TO 3PM	2. Angle	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
5	122505099	8/20/2012	Monday	9AM TO 12PM	2. Angle	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
15	130585199	10/17/2012	Wednesday	6AM TO 9AM	2. Angle	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
28	123535189	12/3/2012	Monday	3PM TO 6PM	2. Angle	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
20	123165176	11/9/2012	Friday	3PM TO 6PM	4. Sideswipe - Same Direction	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
24	123325216	11/13/2012	Tuesday	3PM TO 6PM	4. Sideswipe - Same Direction	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
90	120265058	1/9/2012	Monday	12PM TO 3PM	9. Fixed Object - Off Road	C.Non-Visible Injury	4. Darkness - Road L	1. Dry	ALCOHOL	N	SPEED	N	N	1

ID	DOCUMENT	DATE	DAY OF WEEK	Time	TYPE	SEVERITY	LIGHT CONDITION	ROADWAY CONDITIO	Alcohol?	Unbelted?	Speeding?	Bike?	Ped?	Vehicle#
33	130245105	1/8/2013	Tuesday	3PM TO 6PM	1. Rear End	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
46	130585244	2/18/2013	Monday	6AM TO 9AM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
47	130515137	2/20/2013	Wednesday	9AM TO 12PM	1. Rear End	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
48	130575262	2/22/2013	Friday	12PM TO 3PM	1. Rear End	C.Non-Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
78	131775237	6/17/2013	Monday	12PM TO 3PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	3
79	131855193	6/25/2013	Tuesday	6AM TO 9AM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
95	132615165	9/10/2013	Tuesday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
98	132765054	9/27/2013	Friday	12PM TO 3PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	4
117	133535100	11/26/2013	Tuesday	12PM TO 3PM	1. Rear End	PDO.Property Damage Only	2. Daylight	2. Wet	N	N	N	N	N	2
115	133535076	11/21/2013	Thursday	12PM TO 3PM	10. Deer	C.Non-Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	1
37	130245155	1/17/2013	Thursday	3PM TO 6PM	16. Other	B.Visible Injury	2. Daylight	2. Wet	N	N	N	N	N	1
49	130585262	2/22/2013	Friday	6AM TO 9AM	2. Angle	PDO.Property Damage Only	2. Daylight	2. Wet	N	N	N	N	N	2
50	130595195	2/26/2013	Tuesday	9AM TO 12PM	2. Angle	PDO.Property Damage Only	2. Daylight	2. Wet	N	N	N	N	N	2
97	132745173	9/25/2013	Wednesday	12PM TO 3PM	2. Angle	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
101	132845084	10/4/2013	Friday	6PM TO 9PM	2. Angle	PDO.Property Damage Only	5. Darkness - Road N	1. Dry	N	N	N	N	N	2
103	132975178	10/7/2013	Monday	9AM TO 12PM	2. Angle	PDO.Property Damage Only	2. Daylight	2. Wet	N	N	N	N	N	2
107	133065214	10/31/2013	Thursday	3PM TO 6PM	2. Angle	K.Fatal Injury	2. Daylight	1. Dry	N	N	SPEED	N	N	3
121	133535218	12/10/2013	Tuesday	6PM TO 9PM	3. Head On	B.Visible Injury	4. Darkness - Road L	1. Dry	N	N	N	N	N	3

ID	DOCUMENT	DATE	DAY OF WEEK	Time	TYPE	SEVERITY	LIGHT CONDITIO	ROADWAY CONDI	Alcohol?	Unbelted?	Speeding?	Bike?	Ped?	Vehicle#
140	140725243	3/6/2014	Thursday	6AM TO 9AM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
9	141285181	4/23/2014	Wednesday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
27	141745298	6/23/2014	Monday	6PM TO 9PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	SPEED	N	N	2
30	142115193	7/17/2014	Thursday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	3
32	142335147	8/12/2014	Tuesday	6PM TO 9PM	1. Rear End	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
36	142415212	8/25/2014	Monday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	4
55	142905298	10/11/2014	Saturday	3PM TO 6PM	1. Rear End	A.Ambulatory Injury	2. Daylight	1. Dry	N	UNBELTED	N	N	N	2
60	143185265	11/3/2014	Monday	6AM TO 9AM	1. Rear End	C.Non-Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
61	143185280	11/7/2014	Friday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	4. Darkness - Roa	1. Dry	N	N	N	N	N	2
63	143255211	11/13/2014	Thursday	6AM TO 9AM	1. Rear End	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
65	143295418	11/21/2014	Friday	6AM TO 9AM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
127	140135308	1/5/2014	Sunday	9AM TO 12PM	2. Angle	PDO.Property Damage Only	2. Daylight	4. Icy	N	N	N	N	N	1
136	140375186	1/26/2014	Sunday	12PM TO 3PM	2. Angle	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
11	141285254	5/7/2014	Wednesday	12PM TO 3PM	2. Angle	C.Non-Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
21	141635176	6/3/2014	Tuesday	9AM TO 12PM	2. Angle	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
38	142475169	9/1/2014	Monday	9AM TO 12PM	2. Angle	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
70	143495076	12/9/2014	Tuesday	6AM TO 9AM	2. Angle	PDO.Property Damage Only	1. Dawn	1. Dry	N	N	N	N	N	2
74	143645116	12/29/2014	Monday	6PM TO 9PM	2. Angle	PDO.Property Damage Only	4. Darkness - Roa	2. Wet	N	N	N	N	N	2
66	143355413	11/26/2014	Wednesday	12PM TO 3PM	4. Sideswipe - Same Direction	PDO.Property Damage Only	2. Daylight	2. Wet	N	N	N	N	N	2
128	140135312	1/5/2014	Sunday	6AM TO 9AM	9. Fixed Object - Off Road	B.Visible Injury	4. Darkness - Roa	4. Icy	N	N	N	N	N	1
10	141285200	4/28/2014	Monday	3PM TO 6PM	9. Fixed Object - Off Road	PDO.Property Damage Only	2. Daylight	2. Wet	N	N	N	N	N	1
67	143395290	12/2/2014	Tuesday	6PM TO 9PM	9. Fixed Object - Off Road	PDO.Property Damage Only	4. Darkness - Roa	2. Wet	N	N	N	N	N	1
75	150065254	12/31/2014	Wednesday	6AM TO 9AM	9. Fixed Object - Off Road	C.Non-Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	1

ID	DOCUMENT	DATE	DAY OF WEEK	Time	TYPE	SEVERITY	LIGHT CONDITION	ROADWAY CONDI	Alcohol?	Unbelted?	Speeding?	Bike?	Ped?	Vehicle#
76	150065257	1/2/2015	Friday	12PM TO 3PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
82	150285219	1/26/2015	Monday	6AM TO 9AM	1. Rear End	PDO.Property Damage Only	1. Dawn	2. Wet	N	N	N	N	N	2
85	150505126	2/13/2015	Friday	6AM TO 9AM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
94	150775184	3/11/2015	Wednesday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	2. Wet	N	N	N	N	N	2
99	150925311	4/1/2015	Wednesday	3PM TO 6PM	1. Rear End	B.Visible Injury	2. Daylight	1. Dry	N	N	SPEED	N	N	2
106	151255229	4/28/2015	Tuesday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
120	151735254	6/16/2015	Tuesday	6AM TO 9AM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
131	152245135	8/10/2015	Monday	9AM TO 12PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
132	152305118	8/11/2015	Tuesday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
139	152665143	9/21/2015	Monday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	2. Wet	N	N	N	N	N	3
141	152795171	9/28/2015	Monday	12PM TO 3PM	1. Rear End	PDO.Property Damage Only	2. Daylight	2. Wet	N	N	N	N	N	2
8	153145153	11/7/2015	Saturday	12PM TO 3PM	1. Rear End	PDO.Property Damage Only	2. Daylight	2. Wet	N	N	N	N	N	2
22	153635248	12/18/2015	Friday	12PM TO 3PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	4
26	160125116	12/30/2015	Wednesday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	2. Wet	N	N	N	N	N	2
80	150265257	1/21/2015	Wednesday	12PM TO 3PM	2. Angle	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
108	151315220	5/4/2015	Monday	3PM TO 6PM	2. Angle	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
112	151415087	5/19/2015	Tuesday	9PM TO 12AM	2. Angle	PDO.Property Damage Only	4. Darkness - Road Li	1. Dry	N	N	N	N	N	2
119	151695103	6/15/2015	Monday	12PM TO 3PM	2. Angle	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
124	151955195	7/13/2015	Monday	3PM TO 6PM	2. Angle	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
129	152195206	8/7/2015	Friday	12PM TO 3PM	2. Angle	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
142	152875270	10/12/2015	Monday	12PM TO 3PM	2. Angle	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
16	153415184	12/2/2015	Wednesday	6AM TO 9AM	2. Angle	PDO.Property Damage Only	2. Daylight	2. Wet	N	N	N	N	N	2
4	153015301	10/26/2015	Monday	6AM TO 9AM	3. Head On	B.Visible Injury	1. Dawn	1. Dry	N	N	N	N	N	2
105	151185181	4/21/2015	Tuesday	12PM TO 3PM	4. Sideswipe - Same Direction	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
92	150705082	3/4/2015	Wednesday	9AM TO 12PM	9. Fixed Object - Off Road	PDO.Property Damage Only	2. Daylight	9. Water (Standing	N	N	N	N	N	1
113	151465362	5/19/2015	Tuesday	3PM TO 6PM	9. Fixed Object - Off Road	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	1

ID	DOCUMENT	DATE	DAY OF WEEK	Time	TYPE	SEVERITY	LIGHT CONDITION	ROADWAY CON	Alcohol?	Unbelted?	Speeding?	Bike?	Ped?	Vehicle#
29	160145205	1/13/2016	Wednesday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	3
42	160615260	2/25/2016	Thursday	12PM TO 3PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	3
43	160685195	3/3/2016	Thursday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	3. Dusk	1. Dry	N	N	N	N	N	2
53	160975106	3/31/2016	Thursday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
54	160975044	4/1/2016	Friday	6AM TO 9AM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
58	161175116	4/20/2016	Wednesday	12PM TO 3PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	ALCOHOL	N	N	N	N	3
62	161325103	5/5/2016	Thursday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	2. Wet	N	N	N	N	N	2
68	161535207	5/26/2016	Thursday	3PM TO 6PM	1. Rear End	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	3
84	162095302	7/20/2016	Wednesday	3PM TO 6PM	1. Rear End	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	3
89	162455137	8/26/2016	Friday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
96	162725158	9/22/2016	Thursday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	3
100	162795113	10/4/2016	Tuesday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
102	162945276	10/14/2016	Friday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
122	163435158	12/2/2016	Friday	3PM TO 6PM	1. Rear End	PDO.Property Damage Only	4. Darkness - Road I	1. Dry	N	N	N	N	N	2
123	163435166	12/5/2016	Monday	9AM TO 12PM	1. Rear End	C.Non-Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	3
44	160685193	3/3/2016	Thursday	6AM TO 9AM	2. Angle	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
52	160905160	3/22/2016	Tuesday	12PM TO 3PM	2. Angle	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	3
57	161125532	4/20/2016	Wednesday	9AM TO 12PM	2. Angle	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
73	161955201	6/16/2016	Thursday	9AM TO 12PM	2. Angle	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
91	162435342	8/29/2016	Monday	3PM TO 6PM	2. Angle	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
93	162525255	9/1/2016	Thursday	6AM TO 9AM	2. Angle	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
109	163145126	11/2/2016	Wednesday	9PM TO 12AM	2. Angle	PDO.Property Damage Only	4. Darkness - Road I	1. Dry	N	N	N	N	N	2
125	170035373	12/14/2016	Wednesday	3PM TO 6PM	2. Angle	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
114	163335387	11/12/2016	Saturday	3PM TO 6PM	3. Head On	B.Visible Injury	2. Daylight	1. Dry	N	N	N	N	N	2
45	160705169	3/9/2016	Wednesday	9AM TO 12PM	4. Sideswipe - Same Direction	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	2
56	161165228	4/17/2016	Sunday	6PM TO 9PM	5. Sideswipe - Opposite Direction	B.Visible Injury	4. Darkness - Road I	1. Dry	N	N	N	N	N	2
126	163575189	12/17/2016	Saturday	9AM TO 12PM	8. Non-Collision	B.Visible Injury	2. Daylight	4. Icy	N	N	N	N	N	1
39	160605103	2/21/2016	Sunday	3PM TO 6PM	9. Fixed Object - Off Road	PDO.Property Damage Only	2. Daylight	2. Wet	N	N	N	N	N	1
72	161655348	6/8/2016	Wednesday	6AM TO 9AM	9. Fixed Object - Off Road	PDO.Property Damage Only	2. Daylight	1. Dry	N	N	N	N	N	1

Appendix C

Raw Traffic Counts

Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and Gristmill
Site Code : 33333333
Start Date : 9/6/2017
Page No : 1

Groups Printed- Passenger Veh - Trucks

	From North					Graves Mill From East					Gristmill From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	82	27	0	109	94	0	3	0	97	3	147	0	0	150	356
07:15 AM	0	0	0	0	0	0	90	36	0	126	120	0	2	0	122	3	153	0	0	156	404
07:30 AM	0	0	0	0	0	0	122	50	0	172	174	0	4	0	178	1	208	0	0	209	559
07:45 AM	0	0	0	0	0	0	121	70	0	191	156	0	7	0	163	7	159	0	0	166	520
Total	0	0	0	0	0	0	415	183	0	598	544	0	16	0	560	14	667	0	0	681	1839
08:00 AM	0	0	0	0	0	0	101	53	0	154	115	0	3	0	118	1	129	0	0	130	402
08:15 AM	0	0	0	0	0	0	132	53	0	185	96	0	2	0	98	4	113	0	0	117	400
08:30 AM	0	0	0	0	0	0	127	39	0	166	102	0	1	0	103	1	149	0	0	150	419
08:45 AM	0	0	0	0	0	0	121	21	0	142	83	0	2	0	85	2	147	0	0	149	376
Total	0	0	0	0	0	0	481	166	0	647	396	0	8	0	404	8	538	0	0	546	1597
*** BREAK ***																					
04:00 PM	0	0	0	0	0	0	174	61	0	235	99	0	3	0	102	2	130	0	0	132	469
04:15 PM	0	0	0	0	0	0	158	80	0	238	67	0	3	0	70	3	130	0	0	133	441
04:30 PM	0	0	0	0	0	0	183	84	0	267	76	0	8	0	84	5	127	0	0	132	483
04:45 PM	0	0	0	0	0	0	207	90	0	297	84	0	11	0	95	7	109	0	0	116	508
Total	0	0	0	0	0	0	722	315	0	1037	326	0	25	0	351	17	496	0	0	513	1901
05:00 PM	0	0	0	0	0	0	212	90	0	302	109	0	12	0	121	3	158	0	0	161	584
05:15 PM	0	0	0	0	0	0	202	65	0	267	81	0	5	0	86	33	103	0	0	136	489
05:30 PM	0	0	0	0	0	0	187	66	0	253	77	0	3	0	80	3	111	0	0	114	447
05:45 PM	0	0	0	0	0	0	139	71	0	210	62	0	8	0	70	3	102	0	0	105	385
Total	0	0	0	0	0	0	740	292	0	1032	329	0	28	0	357	42	474	0	0	516	1905
Grand Total	0	0	0	0	0	0	2358	956	0	3314	1595	0	77	0	1672	81	2175	0	0	2256	7242
Apprch %	0	0	0	0		0	71.2	28.8	0		95.4	0	4.6	0		3.6	96.4	0	0		
Total %	0	0	0	0	0	0	32.6	13.2	0	45.8	22	0	1.1	0	23.1	1.1	30	0	0	31.2	
Passenger Veh	0	0	0	0	0	0	2335	956	0	3291	1591	0	74	0	1665	81	2149	0	0	2230	7186
% Passenger Veh	0	0	0	0	0	0	99	100	0	99.3	99.7	0	96.1	0	99.6	100	98.8	0	0	98.8	99.2
Trucks	0	0	0	0	0	0	23	0	0	23	4	0	3	0	7	0	26	0	0	26	56
% Trucks	0	0	0	0	0	0	1	0	0	0.7	0.3	0	3.9	0	0.4	0	1.2	0	0	1.2	0.8

Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and Gristmill
Site Code : 33333333
Start Date : 9/6/2017
Page No : 2

	From North					Graves Mill From East					Gristmill From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	0	0	0	0	0	90	36	0	126	120	0	2	0	122	3	153	0	0	156	404
07:30 AM	0	0	0	0	0	0	**122**	50	0	172	**174**	0	4	0	**178**	1	**208**	0	0	**209**	**559**
07:45 AM	0	0	0	0	0	0	121	**70**	0	**191**	156	0	**7**	0	163	**7**	159	0	0	166	520
08:00 AM	0	0	0	0	0	0	101	53	0	154	115	0	3	0	118	1	129	0	0	130	402
Total Volume	0	0	0	0	0	0	434	209	0	643	565	0	16	0	581	12	649	0	0	661	1885
% App. Total	0	0	0	0		0	67.5	32.5	0		97.2	0	2.8	0		1.8	98.2	0	0		
PHF	.000	.000	.000	.000	.000	.000	.889	.746	.000	.842	.812	.000	.571	.000	.816	.429	.780	.000	.000	.791	.843
Passenger Veh	0	0	0	0	0	0	428	209	0	637	563	0	15	0	578	12	642	0	0	654	1869
% Passenger Veh	0	0	0	0	0	0	98.6	100	0	99.1	99.6	0	93.8	0	99.5	100	98.9	0	0	98.9	99.2
Trucks	0	0	0	0	0	0	6	0	0	6	2	0	1	0	3	0	7	0	0	7	16
% Trucks	0	0	0	0	0	0	1.4	0	0	0.9	0.4	0	6.3	0	0.5	0	1.1	0	0	1.1	0.8

Data Collection Group
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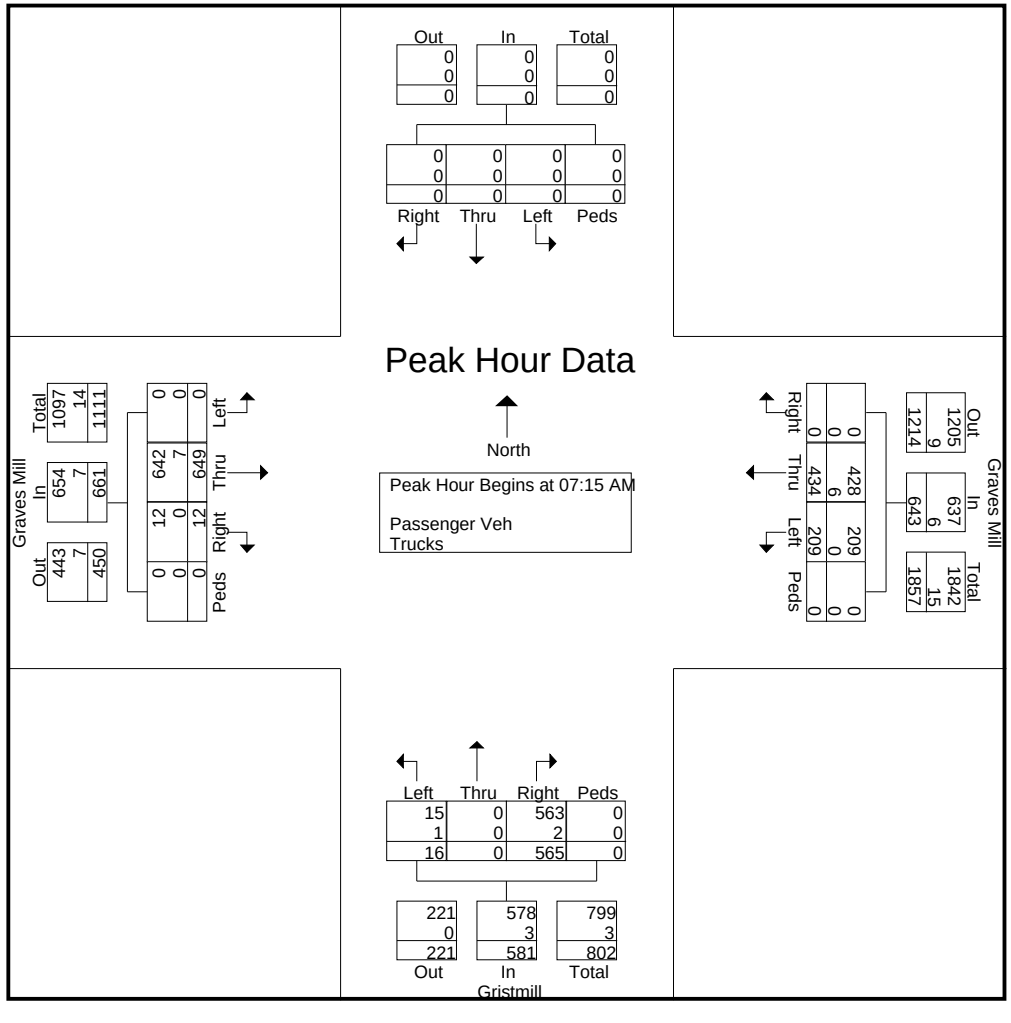
File Name : Graves Mill and Gristmill
Site Code : 33333333
Start Date : 9/6/2017
Page No : 3



Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and Gristmill
Site Code : 33333333
Start Date : 9/6/2017
Page No : 4

	From North					Graves Mill From East					Gristmill From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	0	0	0	0	0	183	84	0	267	76	0	8	0	84	5	127	0	0	132	483
04:45 PM	0	0	0	0	0	0	207	**90**	0	297	84	0	11	0	95	7	109	0	0	116	508
05:00 PM	0	0	0	0	0	0	**212**	90	0	**302**	**109**	0	**12**	0	**121**	3	**158**	0	0	**161**	**584**
05:15 PM	0	0	0	0	0	0	202	65	0	267	81	0	5	0	86	**33**	103	0	0	136	489
Total Volume	0	0	0	0	0	0	804	329	0	1133	350	0	36	0	386	48	497	0	0	545	2064
% App. Total	0	0	0	0		0	71	29	0		90.7	0	9.3	0		8.8	91.2	0	0		
PHF	.000	.000	.000	.000	.000	.000	.948	.914	.000	.938	.803	.000	.750	.000	.798	.364	.786	.000	.000	.846	.884
Passenger Veh	0	0	0	0	0	0	801	329	0	1130	350	0	36	0	386	48	492	0	0	540	2056
% Passenger Veh	0	0	0	0	0	0	99.6	100	0	99.7	100	0	100	0	100	100	99.0	0	0	99.1	99.6
Trucks	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	5	0	0	5	8
% Trucks	0	0	0	0	0	0	0.4	0	0	0.3	0	0	0	0	0	0	1.0	0	0	0.9	0.4

Data Collection Group
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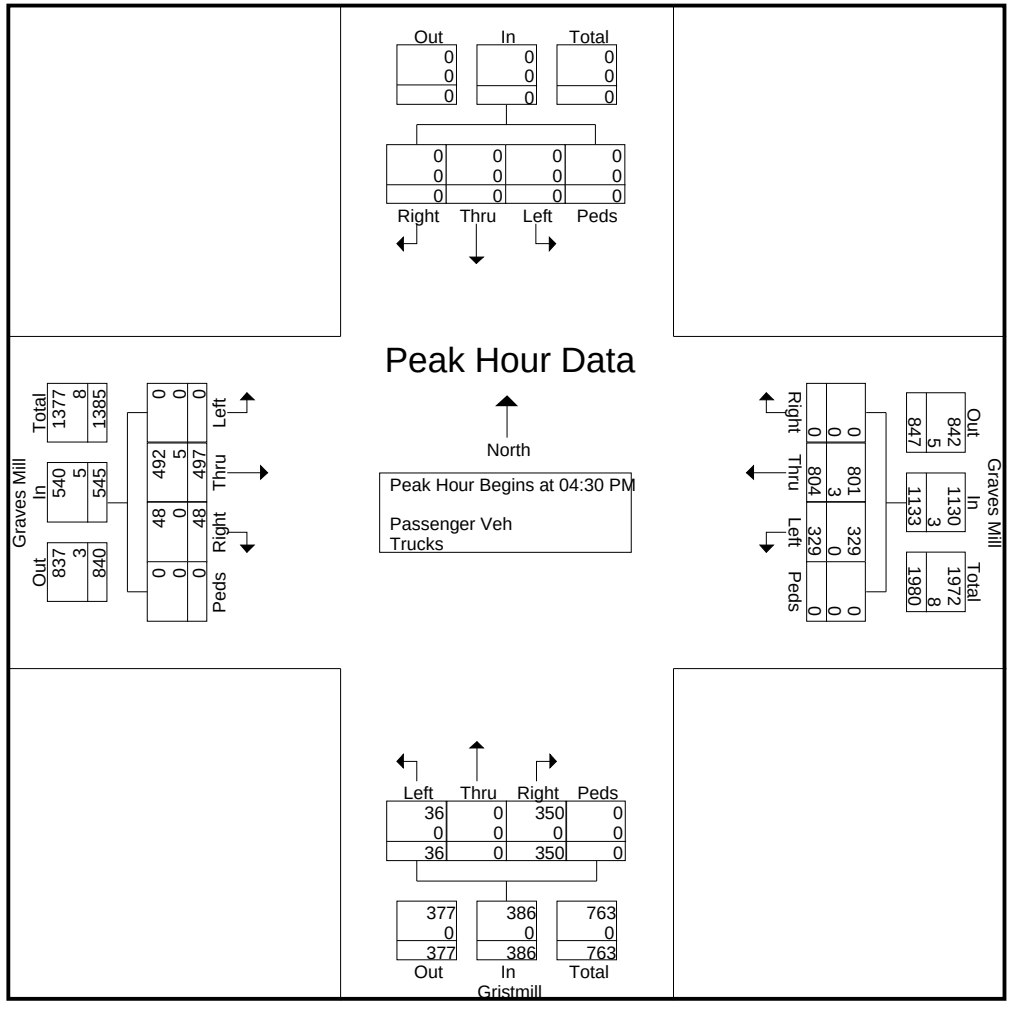
File Name : Graves Mill and Gristmill
Site Code : 33333333
Start Date : 9/6/2017
Page No : 5



Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and Millrace
Site Code : 34444444
Start Date : 9/6/2017
Page No : 1

Groups Printed- Passenger Veh - Trucks

	From North					Graves Mill From East					Millrace From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	93	21	0	114	4	0	2	0	6	16	214	0	0	230	350
07:15 AM	0	0	0	0	0	0	131	11	0	142	2	0	1	0	3	9	269	0	0	278	423
07:30 AM	0	0	0	0	0	0	178	19	0	197	3	0	5	0	8	13	355	0	0	368	573
07:45 AM	0	0	0	0	0	0	212	20	0	232	4	0	3	0	7	20	286	0	0	306	545
Total	0	0	0	0	0	0	614	71	0	685	13	0	11	0	24	58	1124	0	0	1182	1891
08:00 AM	0	0	0	0	0	0	163	20	0	183	2	0	3	0	5	14	214	0	0	228	416
08:15 AM	0	0	0	0	0	0	185	14	0	199	4	0	1	0	5	10	189	0	0	199	403
08:30 AM	0	0	0	0	0	0	152	19	0	171	4	0	10	0	14	12	209	0	0	221	406
08:45 AM	0	0	0	0	0	0	137	11	0	148	4	0	2	0	6	9	242	0	0	251	405
Total	0	0	0	0	0	0	637	64	0	701	14	0	16	0	30	45	854	0	0	899	1630
*** BREAK ***																					
04:00 PM	0	0	0	0	0	0	200	1	0	201	48	0	26	0	74	3	223	0	0	226	501
04:15 PM	0	0	0	0	0	0	213	4	0	217	10	0	13	0	23	2	204	0	0	206	446
04:30 PM	0	0	0	0	0	0	234	3	0	237	23	0	11	0	34	3	191	0	0	194	465
04:45 PM	0	0	0	0	0	0	245	4	0	249	17	0	18	0	35	7	208	0	0	215	499
Total	0	0	0	0	0	0	892	12	0	904	98	0	68	0	166	15	826	0	0	841	1911
05:00 PM	0	0	0	0	0	0	254	8	0	262	44	0	20	0	64	2	239	0	0	241	567
05:15 PM	0	0	0	0	0	0	241	9	0	250	40	0	14	0	54	4	217	0	0	221	525
05:30 PM	0	0	0	0	0	0	210	7	0	217	77	0	26	0	103	1	182	0	0	183	503
05:45 PM	0	0	0	0	0	0	197	1	0	198	17	0	5	0	22	2	164	0	0	166	386
Total	0	0	0	0	0	0	902	25	0	927	178	0	65	0	243	9	802	0	0	811	1981
Grand Total	0	0	0	0	0	0	3045	172	0	3217	303	0	160	0	463	127	3606	0	0	3733	7413
Apprch %	0	0	0	0		0	94.7	5.3	0		65.4	0	34.6	0		3.4	96.6	0	0		
Total %	0	0	0	0	0	0	41.1	2.3	0	43.4	4.1	0	2.2	0	6.2	1.7	48.6	0	0	50.4	
Passenger Veh	0	0	0	0	0	0	3027	167	0	3194	293	0	157	0	450	126	3575	0	0	3701	7345
% Passenger Veh	0	0	0	0	0	0	99.4	97.1	0	99.3	96.7	0	98.1	0	97.2	99.2	99.1	0	0	99.1	99.1
Trucks	0	0	0	0	0	0	18	5	0	23	10	0	3	0	13	1	31	0	0	32	68
% Trucks	0	0	0	0	0	0	0.6	2.9	0	0.7	3.3	0	1.9	0	2.8	0.8	0.9	0	0	0.9	0.9

Data Collection Group
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File Name : Graves Mill and Millrace
Site Code : 34444444
Start Date : 9/6/2017
Page No : 2

	From North					Graves Mill From East					Millrace From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	0	0	0	0	0	131	11	0	142	2	0	1	0	3	9	269	0	0	278	423
07:30 AM	0	0	0	0	0	0	178	19	0	197	3	0	**5**	0	**8**	13	**355**	0	0	**368**	**573**
07:45 AM	0	0	0	0	0	0	**212**	**20**	0	**232**	**4**	0	3	0	7	**20**	286	0	0	306	545
08:00 AM	0	0	0	0	0	0	163	20	0	183	2	0	3	0	5	14	214	0	0	228	416
Total Volume	0	0	0	0	0	0	684	70	0	754	11	0	12	0	23	56	1124	0	0	1180	1957
% App. Total	0	0	0	0		0	90.7	9.3	0		47.8	0	52.2	0		4.7	95.3	0	0		
PHF	.000	.000	.000	.000	.000	.000	.807	.875	.000	.813	.688	.000	.600	.000	.719	.700	.792	.000	.000	.802	.854
Passenger Veh	0	0	0	0	0	0	676	69	0	745	10	0	12	0	22	56	1116	0	0	1172	1939
% Passenger Veh	0	0	0	0	0	0	98.8	98.6	0	98.8	90.9	0	100	0	95.7	100	99.3	0	0	99.3	99.1
Trucks	0	0	0	0	0	0	8	1	0	9	1	0	0	0	1	0	8	0	0	8	18
% Trucks	0	0	0	0	0	0	1.2	1.4	0	1.2	9.1	0	0	0	4.3	0	0.7	0	0	0.7	0.9

Data Collection Group
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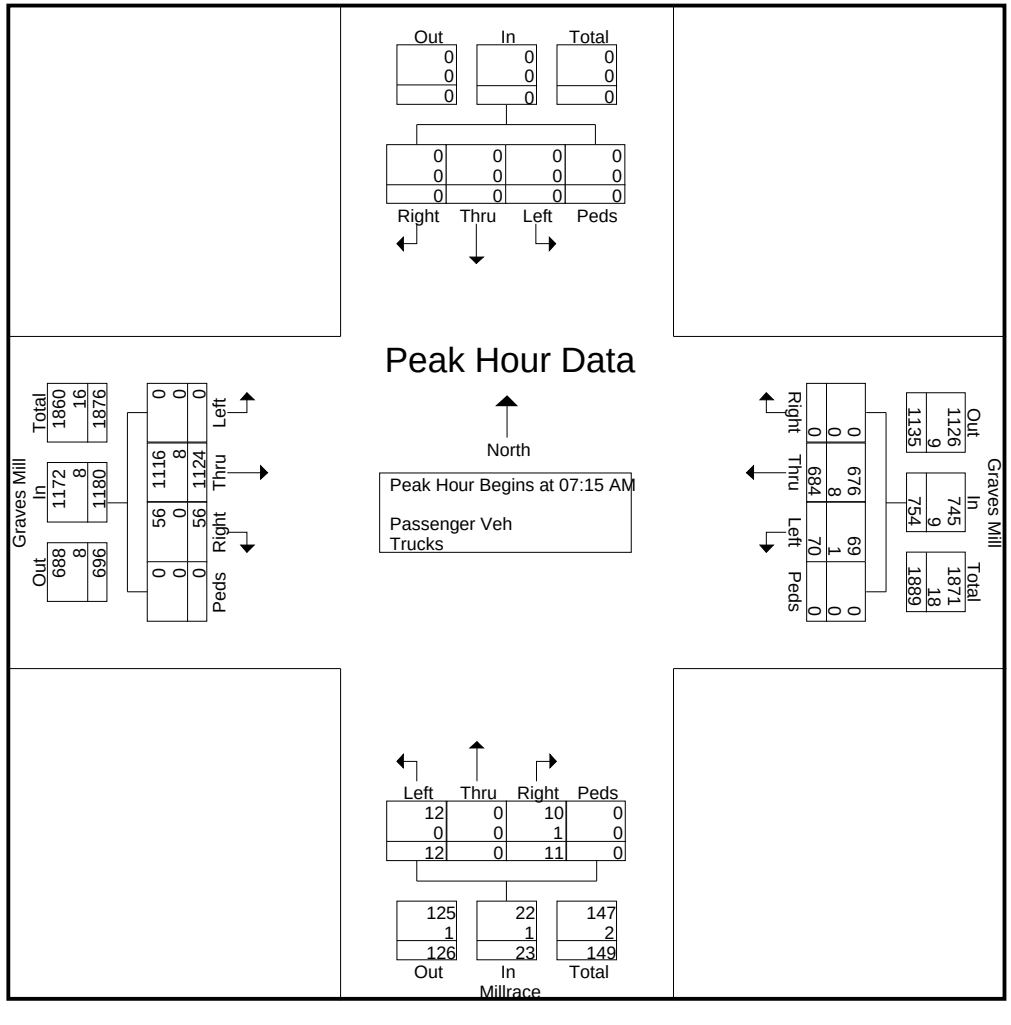
File Name : Graves Mill and Millrace
Site Code : 34444444
Start Date : 9/6/2017
Page No : 3



Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and Millrace
Site Code : 34444444
Start Date : 9/6/2017
Page No : 4

	From North					Graves Mill From East					Millrace From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	0	0	0	0	0	245	4	0	249	17	0	18	0	35	**7**	208	0	0	215	499
05:00 PM	0	0	0	0	0	0	**254**	8	0	**262**	44	0	20	0	64	2	**239**	0	0	**241**	**567**
05:15 PM	0	0	0	0	0	0	241	**9**	0	250	40	0	14	0	54	4	217	0	0	221	525
05:30 PM	0	0	0	0	0	0	210	7	0	217	**77**	0	**26**	0	**103**	1	182	0	0	183	503
Total Volume	0	0	0	0	0	0	950	28	0	978	178	0	78	0	256	14	846	0	0	860	2094
% App. Total	0	0	0	0		0	97.1	2.9	0		69.5	0	30.5	0		1.6	98.4	0	0		
PHF	.000	.000	.000	.000	.000	.000	.935	.778	.000	.933	.578	.000	.750	.000	.621	.500	.885	.000	.000	.892	.923
Passenger Veh	0	0	0	0	0	0	948	28	0	976	175	0	77	0	252	14	840	0	0	854	2082
% Passenger Veh	0	0	0	0	0	0	99.8	100	0	99.8	98.3	0	98.7	0	98.4	100	99.3	0	0	99.3	99.4
Trucks	0	0	0	0	0	0	2	0	0	2	3	0	1	0	4	0	6	0	0	6	12
% Trucks	0	0	0	0	0	0	0.2	0	0	0.2	1.7	0	1.3	0	1.6	0	0.7	0	0	0.7	0.6

Data Collection Group
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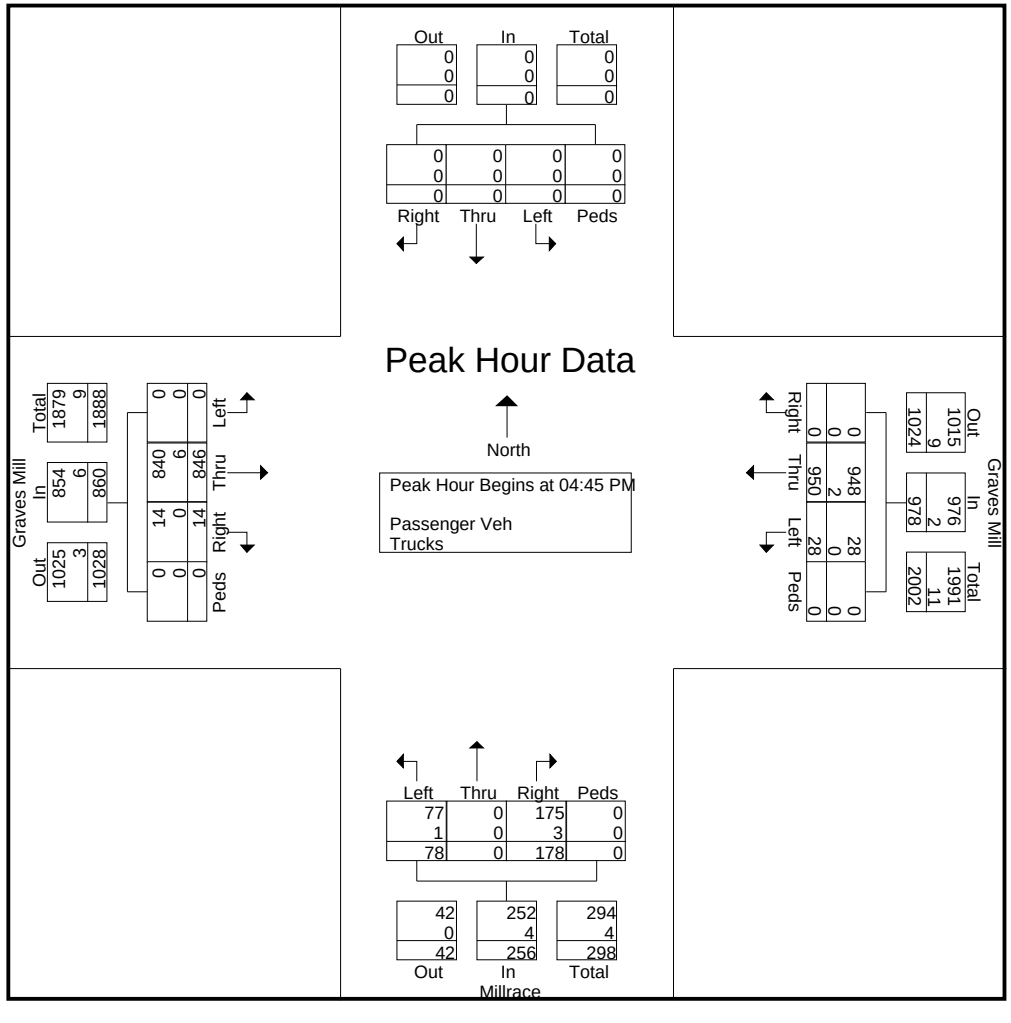
File Name : Graves Mill and Millrace
Site Code : 34444444
Start Date : 9/6/2017
Page No : 5



Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and Old Graves Mill
Site Code : 35555555
Start Date : 9/6/2017
Page No : 1

Groups Printed- Passenger Veh - Trucks

	Driveway From North					Graves Mill From East					Old Graves Mill From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	106	8	0	114	9	0	25	0	34	14	197	0	0	211	359
07:15 AM	0	0	0	0	0	0	136	13	0	149	7	0	24	0	31	31	229	0	0	260	440
07:30 AM	0	0	0	0	0	0	169	24	0	193	13	0	34	0	47	25	299	0	0	324	564
07:45 AM	0	0	0	0	0	0	185	30	0	215	15	0	37	0	52	45	254	0	0	299	566
Total	0	0	0	0	0	0	596	75	0	671	44	0	120	0	164	115	979	0	0	1094	1929
08:00 AM	0	0	0	0	0	0	165	17	0	182	12	0	18	0	30	37	194	0	0	231	443
08:15 AM	0	0	0	0	0	0	171	28	0	199	9	0	43	0	52	27	174	0	0	201	452
08:30 AM	0	0	0	0	0	0	155	12	0	167	19	0	23	0	42	25	182	0	0	207	416
08:45 AM	0	0	0	0	0	0	126	19	0	145	15	0	29	0	44	30	221	0	0	251	440
Total	0	0	0	0	0	0	617	76	0	693	55	0	113	0	168	119	771	0	0	890	1751
*** BREAK ***																					
04:00 PM	0	0	0	0	0	0	160	28	0	188	6	0	31	0	37	42	205	0	0	247	472
04:15 PM	0	0	0	0	0	0	189	38	0	227	8	1	24	0	33	42	171	0	0	213	473
04:30 PM	1	0	1	0	2	0	199	37	0	236	6	0	25	0	31	41	183	0	0	224	493
04:45 PM	2	1	0	0	3	0	215	48	0	263	15	0	29	0	44	34	203	0	0	237	547
Total	3	1	1	0	5	0	763	151	0	914	35	1	109	0	145	159	762	0	0	921	1985
05:00 PM	0	0	0	0	0	0	231	78	0	309	14	0	26	0	40	57	244	1	0	302	651
05:15 PM	0	0	0	0	0	0	209	74	0	283	10	0	39	0	49	54	233	0	0	287	619
05:30 PM	0	0	0	0	0	0	175	55	0	230	11	0	23	0	34	51	241	0	0	292	556
05:45 PM	0	0	0	0	0	0	167	29	0	196	6	0	33	0	39	34	158	0	0	192	427
Total	0	0	0	0	0	0	782	236	0	1018	41	0	121	0	162	196	876	1	0	1073	2253
Grand Total	3	1	1	0	5	0	2758	538	0	3296	175	1	463	0	639	589	3388	1	0	3978	7918
Apprch %	60	20	20	0		0	83.7	16.3	0		27.4	0.2	72.5	0		14.8	85.2	0	0		
Total %	0	0	0	0	0.1	0	34.8	6.8	0	41.6	2.2	0	5.8	0	8.1	7.4	42.8	0	0	50.2	
Passenger Veh	3	1	1	0	5	0	2739	519	0	3258	168	1	455	0	624	578	3359	1	0	3938	7825
% Passenger Veh	100	100	100	0	100	0	99.3	96.5	0	98.8	96	100	98.3	0	97.7	98.1	99.1	100	0	99	98.8
Trucks	0	0	0	0	0	0	19	19	0	38	7	0	8	0	15	11	29	0	0	40	93
% Trucks	0	0	0	0	0	0	0.7	3.5	0	1.2	4	0	1.7	0	2.3	1.9	0.9	0	0	1	1.2

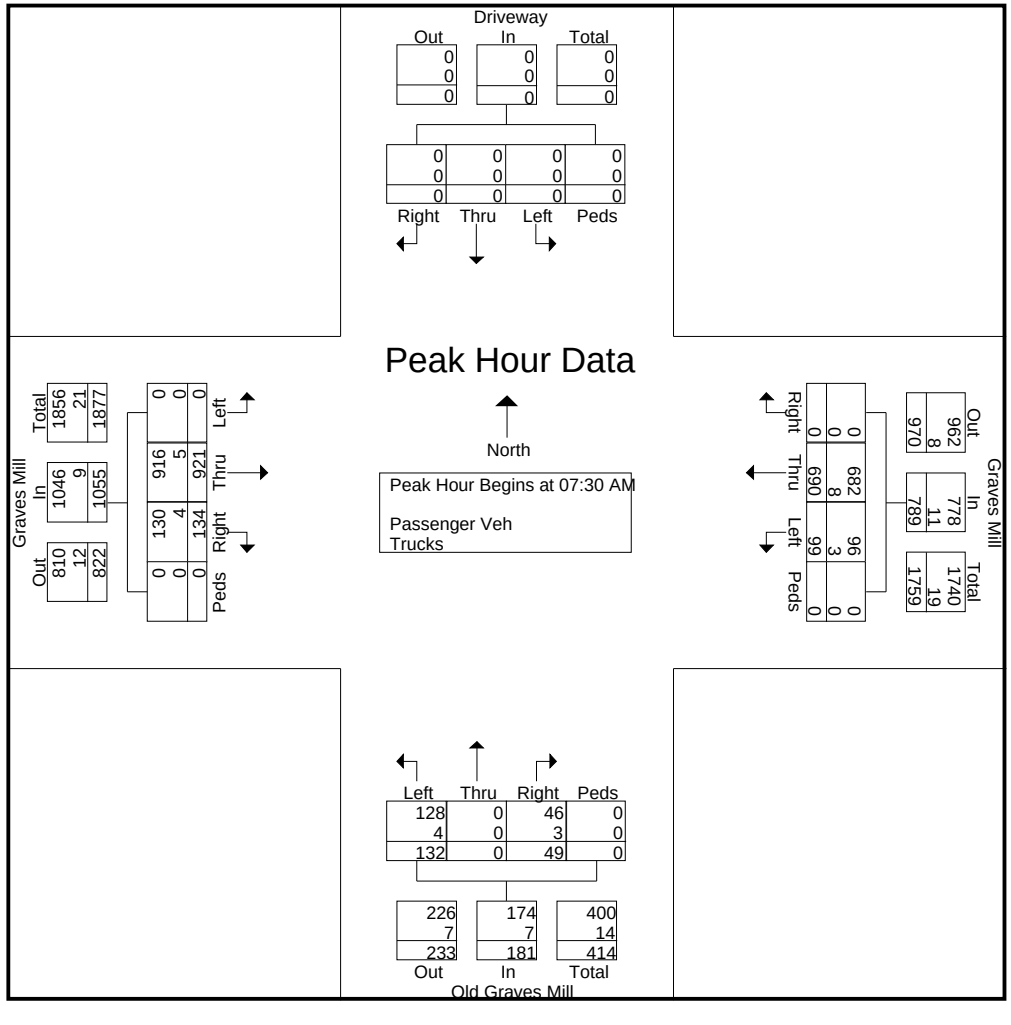
Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and Old Graves Mill
Site Code : 35555555
Start Date : 9/6/2017
Page No : 2

	Driveway From North					Graves Mill From East					Old Graves Mill From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	0	169	24	0	193	13	0	34	0	47	25	**299**	0	0	**324**	564
07:45 AM	0	0	0	0	0	0	**185**	**30**	0	**215**	**15**	0	37	0	**52**	**45**	254	0	0	299	**566**
08:00 AM	0	0	0	0	0	0	165	17	0	182	12	0	18	0	30	37	194	0	0	231	443
08:15 AM	0	0	0	0	0	0	171	28	0	199	9	0	**43**	0	52	27	174	0	0	201	452
Total Volume	0	0	0	0	0	0	690	99	0	789	49	0	132	0	181	134	921	0	0	1055	2025
% App. Total	0	0	0	0		0	87.5	12.5	0		27.1	0	72.9	0		12.7	87.3	0	0		
PHF	.000	.000	.000	.000	.000	.000	.932	.825	.000	.917	.817	.000	.767	.000	.870	.744	.770	.000	.000	.814	.894
Passenger Veh	0	0	0	0	0	0	682	96	0	778	46	0	128	0	174	130	916	0	0	1046	1998
% Passenger Veh	0	0	0	0	0	0	98.8	97.0	0	98.6	93.9	0	97.0	0	96.1	97.0	99.5	0	0	99.1	98.7
Trucks	0	0	0	0	0	0	8	3	0	11	3	0	4	0	7	4	5	0	0	9	27
% Trucks	0	0	0	0	0	0	1.2	3.0	0	1.4	6.1	0	3.0	0	3.9	3.0	0.5	0	0	0.9	1.3

Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and Old Graves Mill
Site Code : 35555555
Start Date : 9/6/2017
Page No : 3



Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and Old Graves Mill
Site Code : 35555555
Start Date : 9/6/2017
Page No : 4

	Driveway From North					Graves Mill From East					Old Graves Mill From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	**2**	**1**	0	0	**3**	0	215	48	0	263	**15**	0	29	0	44	34	203	0	0	237	547
05:00 PM	0	0	0	0	0	0	**231**	**78**	0	**309**	14	0	26	0	40	**57**	**244**	**1**	0	**302**	**651**
05:15 PM	0	0	0	0	0	0	209	74	0	283	10	0	**39**	0	**49**	54	233	0	0	287	619
05:30 PM	0	0	0	0	0	0	175	55	0	230	11	0	23	0	34	51	241	0	0	292	556
Total Volume	2	1	0	0	3	0	830	255	0	1085	50	0	117	0	167	196	921	1	0	1118	2373
% App. Total	66.7	33.3	0	0		0	76.5	23.5	0		29.9	0	70.1	0		17.5	82.4	0.1	0		
PHF	.250	.250	.000	.000	.250	.000	.898	.817	.000	.878	.833	.000	.750	.000	.852	.860	.944	.250	.000	.925	.911
Passenger Veh	2	1	0	0	3	0	828	250	0	1078	49	0	115	0	164	195	912	1	0	1108	2353
% Passenger Veh	100	100	0	0	100	0	99.8	98.0	0	99.4	98.0	0	98.3	0	98.2	99.5	99.0	100	0	99.1	99.2
Trucks	0	0	0	0	0	0	2	5	0	7	1	0	2	0	3	1	9	0	0	10	20
% Trucks	0	0	0	0	0	0	0.2	2.0	0	0.6	2.0	0	1.7	0	1.8	0.5	1.0	0	0	0.9	0.8

Data Collection Group
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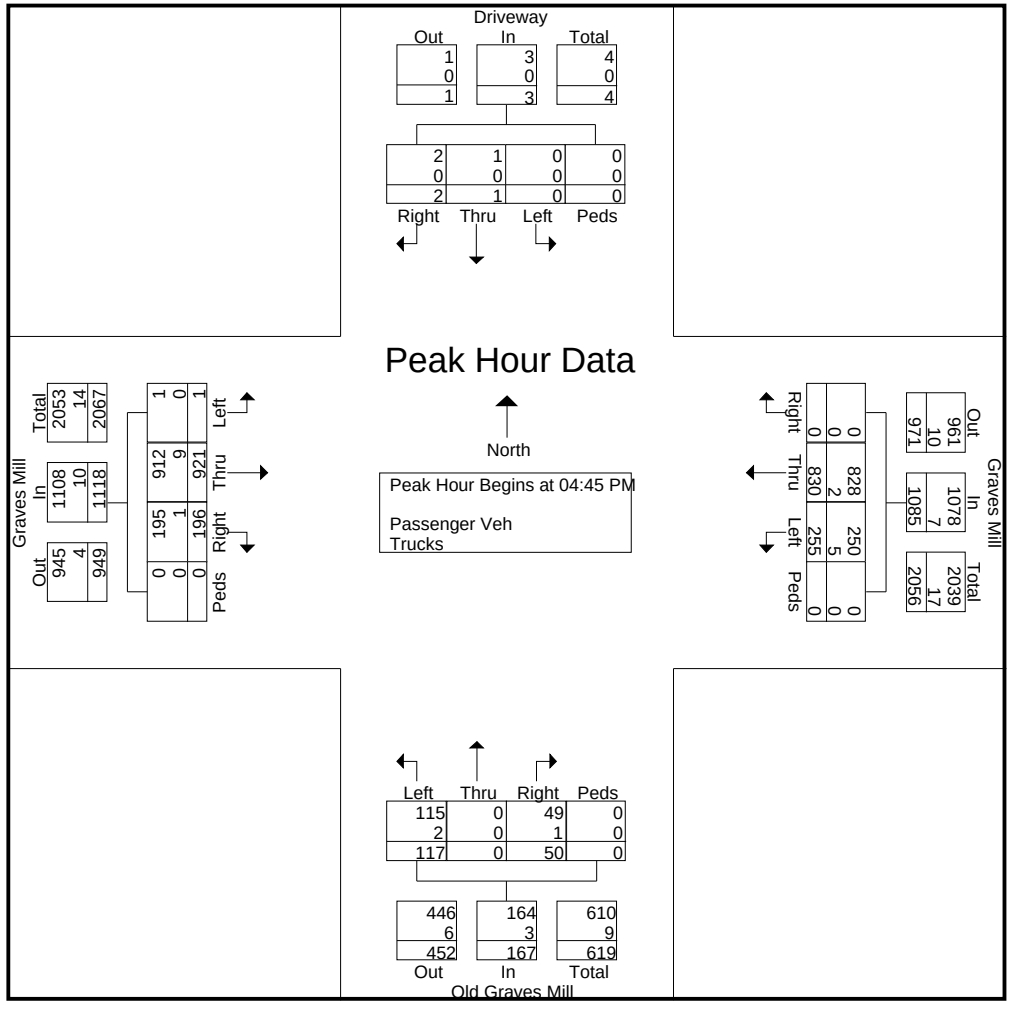
File Name : Graves Mill and Old Graves Mill
Site Code : 35555555
Start Date : 9/6/2017
Page No : 5



Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and Creekside
Site Code : 00033396
Start Date : 9/6/2017
Page No : 1

Groups Printed- Passenger Veh - Trucks

	Creekside From North					Graves Mill From East					Old Graves Mill From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	2	6	0	8	4	113	40	0	157	45	2	1	0	48	4	201	1	0	206	419
07:15 AM	1	1	6	0	8	9	140	35	0	184	67	3	5	0	75	2	209	5	0	216	483
07:30 AM	4	2	7	0	13	9	199	55	0	263	92	2	1	0	95	0	301	4	0	305	676
07:45 AM	8	2	6	0	16	30	190	62	0	282	124	3	1	0	128	3	285	7	0	295	721
Total	13	7	25	0	45	52	642	192	0	886	328	10	8	0	346	9	996	17	0	1022	2299
08:00 AM	2	4	12	0	18	18	175	64	0	257	72	2	3	0	77	4	185	9	0	198	550
08:15 AM	3	1	11	0	15	20	186	65	0	271	78	6	2	0	86	3	165	11	0	179	551
08:30 AM	6	2	14	0	22	15	156	50	0	221	64	7	5	0	76	3	185	3	0	191	510
08:45 AM	5	0	20	0	25	26	130	47	0	203	66	4	7	0	77	6	215	7	0	228	533
Total	16	7	57	0	80	79	647	226	0	952	280	19	17	0	316	16	750	30	0	796	2144
*** BREAK ***																					
04:00 PM	15	5	26	0	46	23	158	42	0	223	58	4	12	0	74	2	188	12	0	202	545
04:15 PM	10	7	28	0	45	25	219	56	0	300	64	4	2	0	70	3	164	12	0	179	594
04:30 PM	8	6	19	0	33	25	201	45	0	271	60	4	15	0	79	1	172	7	0	180	563
04:45 PM	11	5	24	0	40	25	258	48	0	331	90	5	5	0	100	2	204	11	0	217	688
Total	44	23	97	0	164	98	836	191	0	1125	272	17	34	0	323	8	728	42	0	778	2390
05:00 PM	12	0	34	0	46	24	270	43	0	337	87	8	19	0	114	1	216	9	0	226	723
05:15 PM	5	6	16	0	27	37	258	65	0	360	88	3	8	0	99	1	237	8	0	246	732
05:30 PM	7	4	20	0	31	24	205	47	0	276	74	5	13	0	92	1	214	11	0	226	625
05:45 PM	8	9	27	0	44	25	185	48	0	258	57	1	5	0	63	0	162	9	0	171	536
Total	32	19	97	0	148	110	918	203	0	1231	306	17	45	0	368	3	829	37	0	869	2616
Grand Total	105	56	276	0	437	339	3043	812	0	4194	1186	63	104	0	1353	36	3303	126	0	3465	9449
Apprch %	24	12.8	63.2	0		8.1	72.6	19.4	0		87.7	4.7	7.7	0		1	95.3	3.6	0		
Total %	1.1	0.6	2.9	0	4.6	3.6	32.2	8.6	0	44.4	12.6	0.7	1.1	0	14.3	0.4	35	1.3	0	36.7	
Passenger Veh	99	54	272	0	425	330	2994	783	0	4107	1150	59	98	0	1307	29	3244	124	0	3397	9236
% Passenger Veh	94.3	96.4	98.6	0	97.3	97.3	98.4	96.4	0	97.9	97	93.7	94.2	0	96.6	80.6	98.2	98.4	0	98	97.7
Trucks	6	2	4	0	12	9	49	29	0	87	36	4	6	0	46	7	59	2	0	68	213
% Trucks	5.7	3.6	1.4	0	2.7	2.7	1.6	3.6	0	2.1	3	6.3	5.8	0	3.4	19.4	1.8	1.6	0	2	2.3

Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and Creekside
Site Code : 00033396
Start Date : 9/6/2017
Page No : 2

	Creekside From North					Graves Mill From East					Old Graves Mill From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	4	2	7	0	13	9	**199**	55	0	263	92	2	1	0	95	0	**301**	4	0	**305**	676
07:45 AM	**8**	2	6	0	16	**30**	190	62	0	**282**	**124**	3	1	0	**128**	3	285	7	0	295	**721**
08:00 AM	2	**4**	**12**	0	**18**	18	175	64	0	257	72	2	**3**	0	77	**4**	185	9	0	198	550
08:15 AM	3	1	11	0	15	20	186	**65**	0	271	78	**6**	2	0	86	3	165	**11**	0	179	551
Total Volume	17	9	36	0	62	77	750	246	0	1073	366	13	7	0	386	10	936	31	0	977	2498
% App. Total	27.4	14.5	58.1	0		7.2	69.9	22.9	0		94.8	3.4	1.8	0		1	95.8	3.2	0		
PHF	.531	.563	.750	.000	.861	.642	.942	.946	.000	.951	.738	.542	.583	.000	.754	.625	.777	.705	.000	.801	.866
Passenger Veh	16	9	34	0	59	73	736	240	0	1049	351	13	7	0	371	9	923	29	0	961	2440
% Passenger Veh	94.1	100	94.4	0	95.2	94.8	98.1	97.6	0	97.8	95.9	100	100	0	96.1	90.0	98.6	93.5	0	98.4	97.7
Trucks	1	0	2	0	3	4	14	6	0	24	15	0	0	0	15	1	13	2	0	16	58
% Trucks	5.9	0	5.6	0	4.8	5.2	1.9	2.4	0	2.2	4.1	0	0	0	3.9	10.0	1.4	6.5	0	1.6	2.3

Data Collection Group
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Data Collection Group
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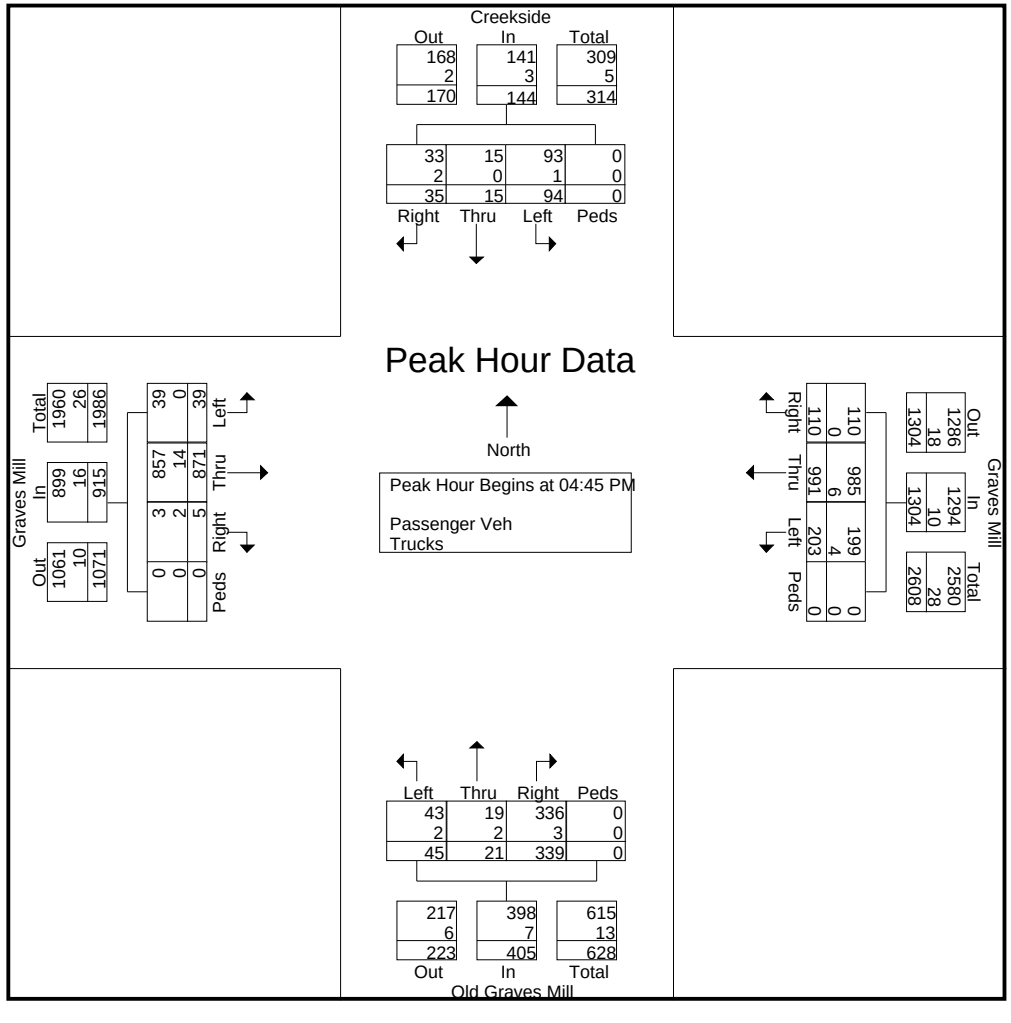
File Name : Graves Mill and Creekside
Site Code : 00033396
Start Date : 9/6/2017
Page No : 4

	Creekside From North					Graves Mill From East					Old Graves Mill From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	11	5	24	0	40	25	258	48	0	331	**90**	5	5	0	100	**2**	204	**11**	0	217	688
05:00 PM	**12**	0	**34**	0	**46**	24	**270**	43	0	337	87	**8**	**19**	0	**114**	1	216	9	0	226	723
05:15 PM	5	**6**	16	0	27	**37**	258	**65**	0	**360**	88	3	8	0	99	1	**237**	8	0	**246**	**732**
05:30 PM	7	4	20	0	31	24	205	47	0	276	74	5	13	0	92	1	214	11	0	226	625
Total Volume	35	15	94	0	144	110	991	203	0	1304	339	21	45	0	405	5	871	39	0	915	2768
% App. Total	24.3	10.4	65.3	0		8.4	76	15.6	0		83.7	5.2	11.1	0		0.5	95.2	4.3	0		
PHF	.729	.625	.691	.000	.783	.743	.918	.781	.000	.906	.942	.656	.592	.000	.888	.625	.919	.886	.000	.930	.945
Passenger Veh	33	15	93	0	141	110	985	199	0	1294	336	19	43	0	398	3	857	39	0	899	2732
% Passenger Veh	94.3	100	98.9	0	97.9	100	99.4	98.0	0	99.2	99.1	90.5	95.6	0	98.3	60.0	98.4	100	0	98.3	98.7
Trucks	2	0	1	0	3	0	6	4	0	10	3	2	2	0	7	2	14	0	0	16	36
% Trucks	5.7	0	1.1	0	2.1	0	0.6	2.0	0	0.8	0.9	9.5	4.4	0	1.7	40.0	1.6	0	0	1.7	1.3

Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and Creekside
Site Code : 00033396
Start Date : 9/6/2017
Page No : 5



Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and W Side of Expressway Ramps
Site Code : 00000223
Start Date : 9/6/2017
Page No : 1

Groups Printed- Passenger Veh - Trucks

	Expressway Off Ramp From North					Graves Mill From East					Expressway On Ramp From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	25	0	13	0	38	0	133	15	0	148	0	0	0	0	0	200	53	0	0	253	439
07:15 AM	40	0	20	0	60	0	144	22	0	166	0	0	0	0	0	209	73	0	0	282	508
07:30 AM	57	0	25	0	82	0	206	39	0	245	0	0	0	0	0	281	119	0	0	400	727
07:45 AM	49	0	51	0	100	0	233	29	0	262	0	0	0	0	0	238	179	0	0	417	779
Total	171	0	109	0	280	0	716	105	0	821	0	0	0	0	0	928	424	0	0	1352	2453
08:00 AM	52	1	31	0	84	0	205	17	0	222	0	0	0	0	0	149	120	0	0	269	575
08:15 AM	49	0	23	0	72	0	222	9	0	231	0	0	0	0	0	152	105	0	0	257	560
08:30 AM	33	0	25	0	58	0	188	26	0	214	0	0	0	0	0	147	116	0	0	263	535
08:45 AM	47	0	40	0	87	0	156	31	0	187	0	0	0	0	0	171	137	0	0	308	582
Total	181	1	119	0	301	0	771	83	0	854	0	0	0	0	0	619	478	0	0	1097	2252
*** BREAK ***																					
04:00 PM	63	0	12	0	75	0	160	33	0	193	0	0	0	0	0	197	79	0	0	276	544
04:15 PM	63	0	7	0	70	0	237	29	0	266	0	0	0	0	0	180	78	0	0	258	594
04:30 PM	53	0	9	0	62	0	218	41	0	259	0	0	0	0	0	192	59	0	0	251	572
04:45 PM	72	2	16	0	90	0	259	43	0	302	0	0	0	0	0	221	98	0	0	319	711
Total	251	2	44	0	297	0	874	146	0	1020	0	0	0	0	0	790	314	0	0	1104	2421
05:00 PM	94	1	11	0	106	0	243	79	0	322	0	0	0	0	0	240	97	0	0	337	765
05:15 PM	112	0	12	0	124	0	248	60	0	308	0	0	0	0	0	248	94	0	0	342	774
05:30 PM	72	0	8	0	80	0	204	31	0	235	0	0	0	0	0	203	105	0	0	308	623
05:45 PM	48	0	6	0	54	0	210	33	0	243	0	0	0	0	0	177	72	0	0	249	546
Total	326	1	37	0	364	0	905	203	0	1108	0	0	0	0	0	868	368	0	0	1236	2708
Grand Total	929	4	309	0	1242	0	3266	537	0	3803	0	0	0	0	0	3205	1584	0	0	4789	9834
Apprch %	74.8	0.3	24.9	0		0	85.9	14.1	0		0	0	0	0		66.9	33.1	0	0		
Total %	9.4	0	3.1	0	12.6	0	33.2	5.5	0	38.7	0	0	0	0	0	32.6	16.1	0	0	48.7	
Passenger Veh	901	4	296	0	1201	0	3206	529	0	3735	0	0	0	0	0	3087	1579	0	0	4666	9602
% Passenger Veh	97	100	95.8	0	96.7	0	98.2	98.5	0	98.2	0	0	0	0	0	96.3	99.7	0	0	97.4	97.6
Trucks	28	0	13	0	41	0	60	8	0	68	0	0	0	0	0	118	5	0	0	123	232
% Trucks	3	0	4.2	0	3.3	0	1.8	1.5	0	1.8	0	0	0	0	0	3.7	0.3	0	0	2.6	2.4

Data Collection Group
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File Name : Graves Mill and W Side of Expressway Ramps
Site Code : 00000223
Start Date : 9/6/2017
Page No : 2

	Expressway Off Ramp From North					Graves Mill From East					Expressway On Ramp From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	**57**	0	25	0	82	0	206	**39**	0	245	0	0	0	0	0	**281**	119	0	0	400	727
07:45 AM	49	0	**51**	0	**100**	0	**233**	29	0	**262**	0	0	0	0	0	238	**179**	0	0	**417**	**779**
08:00 AM	52	**1**	31	0	84	0	205	17	0	222	0	0	0	0	0	149	120	0	0	269	575
08:15 AM	49	0	23	0	72	0	222	9	0	231	0	0	0	0	0	152	105	0	0	257	560
Total Volume	207	1	130	0	338	0	866	94	0	960	0	0	0	0	0	820	523	0	0	1343	2641
% App. Total	61.2	0.3	38.5	0		0	90.2	9.8	0		0	0	0	0		61.1	38.9	0	0		
PHF	.908	.250	.637	.000	.845	.000	.929	.603	.000	.916	.000	.000	.000	.000	.000	.730	.730	.000	.000	.805	.848
Passenger Veh	195	1	125	0	321	0	854	93	0	947	0	0	0	0	0	788	520	0	0	1308	2576
% Passenger Veh	94.2	100	96.2	0	95.0	0	98.6	98.9	0	98.6	0	0	0	0	0	96.1	99.4	0	0	97.4	97.5
Trucks	12	0	5	0	17	0	12	1	0	13	0	0	0	0	0	32	3	0	0	35	65
% Trucks	5.8	0	3.8	0	5.0	0	1.4	1.1	0	1.4	0	0	0	0	0	3.9	0.6	0	0	2.6	2.5

Data Collection Group
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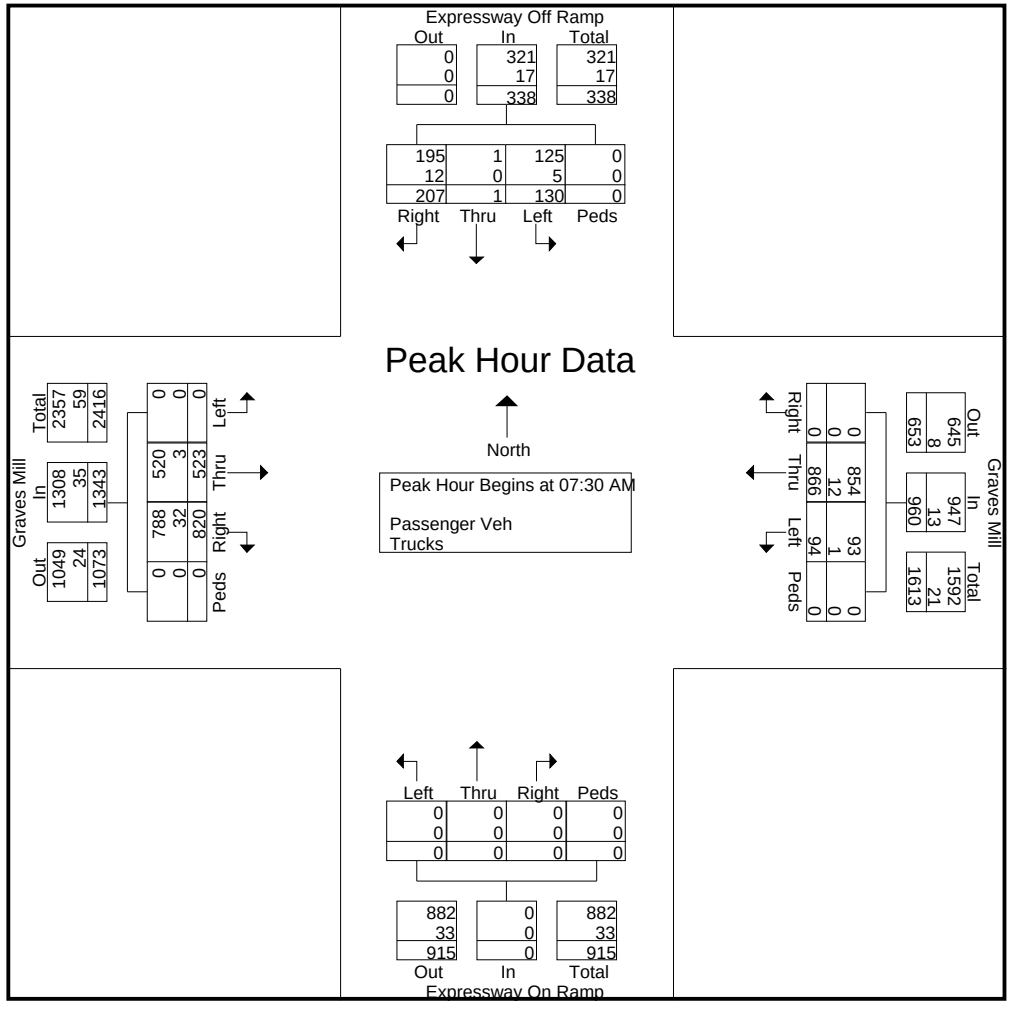
File Name : Graves Mill and W Side of Expressway Ramps
Site Code : 00000223
Start Date : 9/6/2017
Page No : 3



Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and W Side of Expressway Ramps
Site Code : 00000223
Start Date : 9/6/2017
Page No : 4

	Expressway Off Ramp From North					Graves Mill From East					Expressway On Ramp From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	72	**2**	**16**	0	90	0	**259**	43	0	302	0	0	0	0	0	221	98	0	0	319	711
05:00 PM	94	1	11	0	106	0	243	**79**	0	**322**	0	0	0	0	0	240	97	0	0	337	765
05:15 PM	**112**	0	12	0	**124**	0	248	60	0	308	0	0	0	0	0	**248**	94	0	0	**342**	**774**
05:30 PM	72	0	8	0	80	0	204	31	0	235	0	0	0	0	0	203	**105**	0	0	308	623
Total Volume	350	3	47	0	400	0	954	213	0	1167	0	0	0	0	0	912	394	0	0	1306	2873
% App. Total	87.5	0.8	11.8	0		0	81.7	18.3	0		0	0	0	0		69.8	30.2	0	0		
PHF	.781	.375	.734	.000	.806	.000	.921	.674	.000	.906	.000	.000	.000	.000	.000	.919	.938	.000	.000	.955	.928
Passenger Veh	347	3	45	0	395	0	947	211	0	1158	0	0	0	0	0	894	392	0	0	1286	2839
% Passenger Veh	99.1	100	95.7	0	98.8	0	99.3	99.1	0	99.2	0	0	0	0	0	98.0	99.5	0	0	98.5	98.8
Trucks	3	0	2	0	5	0	7	2	0	9	0	0	0	0	0	18	2	0	0	20	34
% Trucks	0.9	0	4.3	0	1.3	0	0.7	0.9	0	0.8	0	0	0	0	0	2.0	0.5	0	0	1.5	1.2

Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and W Side of Expressway Ramps
Site Code : 00000223
Start Date : 9/6/2017

Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Milll and E Side of Expressway Ramps
Site Code : 00006243
Start Date : 9/7/2017
Page No : 1

Groups Printed- Passenger Veh - Trucks

	Lynchburg Expwy On Ramp From North					Graves Mill From East					Lynchburg Expwy Off Ramp From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	5	21	0	0	26	18	0	129	0	147	0	41	48	0	89	262
07:15 AM	0	0	0	0	0	6	29	0	0	35	28	0	153	0	181	0	50	53	0	103	319
07:30 AM	0	0	0	0	0	10	83	0	0	93	42	0	170	0	212	0	86	70	0	156	461
07:45 AM	0	0	0	0	0	16	77	0	0	93	74	0	185	0	259	0	134	72	0	206	558
Total	0	0	0	0	0	37	210	0	0	247	162	0	637	0	799	0	311	243	0	554	1600
08:00 AM	0	0	0	0	0	14	65	0	0	79	38	0	135	0	173	0	96	60	0	156	408
08:15 AM	0	0	0	0	0	13	69	0	0	82	29	0	140	0	169	0	68	69	0	137	388
08:30 AM	0	0	0	0	0	19	66	0	0	85	42	0	143	0	185	0	85	50	0	135	405
08:45 AM	0	0	0	0	0	25	58	0	0	83	56	0	130	0	186	0	97	51	0	148	417
Total	0	0	0	0	0	71	258	0	0	329	165	0	548	0	713	0	346	230	0	576	1618
*** BREAK ***																					
04:00 PM	0	0	0	0	0	29	65	0	0	94	18	1	145	0	164	0	44	43	0	87	345
04:15 PM	0	0	0	0	0	27	91	0	0	118	20	0	171	0	191	0	47	46	0	93	402
04:30 PM	0	0	0	0	0	28	104	0	0	132	17	0	161	0	178	0	37	38	0	75	385
04:45 PM	0	0	0	0	0	34	134	0	0	168	20	0	158	0	178	0	55	52	0	107	453
Total	0	0	0	0	0	118	394	0	0	512	75	1	635	0	711	0	183	179	0	362	1585
05:00 PM	0	0	0	0	0	41	158	0	0	199	14	0	170	0	184	0	58	62	0	120	503
05:15 PM	0	0	0	0	0	27	111	0	0	138	14	1	199	0	214	0	43	77	0	120	472
05:30 PM	0	0	0	0	0	29	72	0	0	101	18	0	158	0	176	0	64	62	0	126	403
05:45 PM	0	0	0	0	0	26	84	0	0	110	13	0	139	0	152	0	34	46	0	80	342
Total	0	0	0	0	0	123	425	0	0	548	59	1	666	0	726	0	199	247	0	446	1720
Grand Total	0	0	0	0	0	349	1287	0	0	1636	461	2	2486	0	2949	0	1039	899	0	1938	6523
Apprch %	0	0	0	0		21.3	78.7	0	0		15.6	0.1	84.3	0		0	53.6	46.4	0		
Total %	0	0	0	0	0	5.4	19.7	0	0	25.1	7.1	0	38.1	0	45.2	0	15.9	13.8	0	29.7	
Passenger Veh	0	0	0	0	0	341	1234	0	0	1575	456	2	2415	0	2873	0	1036	887	0	1923	6371
% Passenger Veh	0	0	0	0	0	97.7	95.9	0	0	96.3	98.9	100	97.1	0	97.4	0	99.7	98.7	0	99.2	97.7
Trucks	0	0	0	0	0	8	53	0	0	61	5	0	71	0	76	0	3	12	0	15	152
% Trucks	0	0	0	0	0	2.3	4.1	0	0	3.7	1.1	0	2.9	0	2.6	0	0.3	1.3	0	0.8	2.3

Data Collection Group
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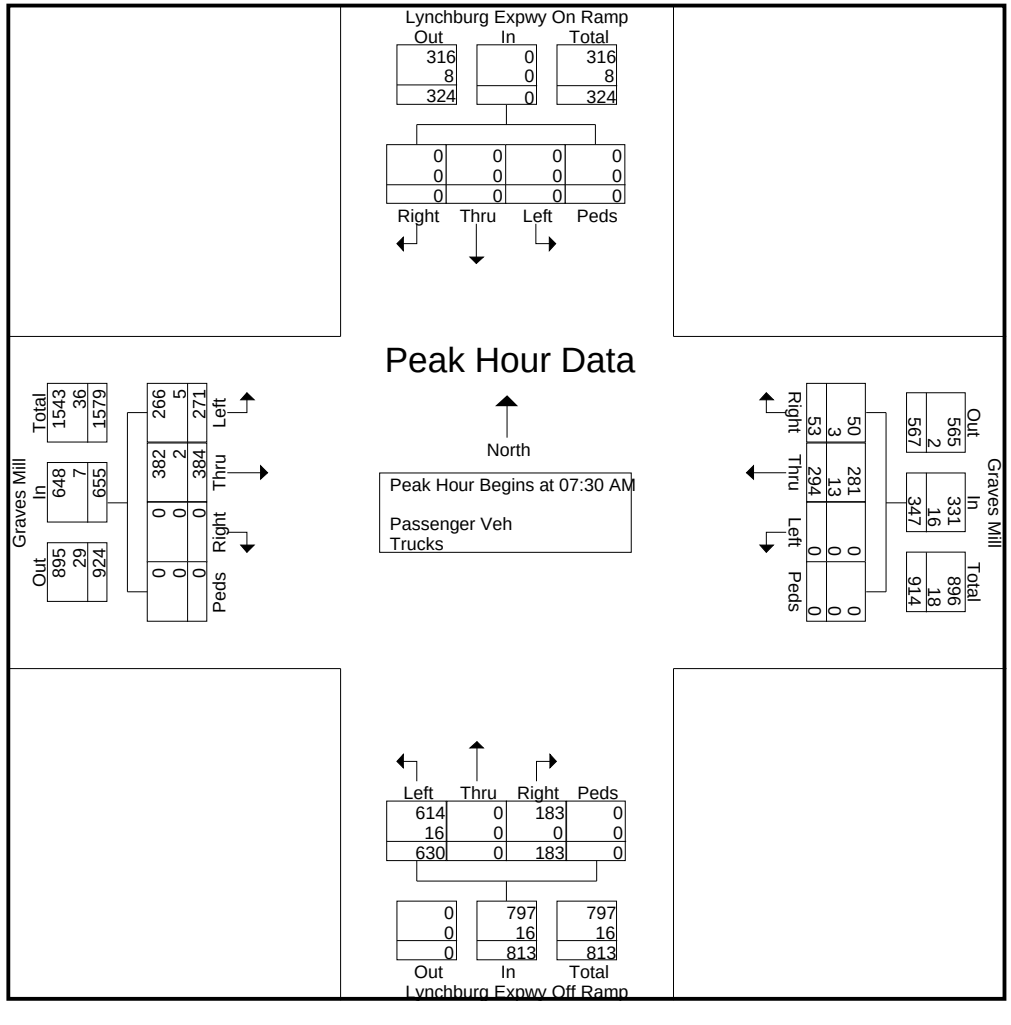
File Name : Graves Milll and E Side of Expressway Ramps
Site Code : 00006243
Start Date : 9/7/2017
Page No : 2

	Lynchburg Expwy On Ramp From North					Graves Mill From East					Lynchburg Expwy Off Ramp From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	10	**83**	0	0	**93**	42	0	170	0	212	0	86	70	0	156	461
07:45 AM	0	0	0	0	0	**16**	77	0	0	93	**74**	0	**185**	0	**259**	0	**134**	**72**	0	**206**	**558**
08:00 AM	0	0	0	0	0	14	65	0	0	79	38	0	135	0	173	0	96	60	0	156	408
08:15 AM	0	0	0	0	0	13	69	0	0	82	29	0	140	0	169	0	68	69	0	137	388
Total Volume	0	0	0	0	0	53	294	0	0	347	183	0	630	0	813	0	384	271	0	655	1815
% App. Total	0	0	0	0		15.3	84.7	0	0		22.5	0	77.5	0		0	58.6	41.4	0		
PHF	.000	.000	.000	.000	.000	.828	.886	.000	.000	.933	.618	.000	.851	.000	.785	.000	.716	.941	.000	.795	.813
Passenger Veh	0	0	0	0	0	50	281	0	0	331	183	0	614	0	797	0	382	266	0	648	1776
% Passenger Veh	0	0	0	0	0	94.3	95.6	0	0	95.4	100	0	97.5	0	98.0	0	99.5	98.2	0	98.9	97.9
Trucks	0	0	0	0	0	3	13	0	0	16	0	0	16	0	16	0	2	5	0	7	39
% Trucks	0	0	0	0	0	5.7	4.4	0	0	4.6	0	0	2.5	0	2.0	0	0.5	1.8	0	1.1	2.1

Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Milll and E Side of Expressway Ramps
Site Code : 00006243
Start Date : 9/7/2017
Page No : 3



Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Milll and E Side of Expressway Ramps
Site Code : 00006243
Start Date : 9/7/2017
Page No : 4

	Lynchburg Expwy On Ramp From North					Graves Mill From East					Lynchburg Expwy Off Ramp From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	0	0	0	0	34	134	0	0	168	**20**	0	158	0	178	0	55	52	0	107	453
05:00 PM	0	0	0	0	0	**41**	**158**	0	0	**199**	14	0	170	0	184	0	58	62	0	120	**503**
05:15 PM	0	0	0	0	0	27	111	0	0	138	14	**1**	**199**	0	**214**	0	43	**77**	0	120	472
05:30 PM	0	0	0	0	0	29	72	0	0	101	18	0	158	0	176	0	**64**	62	0	**126**	403
Total Volume	0	0	0	0	0	131	475	0	0	606	66	1	685	0	752	0	220	253	0	473	1831
% App. Total	0	0	0	0		21.6	78.4	0	0		8.8	0.1	91.1	0		0	46.5	53.5	0		
PHF	.000	.000	.000	.000	.000	.799	.752	.000	.000	.761	.825	.250	.861	.000	.879	.000	.859	.821	.000	.938	.910
Passenger Veh	0	0	0	0	0	130	470	0	0	600	66	1	677	0	744	0	219	251	0	470	1814
% Passenger Veh	0	0	0	0	0	99.2	98.9	0	0	99.0	100	100	98.8	0	98.9	0	99.5	99.2	0	99.4	99.1
Trucks	0	0	0	0	0	1	5	0	0	6	0	0	8	0	8	0	1	2	0	3	17
% Trucks	0	0	0	0	0	0.8	1.1	0	0	1.0	0	0	1.2	0	1.1	0	0.5	0.8	0	0.6	0.9

Data Collection Group
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File Name : Graves Milll and E Side of Expressway Ramps
Site Code : 00006243
Start Date : 9/7/2017
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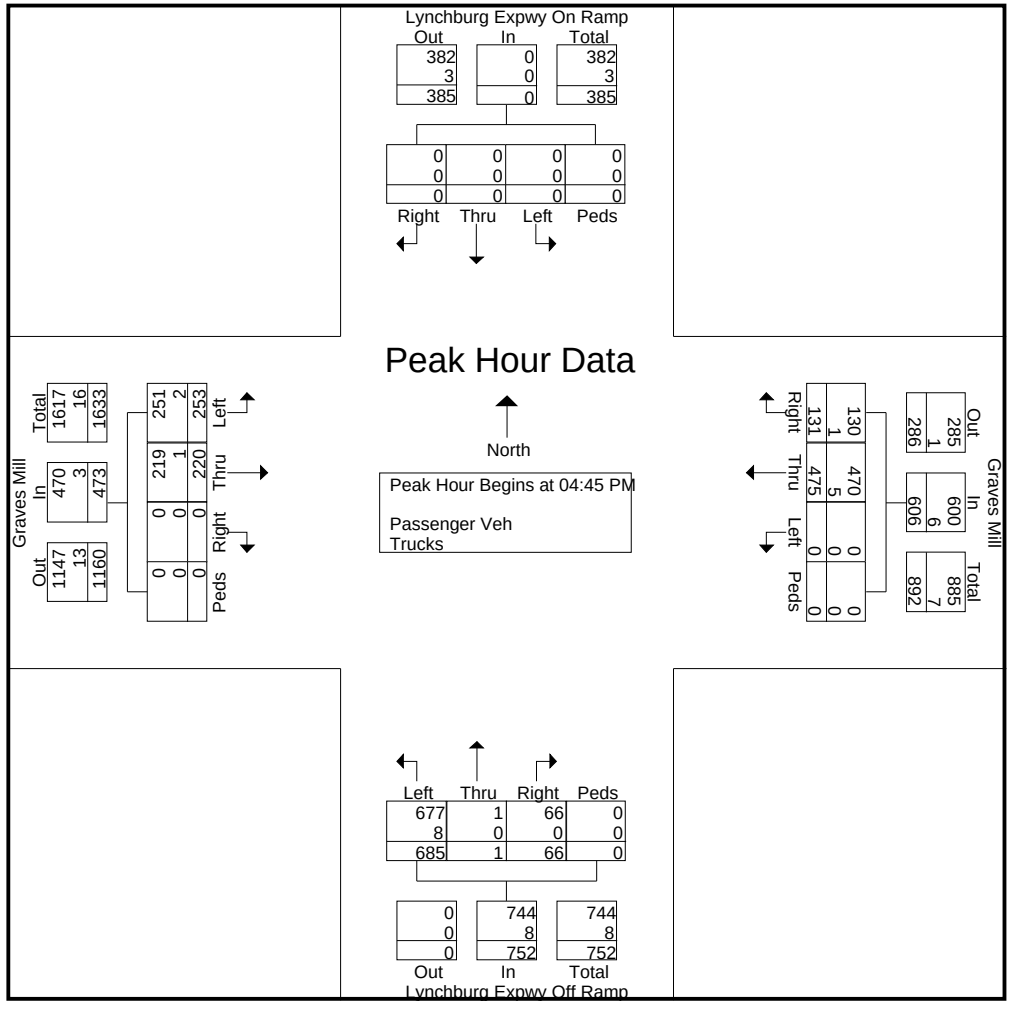


Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and McConville
Site Code : 00101010
Start Date : 9/6/2017
Page No : 1

Groups Printed- Passenger Veh - Trucks

	McConville From North					Nationwide From East					Graves Mill From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	16	6	0	0	22	0	2	0	0	2	4	2	8	0	14	32	27	6	0	65	103
07:15 AM	31	8	1	0	40	0	0	0	0	0	13	3	21	0	37	37	52	7	0	96	173
07:30 AM	49	13	5	0	67	0	6	1	0	7	14	6	36	0	56	51	67	10	0	128	258
07:45 AM	30	8	2	0	40	0	18	1	0	19	30	2	41	0	73	73	114	12	0	199	331
Total	126	35	8	0	169	0	26	2	0	28	61	13	106	0	180	193	260	35	0	488	865
08:00 AM	27	7	1	0	35	1	14	0	0	15	15	5	24	0	44	44	65	6	0	115	209
08:15 AM	10	7	2	0	19	1	18	1	0	20	14	3	29	0	46	38	60	7	0	105	190
08:30 AM	21	6	1	0	28	0	19	2	0	21	7	5	32	0	44	46	62	10	0	118	211
08:45 AM	30	3	0	0	33	0	27	1	0	28	6	4	20	0	30	48	61	16	0	125	216
Total	88	23	4	0	115	2	78	4	0	84	42	17	105	0	164	176	248	39	0	463	826
*** BREAK ***																					
04:00 PM	22	5	0	0	27	0	44	10	0	54	2	16	34	0	52	27	19	21	0	67	200
04:15 PM	26	6	1	0	33	2	57	8	0	67	3	6	30	0	39	33	10	26	0	69	208
04:30 PM	25	5	0	0	30	2	56	5	0	63	4	11	50	0	65	31	10	19	0	60	218
04:45 PM	32	7	0	0	39	1	67	13	0	81	4	12	57	0	73	35	15	28	0	78	271
Total	105	23	1	0	129	5	224	36	0	265	13	45	171	0	229	126	54	94	0	274	897
05:00 PM	29	9	0	0	38	3	92	20	0	115	3	16	82	0	101	53	4	21	0	78	332
05:15 PM	26	3	0	0	29	2	46	6	0	54	2	14	62	0	78	36	1	33	0	70	231
05:30 PM	23	4	1	0	28	2	31	1	0	34	0	10	50	0	60	42	4	32	0	78	200
05:45 PM	17	5	0	0	22	1	26	3	0	30	2	11	49	0	62	16	5	19	0	40	154
Total	95	21	1	0	117	8	195	30	0	233	7	51	243	0	301	147	14	105	0	266	917
Grand Total	414	102	14	0	530	15	523	72	0	610	123	126	625	0	874	642	576	273	0	1491	3505
Apprch %	78.1	19.2	2.6	0		2.5	85.7	11.8	0		14.1	14.4	71.5	0		43.1	38.6	18.3	0		
Total %	11.8	2.9	0.4	0	15.1	0.4	14.9	2.1	0	17.4	3.5	3.6	17.8	0	24.9	18.3	16.4	7.8	0	42.5	
Passenger Veh	413	99	14	0	526	15	515	72	0	602	117	121	616	0	854	621	575	270	0	1466	3448
% Passenger Veh	99.8	97.1	100	0	99.2	100	98.5	100	0	98.7	95.1	96	98.6	0	97.7	96.7	99.8	98.9	0	98.3	98.4
Trucks	1	3	0	0	4	0	8	0	0	8	6	5	9	0	20	21	1	3	0	25	57
% Trucks	0.2	2.9	0	0	0.8	0	1.5	0	0	1.3	4.9	4	1.4	0	2.3	3.3	0.2	1.1	0	1.7	1.6

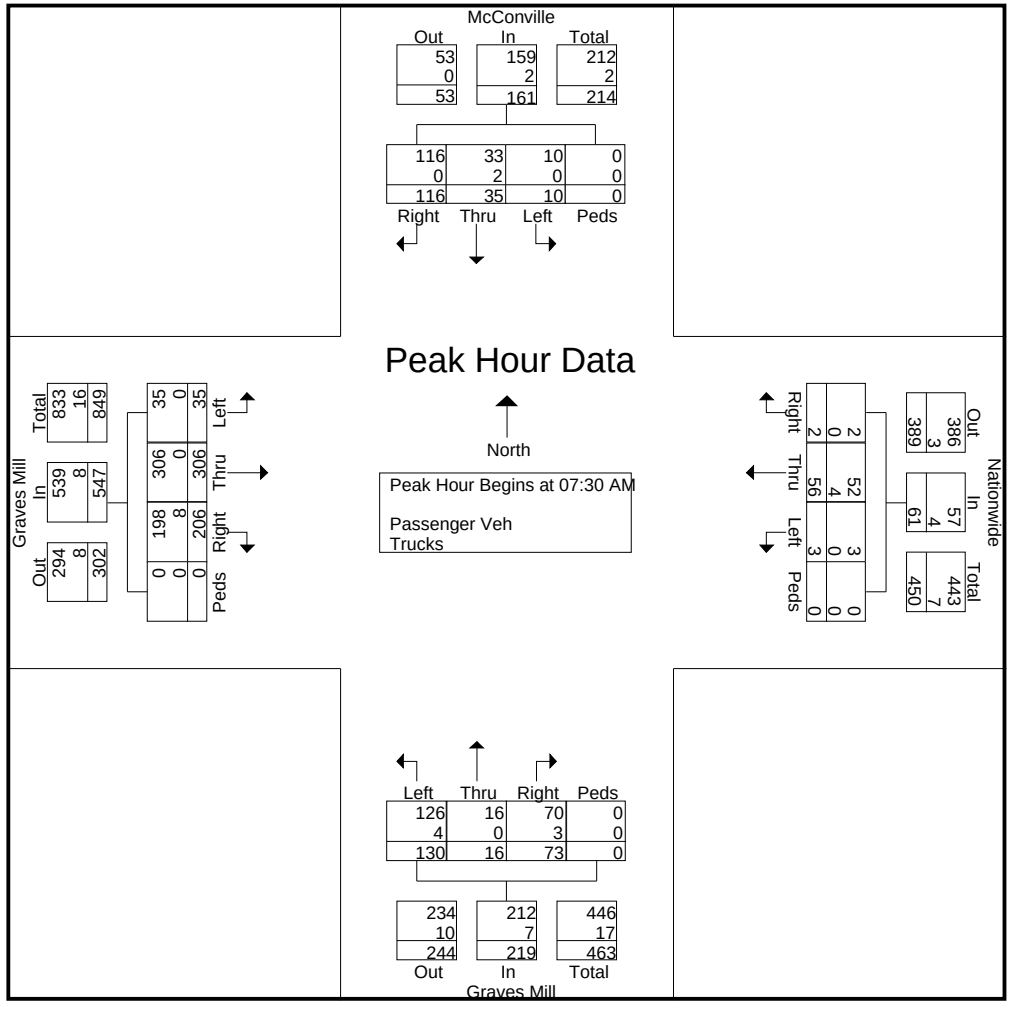
Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and McConville
Site Code : 00101010
Start Date : 9/6/2017
Page No : 2

	McConville From North					Nationwide From East					Graves Mill From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	**49**	**13**	**5**	0	**67**	0	6	**1**	0	7	14	**6**	36	0	56	51	67	10	0	128	258
07:45 AM	30	8	2	0	40	0	**18**	1	0	19	**30**	2	**41**	0	**73**	**73**	**114**	**12**	0	**199**	**331**
08:00 AM	27	7	1	0	35	**1**	14	0	0	15	15	5	24	0	44	44	65	6	0	115	209
08:15 AM	10	7	2	0	19	1	18	1	0	**20**	14	3	29	0	46	38	60	7	0	105	190
Total Volume	116	35	10	0	161	2	56	3	0	61	73	16	130	0	219	206	306	35	0	547	988
% App. Total	72	21.7	6.2	0		3.3	91.8	4.9	0		33.3	7.3	59.4	0		37.7	55.9	6.4	0		
PHF	.592	.673	.500	.000	.601	.500	.778	.750	.000	.763	.608	.667	.793	.000	.750	.705	.671	.729	.000	.687	.746
Passenger Veh	116	33	10	0	159	2	52	3	0	57	70	16	126	0	212	198	306	35	0	539	967
% Passenger Veh	100	94.3	100	0	98.8	100	92.9	100	0	93.4	95.9	100	96.9	0	96.8	96.1	100	100	0	98.5	97.9
Trucks	0	2	0	0	2	0	4	0	0	4	3	0	4	0	7	8	0	0	0	8	21
% Trucks	0	5.7	0	0	1.2	0	7.1	0	0	6.6	4.1	0	3.1	0	3.2	3.9	0	0	0	1.5	2.1

Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and McConville
Site Code : 00101010
Start Date : 9/6/2017
Page No : 3



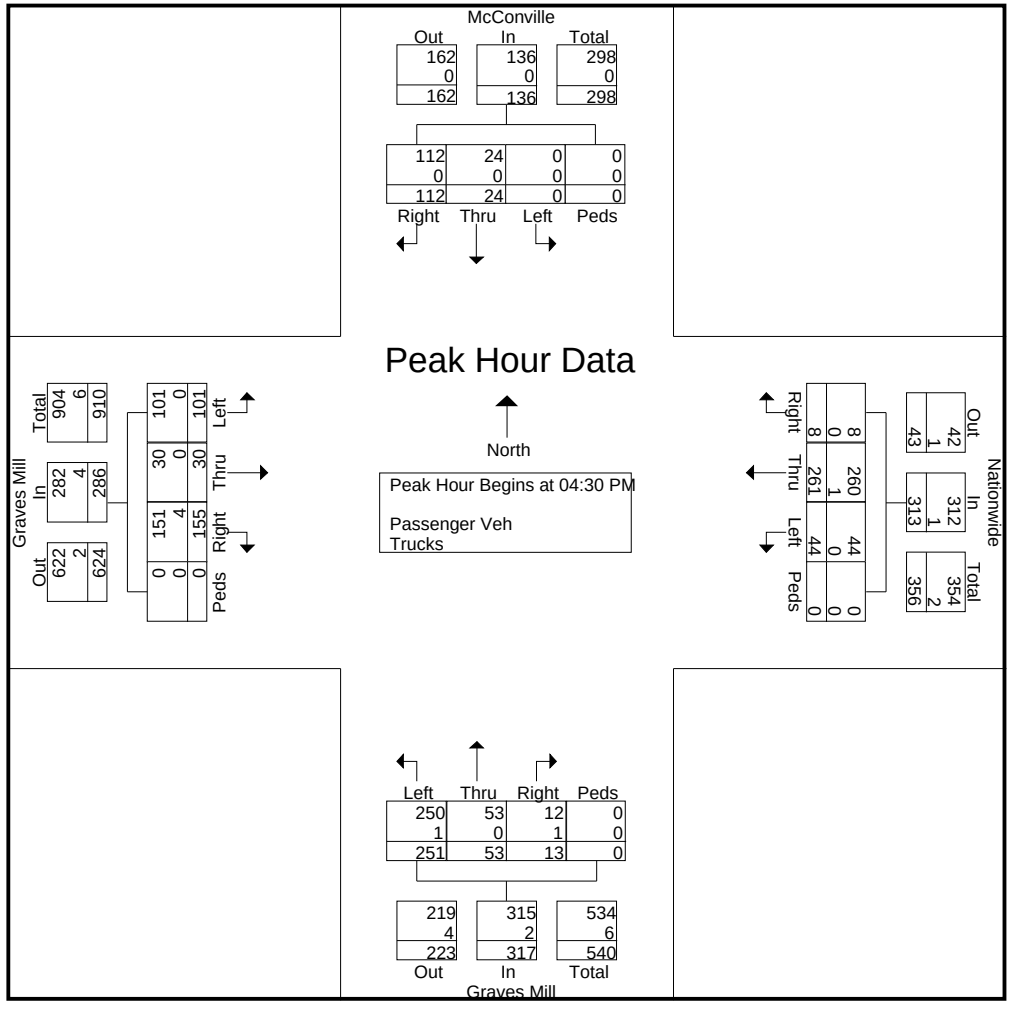
Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and McConville
Site Code : 00101010
Start Date : 9/6/2017
Page No : 4

	McConville From North					Nationwide From East					Graves Mill From South					Graves Mill From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	25	5	0	0	30	2	56	5	0	63	**4**	11	50	0	65	31	10	19	0	60	218
04:45 PM	**32**	7	0	0	**39**	1	67	13	0	81	4	12	57	0	73	35	**15**	28	0	**78**	271
05:00 PM	29	**9**	0	0	38	**3**	**92**	**20**	0	**115**	3	**16**	**82**	0	**101**	**53**	4	21	0	78	**332**
05:15 PM	26	3	0	0	29	2	46	6	0	54	2	14	62	0	78	36	1	**33**	0	70	231
Total Volume	112	24	0	0	136	8	261	44	0	313	13	53	251	0	317	155	30	101	0	286	1052
% App. Total	82.4	17.6	0	0		2.6	83.4	14.1	0		4.1	16.7	79.2	0		54.2	10.5	35.3	0		
PHF	.875	.667	.000	.000	.872	.667	.709	.550	.000	.680	.813	.828	.765	.000	.785	.731	.500	.765	.000	.917	.792
Passenger Veh	112	24	0	0	136	8	260	44	0	312	12	53	250	0	315	151	30	101	0	282	1045
% Passenger Veh	100	100	0	0	100	100	99.6	100	0	99.7	92.3	100	99.6	0	99.4	97.4	100	100	0	98.6	99.3
Trucks	0	0	0	0	0	0	1	0	0	1	1	0	1	0	2	4	0	0	0	4	7
% Trucks	0	0	0	0	0	0	0.4	0	0	0.3	7.7	0	0.4	0	0.6	2.6	0	0	0	1.4	0.7

Data Collection Group
LSmith@DataCollectionGroup.net

File Name : Graves Mill and McConville
Site Code : 00101010
Start Date : 9/6/2017
Page No : 5



Appendix D

Traffic Forecasting Memorandum

EPRPC EPR, P,C. "ENGINEERING & PLANNING RESOURCES"
637 BERKMAR CIRCLE, CHARLOTTESVILLE, VA 22901

MEMORANDUM

TO: W. SCOTT SMITH	FROM: DREW DRAPER, PTP BILL WUENSCH, P.E., PTOE
ORGANIZATION: VIRGINIA'S REGION 2000 LOCAL GOVERNMENT COUNCIL	DATE: OCTOBER 6, 2017
PHONE NUMBER:	SENDER'S REFERENCE NUMBER:
RE: GRAVES MILL ROAD CORRIDOR STUDY – TRAFFIC FORECASTING METHODOLOGY	YOUR REFERENCE NUMBER:

☐ URGENT X FOR YOUR USE ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

The purpose of this memorandum is to summarize the method used to develop traffic projections for the Graves Mill Road Corridor Study in Lynchburg, Virginia. Multiple sources have been reviewed to determine an appropriate growth rate for a 23-year time horizon (2017 to 2040) including:

- Existing traffic demand
- Historical traffic demand
- Land use context (transportation analysis zones)
- Statewide Planning System
- Travel demand projections
- Planned development

The traffic projections methodology will be applied to existing traffic counts to develop traffic volumes for use in the analysis of future conditions for the study corridor. A map of the study area has been provided as an **Attachment**.

Existing (2017) Traffic Demand

A traffic operational assessment is currently being completed for existing conditions and, to date, has identified pockets of congestion that experience high delays for typical weekdays. Due to heavy commuter traffic during the weekday AM and PM peak hours, the heaviest congestion during peak conditions along the corridor is experienced between Old Graves Mill Road and the ramp intersections. Additionally, the westbound approach to Gristmill Road experiences a lot of queuing due to heavy left turn demand and no dedicated turn lane. These results were confirmed with field observations.

As the economy improves and local and regional growth continues to increase, traffic demand will likely grow with it. This growth will exacerbate existing operational and safety issues. Traffic intersection turning movement counts collected during the weekday AM and PM peak hour are included as an **Attachment**.

Historical Traffic Demand

The Virginia Department of Transportation (VDOT) maintains a statewide traffic count database that is updated on an annual basis. Recent average daily traffic (ADT) counts indicate Graves Mill Road west of the interchange serves approximately 22,000 to 27,000 vehicles per day (vpd) in the study area. However, it's important to recognize traffic demand has fluctuated over the last decade, perhaps due to the recent recession. **Table 1** illustrates the trends and annual changes in ADTs on Graves Mill Road over the last decade.

Table 1: Graves Mill Road Traffic Trends

Location	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average Growth Rate
Between Expressway and Old	25,000	26,000	25,000	25,000	24,000	24,000	25,000	25,000	26,000	27,000	
Graves Mill Road		4.0%	-3.8%	0.0%	-4.0%	0.0%	4.2%	0.0%	4.0%	3.8%	0.91%
Between Old Graves Mill	19,000	20,000	19,000	19,000	19,000	19,000	20,000	20,000	21,000	22,000	
Road and City Limits		5.3%	-5.0%	0.0%	0.0%	0.0%	5.3%	0.0%	5.0%	4.8%	1.70%
Combined Locations	44,000	46,000	44,000	44,000	43,000	43,000	45,000	45,000	47,000	49,000	
		4.5%	-4.3%	0.0%	-2.3%	0.0%	4.7%	0.0%	4.4%	4.3%	**1.25%**

Source: VDOT's Count Program, between City Limits and the Expressway.

Considering the economic downturn, the historical trend indicates rather aggressive annual growth. In fact, positive annual changes range from 4% to 5%. When each location is combined, the annual growth rate (linear) equates to 1.25%.

Land Use Context

The abutting land use context is another source to consider when determining an appropriate traffic growth rate. Changes in land use will ultimately impact traffic demand. The adjacent land use along the corridor is fairly undeveloped, but anchored on both ends by extensive commercial, retail and office uses. There are also some industrial and warehouse uses along the south side of the corridor.

Transportation analysis zones (TAZs) are a component of the regional travel demand model. The TAZs provide important land use information on population rates, number of households, and employment statistics for existing (2010), and future (2040). **Table 2** summarizes the six (6) primary TAZs that are adjacent to the corridor.

Table 2: TAZ Summary

Location	Population		Households		Employment		*Population*	*Households*	*Employment*
	2010	2040	2010	2040	2010	2040	*2040 Rate*	*2040 Rate*	*2040 Rate*
E/O the Expressway	695	695	323	323	1,200	1,700	*0.00%*	*0.00%*	*1.39%*
S/O Old Graves and Mcconville	87	82	48	48	215	415	*-0.19%*	*0.00%*	*3.10%*
N/O Expressway and City Limits	1,551	1,669	866	932	1,101	1,301	*0.25%*	*0.25%*	*0.61%*
S/O Old Graves and City Limits	363	775	168	359	1,875	2,025	*3.78%*	*3.79%*	*0.27%*
N/O City Limits and 221	254	245	131	131	367	1,167	*-0.12%*	*0.00%*	*7.27%*
S/O City Limits and 221	177	177	113	113	755	955	*0.00%*	*0.00%*	*0.88%*
Totals	**3,127**	**3,643**	**1,649**	**1,906**	**5,513**	**7,563**	***0.55%***	***0.52%***	***1.24%***

Source: Regional Travel Demand Model

Based on this TAZ data, average growth rates for total population, households, and employment will range from approximately 0.5% annually to 1.24% annually. To note, these figures do not appear to reflect recent planned developments along the corridor. Furthermore, this data is localized and does not consider regional data.

VDOT Statewide Planning System

VDOT's resources for statewide planning include a database of projected traffic volumes for key routes throughout the state. This database, referred to as the Statewide Planning System (SPS), provides guidance to planners relative to using a consistent system for traffic forecasting. The SPS data is generally derived through inspection of historical growth rates, and in areas that utilize a regional travel demand model, the SPS data considers the model output which corresponds to forecasted growth within the model area. Data from SPS for the Graves Mill Road corridor has been summarized in **Table 3**.

Table 3: SPS Summary

Location	ADT			2035 Rate	2040 Rate
	2014	2035	2045		
McConnville to Expressway	8,938	16,418	19,070	3.99%	3.66%
Expressway to Old Graves	25,218	29,263	31,189	0.76%	0.76%
Old Graves to Gristmill	25,218	41,579	48,819	3.09%	3.02%
Gristmill to 221	19,976	25,500	28,130	1.32%	1.32%
Totals	79,350	112,760	127,208	**2.00%**	**1.95%**

Source: VDOT SPS Data

Data on projected population and employment is subsequently converted to vehicle trips and included in the transportation network. The 2014 traffic counts on Graves Mill Road are estimated to increase by nearly 2.0% per year by 2040.

Travel Demand Model Projections

The Central Virginia MPO maintains a regional travel demand model (TDM). A TDM is an analytical tool to support policy decision making and utilizes a traditional four-step trip-based model process consisting of trip generation, trip distribution, mode choice, and trip assignment. The model has a base year of 2007, a 2035 mid-year, and a planning horizon year of 2040. Growth rates are based on interpolation between the base year and 2040. Linear growth rates by segment along Graves Mill Road are summarized in **Table 4**.

Table 4: TDM Summary

Location	ADT		2040 Rate
	2007	2040	
McConville to Expressway	4,315	11,095	4.76%
Expressway to Old Graves	31,418	32,628	0.12%
Old Graves and Commercial Entrance	18,264	28,417	1.68%
Commercial Entrance and Millrace	19,372		1.41%
Millrace and Gristmill	21,277	24,900	0.52%
Gristmill and 221	20,514	24,900	0.65%
Totals	115,160	150,357	**0.93%**

Source: Central Virginia MPO TDM (2040)

The projected annual growth rates along Graves Mill Road range from nearly flat growth (0.12%) to nearly 5%. When averaged by all 2007 and 2040 ADTs, the annual rate is anticipated to be approximately 1% for the corridor.

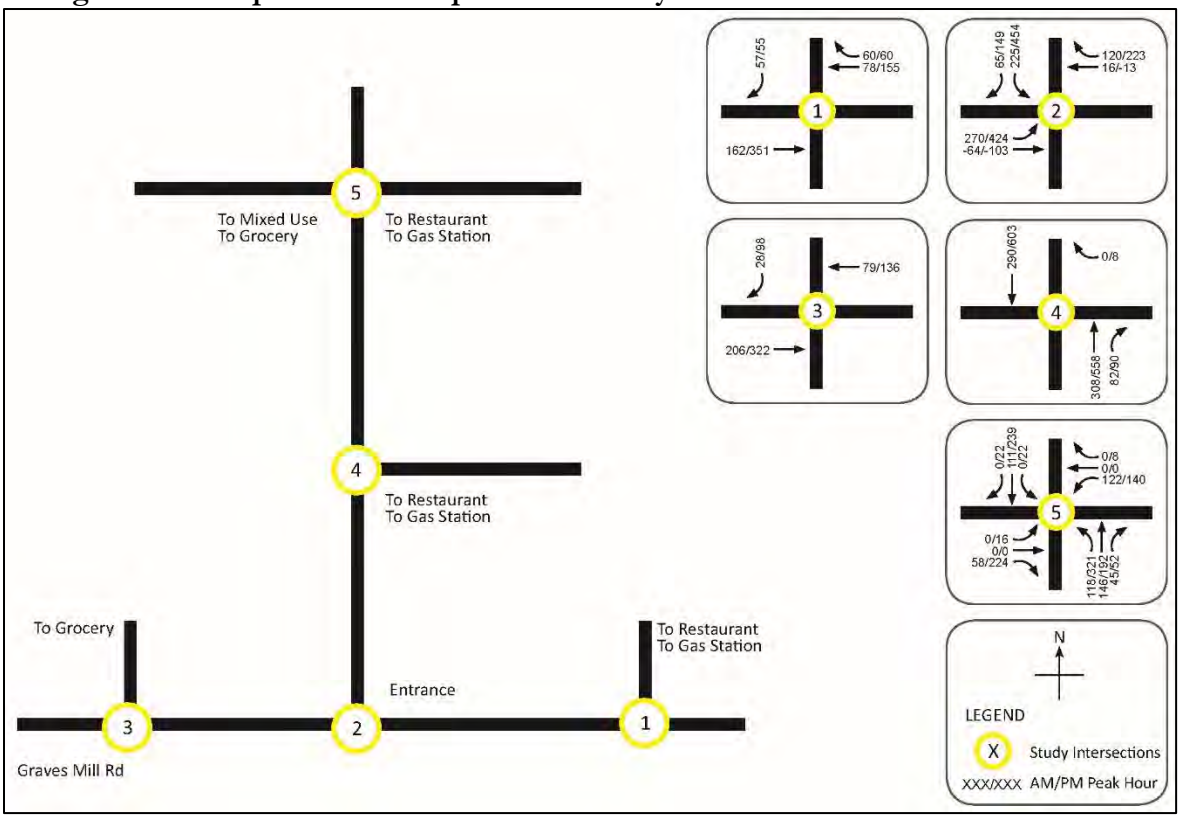
Planned Development

Planned and approved developments adjacent to, or near the corridor should be considered when developing future traffic projects. At times, these developments are not accounted for in regional modeling efforts (i.e. TDM, SPS, TAZ); therefore, may need to be considered independently. There are two (2) developments currently planned along or near the corridor:

Rosedale Farms Development – The proposed development is located just west of the existing Home Depot side off of Graves Mill Road. The proposed site includes three entrance locations on Graves Mill Road – one right in only, one right out only and one full entrance. The site is planned to be constructed in three phases with an ultimate build-out year of 2024. The proposed land uses include a mix of residential, office, retail, grocery, service and restaurant land uses with the potential to generate over 15,000 new daily trips.[1]

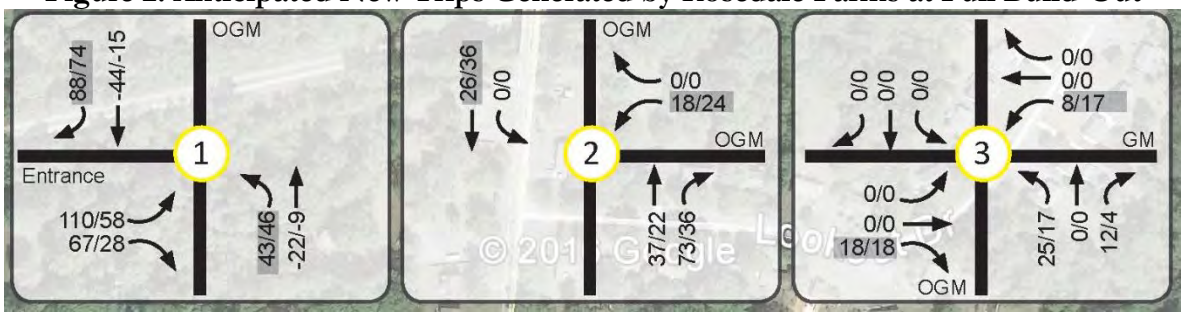
Elements at Old Graves Mill Road – The proposed development is located on Old Graves Mill Road, approximately 500' south of Graves Mill Road. The site will have one entrance to Old Graves Mill Road. The site is currently moving forward with construction and will include a mix of residential and office land uses with the potential to generate over 2,000 new daily trips. While many trips are expected to head south along Old Graves Mill Road, some will travel north to Graves Mill Road to access either Route 501 or Route 221.[2]

Figure 1: Anticipated New Trips Generated by Rosedale Farms at Full Build-Out



[1] Rosedale Farms Traffic Impact Analysis, November 2013 (revised January 2014).
[2] Elements at Old Graves Mill Road Traffic Impact Analysis, June 2016 (supplemental revision August 2016).

Figure 2: Anticipated New Trips Generated by Rosedale Farms at Full Build-Out



OGM: Old Graves Mill Road
GM: Graves Mill Road

Recommendation

The purpose of this memorandum is to summarize the method used to develop traffic projections for the Graves Mill Road Corridor Study. Multiple sources were reviewed to determine an appropriate growth rate for a 23-year time horizon (2017 to 2040). Based on:

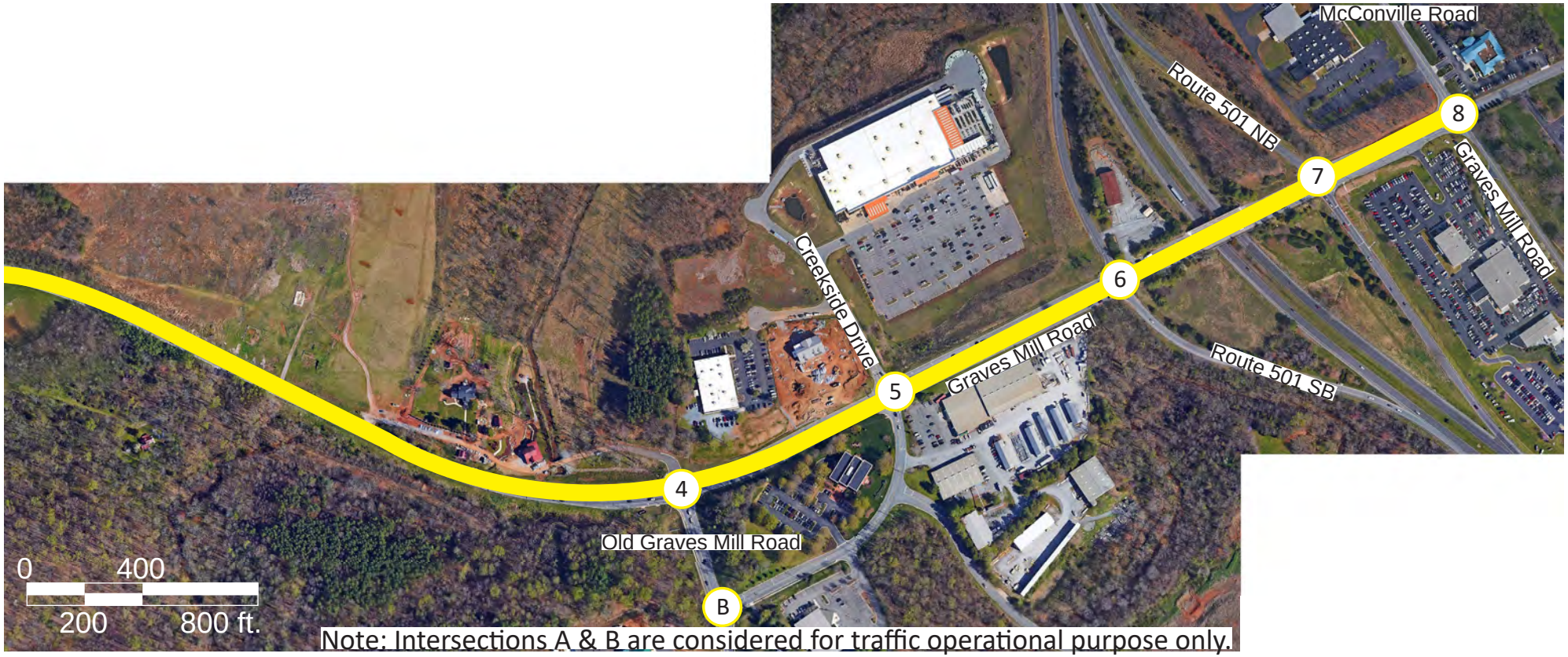
1) TAZ, SPS, and TDM linear growth rates that range from 0.5% to 2.0% annually (1.25% average rate),
2) new traffic anticipated from Rosedale Farms and Elements at Old Graves Mill Road, and
3) 1.25% annual historical growth likely to continue that is unrelated to planned developments,

A **1.25% annual background growth rate, plus the site generated traffic from the planned developments** is recommended through 2040. The 1.25% linear rate will be applied to all existing – or "background" – traffic counts collected in the study area that is unrelated to traffic generated specifically by developments proposed along Graves Mill Road. Then, site generated trips from each of the two (2) developments will be applied. To note, trips from Rosedale Farms will be distributed west through the study area based on existing travel patterns. With the application of a 1.25% rate, plus the addition of the site generated trips, the effective annual growth rate along the corridor will be approximately 2% in the morning peak, and 2.5% in the evening peak.

The following attachments are included:
Attachment A: Study Area
Attachment B: Existing 2017 Traffic Volumes
Attachment C: Planned Development Site Generated Trips
Attachment D: Future 2040 Traffic Volumes (1.25% background rate, plus site generated trips)

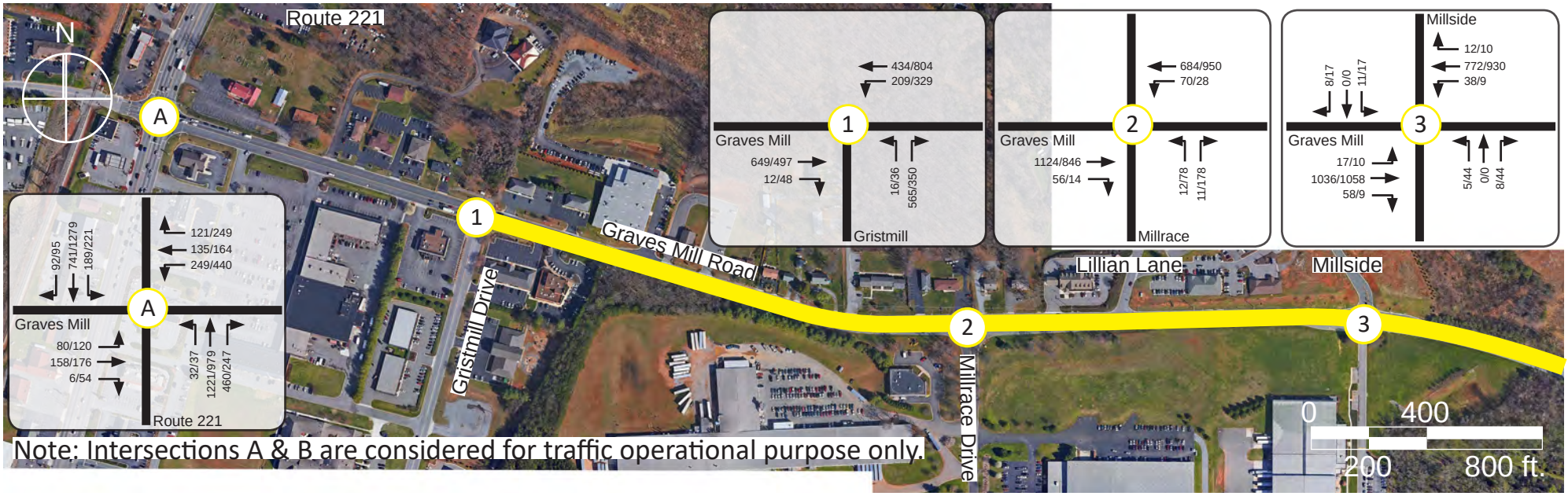
Attachment A Study Area and Intersections

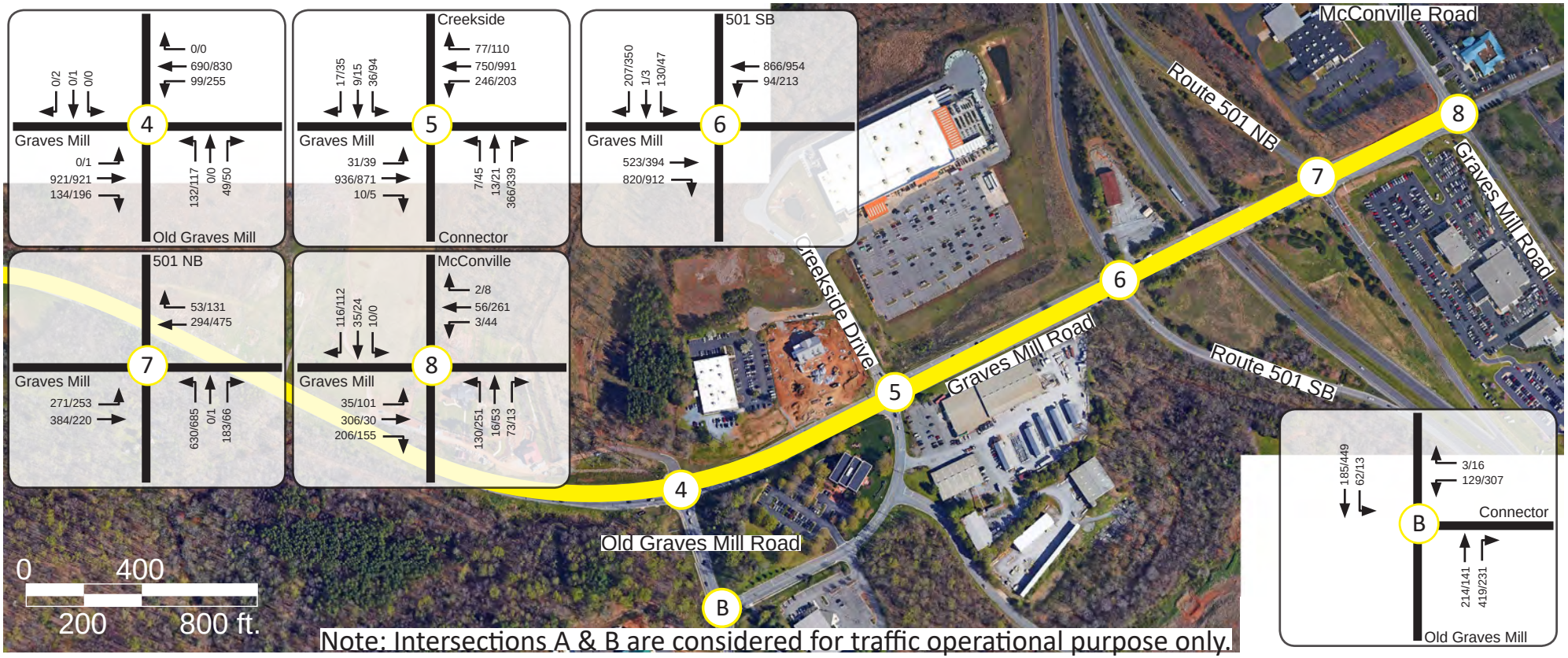
Note: Intersections A & B are considered for traffic operational purpose only.



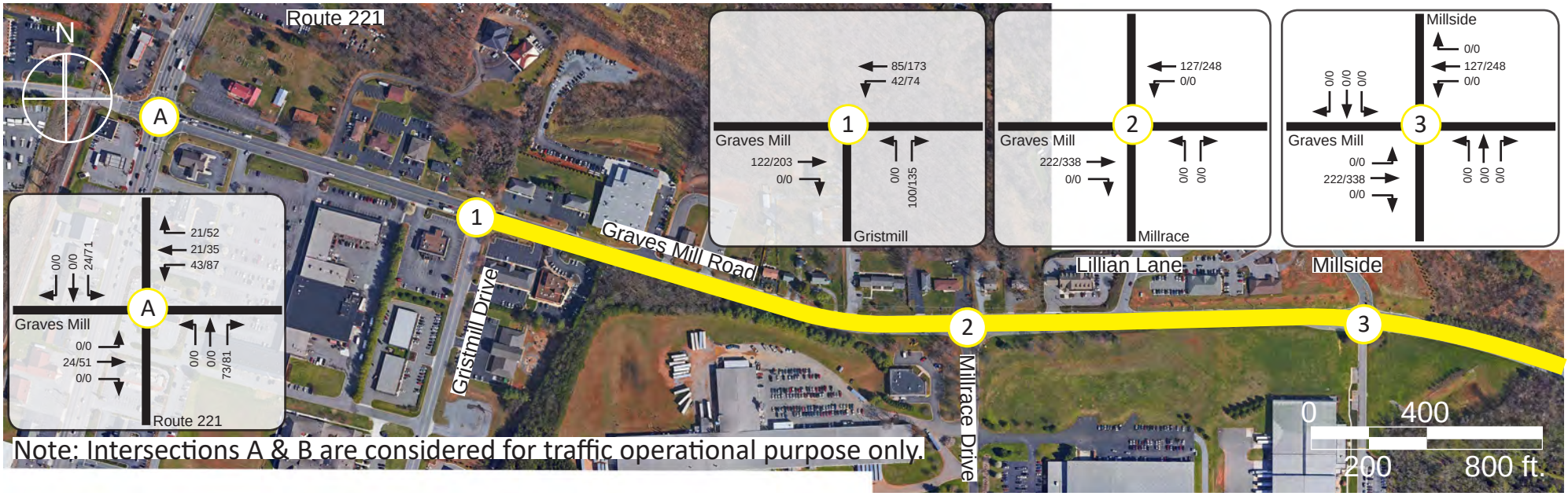
Note: Intersections A & B are considered for traffic operational purpose only.

Attachment B: Existing 2017 Traffic Volumes

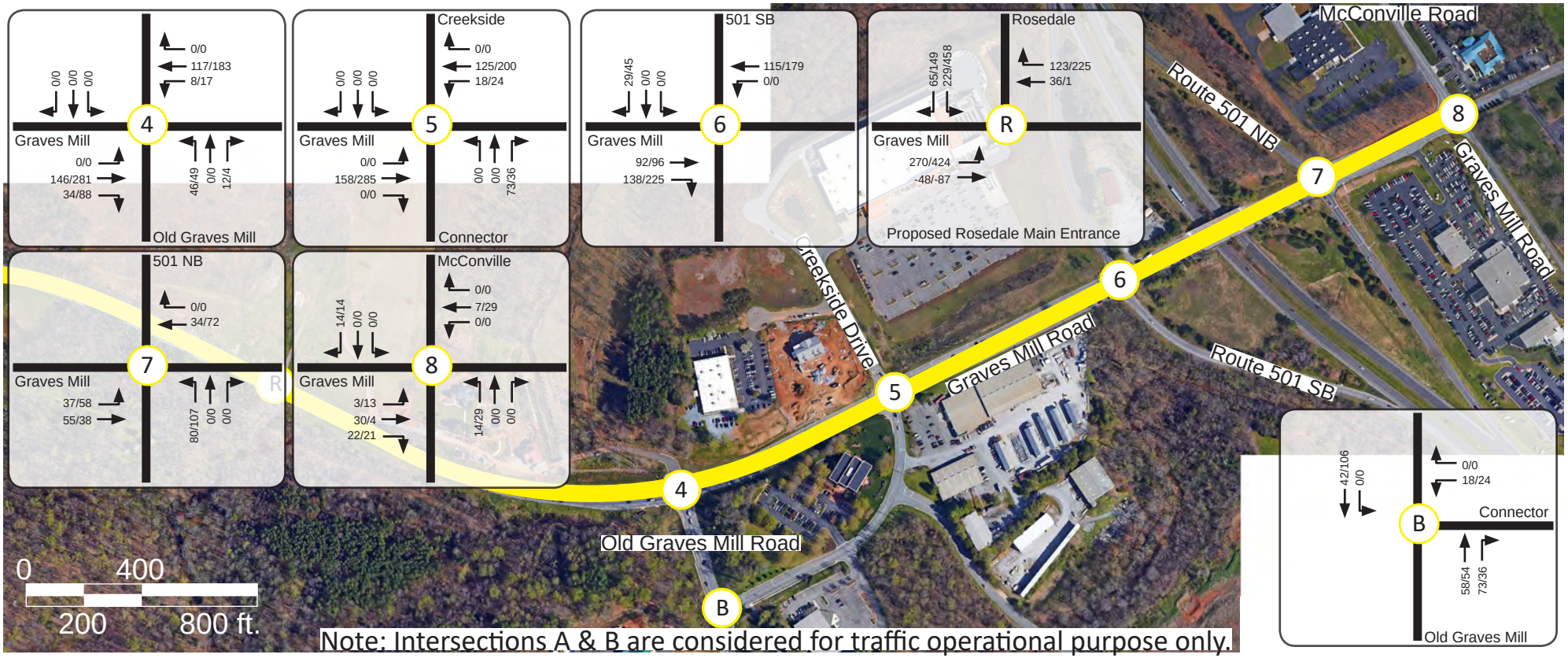




Attachment C: Planned Development Site Generated Trips

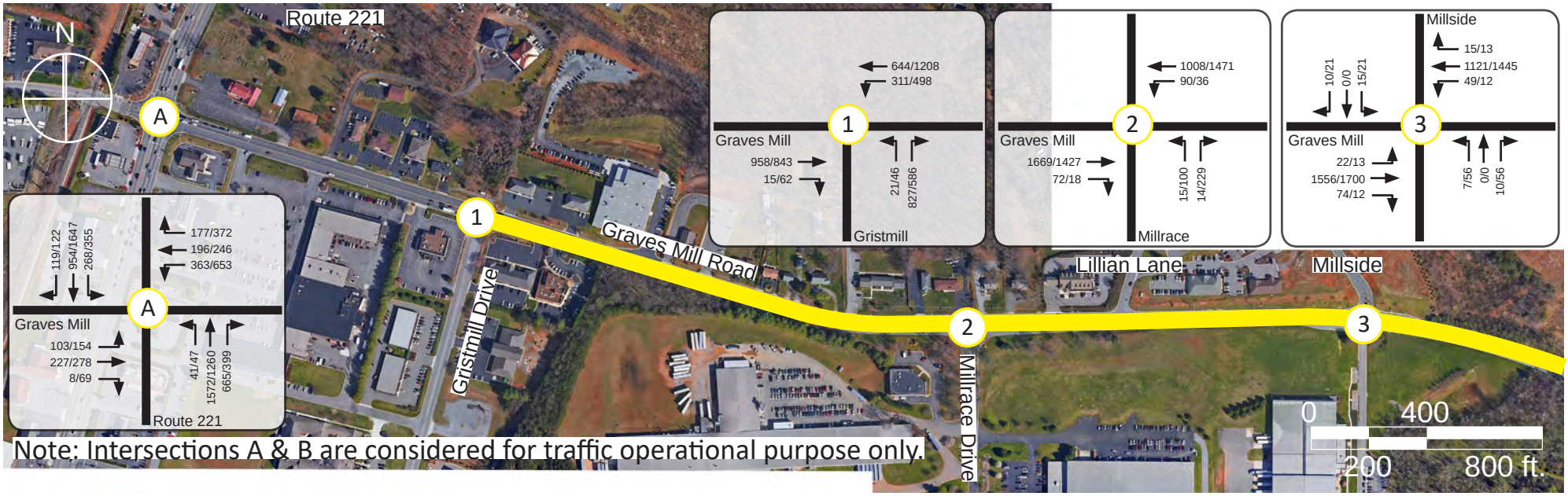


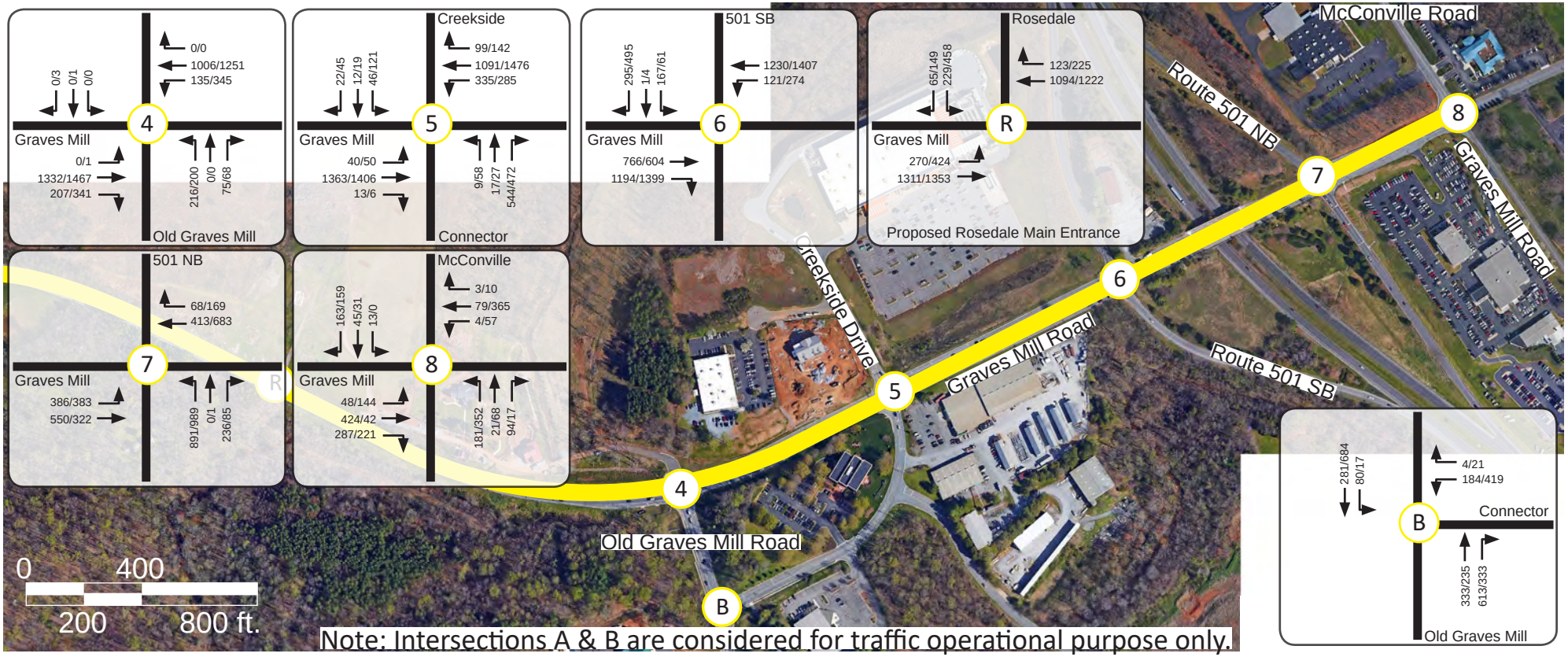
Note: Intersections A & B are considered for traffic operational purpose only.



Note: Intersections A & B are considered for traffic operational purpose only.

Attachment D: Future 2040 Traffic Volumes (1.25% background rate, plus site generated trips)





Appendix E

Public Meeting Summaries

EPRPC EPR, P,C. "ENGINEERING & PLANNING RESOURCES"
637 BERKMAR CIRCLE, CHARLOTTESVILLE, VA 22901

MEMORANDUM

TO: SCOTT SMITH	FROM: DREW DRAPER, PTP BILL WUENSCH, P.E., PTOE
ORGANIZATION: VIRGINIA'S REGION 2000 LOCAL GOVERNMENT COUNCIL	DATE: JANUARY 4, 2018
PHONE NUMBER: 434-845-3491	SENDER'S REFERENCE NUMBER:
Re: MEETING SUMMARY – GRAVES MILL ROAD COMMUNITY MEETING #1	YOUR REFERENCE NUMBER:

☐ URGENT X FOR YOUR USE ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

A public meeting for the Graves Mill Road Corridor Study was held on Tuesday, December 12, 2017 at the Lynchburg Humane Society in Lynchburg, Virginia. The meeting was organized as an open-house format and was open to the general public from 4:00 – 6:30 pm. Advertisement for the meeting included:

- Mail-outs to residents and businesses near the study area approximately two weeks in advance of the meeting
- Deployment of variable message signs on Graves Mill Road approximately one week in advance of the meeting
- Press release
- Advertisement via social media
- Advertisement via local news agencies
- Notice included on the project website (www.gravesmillplan.com)

The goal of this meeting was for the public to 1) learn about the study, 2) review information about the corridor, and 3) share comments regarding concerns, opportunities, and improvement ideas. Attendees were encouraged to provide feedback and offer suggestions that would help to inform the project development process. Representatives from the Virginia Department of Transportation (VDOT), City of Lynchburg, Virginia's Region 2000 Local Government Council, and project consultants were available to explain materials, answer questions, and record feedback. Information boards were set up in the meeting space that presented the following subjects:

- Welcome and purpose of the meeting
- Information about the study
- Summary of existing and future traffic conditions
- Crash data (six years)
- Summary of multimodal conditions (sidewalks, transit stops, etc.)

- General information on innovative intersection ideas applicable to the corridor

In addition to the information boards, large table-top maps of the corridor were available for attendees to gather around and mark-up. Comment sheets were also made available for participants. The meeting was attended by approximately 50 people (that signed in), including business owners/representatives along the corridor. There were also several local news organizations that covered the meeting (WDBJ7, NewsAdvance, WSLS, and WLNI).

A consistent flow of attendees began right at 4:00 PM and continued through approximately 6:00 PM. Representatives were provided sufficient time to walk attendees through the study and answer questions, as needed. Several news organization interviews were provided by the public and agency representatives. Overall, attendees were very pleased City officials were attempting to stay in front of potential growth that could exceed 50% over the next 20 years. In additional to managing traffic congestion, attendees were also pleased attention was being paid to transit, pedestrian and bicycle accommodations along the corridor.

It was further suggested by multiple attendees the City (or other agencies) undergo a study along Old Graves Mill Road between Graves Mill Road and Timberlake Road.

Specific Public Comments

The following public comments were **written on comment sheets** that were provided at the meeting, or **emailed via the project website** (specific identifying information has been removed, and at times, comments are paraphrased):

I was not able to attend the meeting. One suggestion (and it might be a long shot) is to have Graves Mill Road 3 lanes each way. However, a more feasible suggestion would be signage. An issue with accidents in Lynchburg is the lack of signs. People from out of town that use Graves Mill to go to the expressway merge over at the very end and back end or swipe other cars. Every street that intersects with the expressway should have a sign like the one on Timberlake Rd. I have heard from transportation officials that "signs are expensive" but this is one of the key reasons for congestion from 3-6pm weekdays.

I have lived in this area since 1976. There used to be little traffic even though it was a cut thru. Now, I can hardly get out of my street. The traffic from Timberlake Road is awful. From McConville Rd to 221 there are too many lights & way too much traffic. Traffic isn't flowing, a light needs to be at Nationwide Dr., that "annex" is a nightmare, it's like crossing 3 lanes & you take your life in your hands using it. People block that light at Bella Rosa. Lots of times it

turns green but you can't go because of cars blocking it. People fly from 221 to just get to the exit for the expressway. There are lots of things that can be done to help traffic.

I was not able to attend the meeting, and I don't know if a stop light at Lillian Ln or Millside Center is part of the discussion, but there are currently a lot of senior citizens that are trying to access this area of Graves Mill with no safe and/or easy way to do it. I'm not sure if a turn lane in this stretch or a stop light is a good solution, but if there is a master plan being developed, I think something like this would be quite helpful.

Has any thought been given to a roundabout at the intersection of Graves Mill Rd. and McConville Rd.? With Lynchburg's consideration of roundabouts throughout the City, this seems to me to be one place that one would work well. The four-way stop is confusing at best and dangerous at worst, especially during times of heavy traffic.

Sync lights so the thru traffic doesn't have to stop at every light.

Plan a stop light for the Bella Rose community development.

Do not add sidewalks directly beside the road. Needs separation by 3' – 5' from road. The same goes for bike lanes.

Road milling contributes to uneven lanes and vehicles crashing.

Add lights so they are on both sides of the road.

Keep speed limit at 45 mph.

Access to highway is currently acceptable.

Roundabout absolutely needed at McConville Rd.

My concerns relate to Old Graves Mill Road. As the area has grown, there has been a tremendous increase in traffic on Old Graves Mill Road between Timberlake Road and Graves Mill Road. Old Graves Mill needs traffic control to better manage cars and commercial truck traffic. Sidewalks throughout the section should also be installed. Old Graves Mill Road is also too narrow and has not been updated since it was originally designed as a rural road.

I attended the recent public meeting at the Lynchburg Humane Society which presented the Graves Mill Road Plan. I was disappointed that the Plan did not include a study of Old Graves Mill Road between Timberlake Road and Graves Mill Road. As a homeowner off Old Graves Mill road, I have no choice but the travel this section of road daily and am increasingly concerned whether this section of road can safely handle traffic. Recent years have seen a marked increase in traffic along Old Graves Mill Road as more drivers use it as a short cut to and from the Graves Mill Road and Timberlake Road areas. Recent development of the Old Graves Mill Road and Graves Mill Road areas has also dramatically added to this traffic. The planned development of this corridor in the near future will surely further increase traffic on Old Graves Mill Road. As you know, the section of Old Graves Mill Road north of Timberlake Road still has a narrow section without shoulders or sidewalks that dates back to an earlier and rural age. In addition, there is considerable commercial truck traffic to and from the Tomahawk Industrial Park not to speak of the number of school buses that pick up children throughout this neighborhood. All this makes for periods of heavy, unregulated traffic that result in the neighbors having difficulty turning onto Old Graves Mill Road from side streets and driveways. Also, please note that the speed limit of 35 MPH is routinely and grossly exceeded. I personally have had cars pass me on Old Graves Mill Road while I am driving the speed limit! I hope that you, VDOT and Lynchburg engineers find my concern warrant further interest. Specifically, I hope that consideration will be given to regulating traffic flow with a

stoplight at the intersection of Tomahawk Industrial Park and Old Graves Mill Road. I believe that a traffic light at that intersection would greatly add to the safety along this stretch of road.

The following public comments were **written on table top maps** that were provided at the meeting, or **on blank note boards** located between the informational boards. The comments are typically more specific and relate to intersection level improvements.

The memorandum ENDS after these comments. However, the following attachments are then included:

- Sign-in sheets
- Summary of news coverage

Corridor-wide comments

McConville Road to Gristmill Drive

- Finish & Connect Sidewalks → along Old Graves Mill (OGM) as well
- Currently, no pedestrians (might walk if felt more protected from high speed traffic)
- More street lights at night
- Need a roundabout at OGM, McConville Rd, and Nationwide
- Eastbound: speed limit feels artificial
    - No posted speed limit signs other than the 35 mph and reduced speed ahead
- New expressway to connect 460 to 221
- Add lane along entire length (eastbound) dedicated to right turns

Gristmill Drive & Graves Mill Road (T-Intersection)

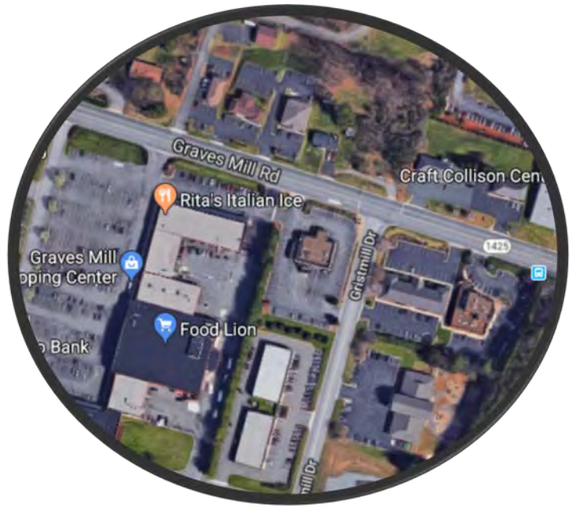
Observed Conditions

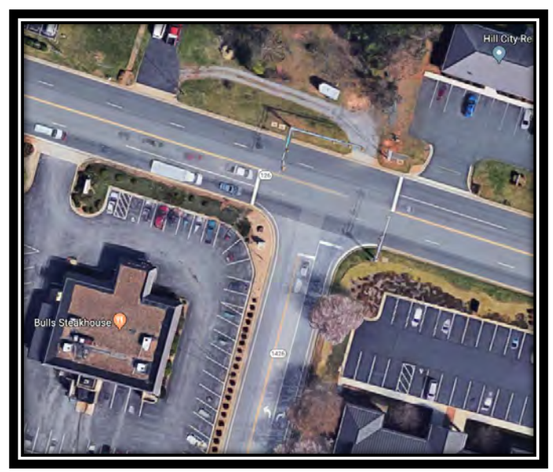
- Water pools between intersections #1 & #2 (Millrace Drive) to the east

Proposals

- Add center left turn lane (full length)
- Eliminate left turns entering/exiting Graves Mill Shopping Center parking lot
- Take away left turn on to 221 from Gristmill

Intersection #1





Intersection #2

Millrace Drive & Graves Mill Road (T-Intersection)

Observed Conditions

- Can’t enter Graves Mill Rd from northside (State Farm Building) between 3-6pm
- High speeds

Intersection #3

Millside Drive & Graves Mill Road

Observed Conditions

- Westbound right turn too abrupt
- Between #3 & I#4 → water pools
- Difficulty making a left across Graves Mill Road

Intersection #4

Old Graves Mill Road & Graves Mill Road

Observed Conditions

- Danger: Westbound turning/veering left - cars have flipped
- From Old GM Rd., can't pull out onto GM Rd. during peak hours ('lacks gaps')
- Bumper to bumper towards Timberlake Rd. (southbound)
    - Old GM Rd. shouldn't be a cut through

Proposals

- Old Graves Mill Road → Need a Study!
- Add double left turn lanes Westbound
    - Add permissive phase
- Open up the end of Tomahawk Dr.
- Change name of either Tomahawk Dr. or Tomahawk Industrial Park

Creekside & Old Graves Mill Road

Observed Conditions

- Not enough turn length on GM from interchange to OGM
- Gas station entrance at Creekside is challenging
- Heavy queuing

Proposals

- The cut through from OGM to GM (that turns into Creekside Drive after GM) should be made one way
- GM/OGM – disconnect or right turn only
- Overpass for OGM to Creekside
- Creekside: extend around Rosedale to Millrace
- Extend Creekside north to 221 and Breezewood Drive (parallels 501)

Intersection #5

Intersection #6

501 Southbound & Graves Mill Road

Observed Conditions

- Danger: LT/RT EB/WB conflicts → crashes → sight/distance issue
- Heavy queuing

Proposals

- Add two right turn-only lanes eastbound onto Rt. 501 southbound
- Salt Facility needs to stay on this side of town
- Replace westbound left with a SB loop on the north side

501 Northbound & Graves Mill Road

Intersection #7

Observed Conditions

- While the southbound tends to be the problem, northbound queu€ing can be long

- Eastbound left queuing can spill back out of turn lane

Intersetion #8

McConville Road & Graves Mill Road

Observed Conditions

- Yield sign confusion
- 700 block is too narrow

Proposals

- Consider a roundabout (multiple references)

Note: Public Information Meeting attendee lists (including personal contact information)have been removed to protect privacy.

Media Summary

Source 1: WDBJ7:

http://www.wdbj7.com/content/news/Public-reacts-to-Graves-Mill-Study--463787483.html

LYNCHBURG, Va. (WDBJ7) Region 2000 leaders are calling the Graves Mill Road Corridor a "congested corridor".

Gristmill Drive in Bedford County to McConville Road in Lynchburg is a popular commuter road in the region and, with that congestion in mind, Region 2000 is looking to make a plan for the future.

The Graves Mill Study was launched three months ago. Region 2000 and the Central Virginia Metropolitan Planning Organization as well as Bedford County, the City of Lynchburg and the Virginia Department of Transportation have teamed up to conduct the study. EPR, a firm out of Charlottesville, has been brought in and paid about $65,000 to conduct the study.

The study has revealed that while the corridor is congested now, the area surrounding it is expecting to grow more than 50 percent in the next 20 years. Current projects like the Rosedale development and a new apartment complex on Old Graves Mill Road will bring more traffic to the area.

"We really need to stay in front of that demand," said Drew Draper, Principal Planner with EPR. "To create a safer…more multimodal environment."

Tuesday night the public came out to learn more about the results of the study so far and to voice their opinions.

"In the morning and night there's so much traffic you have to slow down," said Albert Turner, who lives on Graves Mill Road.

"I try to avoid it sometimes of the day, but it's not always possible," said Laura Dooley, who travels the corridor daily.

The study not only showed how congested the corridor is, but also revealed higher than average crash rates. Leaders say high crash rates are typic of a congested corridor.

The study will be looking at short term and long term solutions. Ranging from signal lights and bike paths, to bigger projects like a roundabout or diverging diamond intersection.

This is the grassroots level of the study, they are working on things to consider moving forward with the future growth in mind.

“It seems as though they really understand that there’s these issues because they are addressed in a lot of the pictures here so I’m kind of hopeful that something really good will come of this,” said Dooley.

The leaders of the study will now take the public comments from Tuesday’s meeting and evaluate them further. They will hold another meeting sometime in February for public input and are hoping to have the study finished by early springtime. The goal of the study is to help plan things out so the project can be prioritized and implemented sooner.

To learn more about the project, go to their website: www.gravesmillplan.com

Source 1 Continued: WDBJ7:

http://www.wdbj7.com/content/news/Corridor-study-underway-for-Graves-Mill-Road-in-Lynchburg-462389983.html

LYNCHBURG, Va. (WDBJ7) -- Lynchburg City leaders are conducting a study on what is considered a congested stretch of road.

Graves Mill Road (WDBJ7)
The corridor study is looking at Graves Mill Rd. to make improvements to help with traffic flow and the crash rate.

The stretch of road is traveled by more than 27,000 vehicles daily; an amount of traffic that doesn't surprise Sherei Scott, who works at Moore's County store at the corner of Graves Mill and Creekside Dr. "It's hectic. It can get hectic … I mean you can sit at the light for five minutes just trying to get up the street," explained Scott.

That exact same intersection also has the highest crash rate on the corridor. So, now, city leaders want to make improvements. "We'll be looking at different lane configurations, different types of intersections, different types of signal configurations, pedestrian accommodations, bicycle accommodation," said Scott Smith, the Transportation Director with Region 2000.

The study includes the stretch of road from McConville to Grist Mill Rd., an area that is also seeing growth. "We have future developments that have been proposed. We want to get ahead of that make sure we can accommodate those developments," said Smith.

The new developments include Rosedale and a new apartment complex that is already under construction.

Smith says the study will help them determine what improvements to make to help with traffic flow and crash rates - which for most of the corridor is higher than other roads in the city and state. "If we can improve the through-put, the capacity of the corridor, while also reducing crashes then we're doing the right thing and that's what we're looking at," said Smith.

Project leaders will host a public workshop on Tuesday, Dec. 12 from 4:00 p.m. to 6:30 p.m. at the Lynchburg Humane Society.

Source 2 - NewsAdvance

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http://www.newsadvance.com/news/local/regional-officials-look-to-alleviate-traffic-problems-on-graves-mill/article_eaa782a4-dfa0-11e7-9fd8-136b1fae48a7.html

Graves Mill Road has served as a transportation corridor since the 1700s, and it has been growing with traffic and business ever since — and regional officials looked at shaping the road’s future at a Tuesday public meeting at the Lynchburg Humane Society.

After Lynchburg and Bedford County planning and transportation officials informed Region 2000 Local Government Council about the concerns for high traffic volume and a higher-than-average vehicular crash rate, a plan to improve traffic in the corridor was developed.

“There is rather extensive growth in this area,” Scott Smith, transportation planning director of Region 2000, said at Tuesday’s meeting. “We wanted to get ahead of the growth and identify ways to address these issues.”

The meeting allowed area residents to see data on possible plans for the road.

Region 2000 Local Government Council and Central Virginia Metropolitan Planning Organization, in partnership with Bedford County and the city of Lynchburg and with assistance from Charlottesville-based engineering company EPR P.C., are conducting the study of Graves Mill Road between Gristmill Road and McConville Road in Lynchburg. The study began this summer and will be concluded next spring.

The planning process began in the summer and cost $65,000. It has been funded mostly by Region 2000, with some money from Lynchburg.

“Our job on a regional level is to help identify and prioritize projects and help get them ready for funding,” Smith said.

The area has grown during the past several years with new businesses like The Home Depot and Moore’s Country Store and will continue to grow with developments like Rosedale — a community that hopes to soon build and attract a hotel, grocery store, restaurants, a brewery and office space — as well as Elements at Old Graves Mill Road — new apartments being constructed.

“Graves Mill serves a larger purpose, and that is to get people from Forest to Lynchburg,” Smith said. “Forest is one of the fastest-growing areas of Bedford County and is one of the fastest-growing areas of Lynchburg metro. Even if no other businesses are proposed, we’re going to have increased traffic. It’s the connector of choice for most people.”

Every intersection between McConville Road and Gristmill Drive, except for one, has a higher than average crash rate than all of Lynchburg and the state, Smith said. There are seven signalized intersections and two with no signals in the corridor. The highest is Creekside Drive, where The Home Depot is located.

Bill Wuensch, principal transportation engineer and planner for EPR, has collected all of the data and looked at crash history.

Most crashes are caused by rear-ending and angle crashes — where drivers make turns and hit another vehicle. There is one reported fatality on Graves Mill Road since 2006, which occurred in 2013 near Bulls Steakhouse.

Kelly Duff Smith, of Amherst County — who works on Nationwide Drive, which intersects with Graves Mill Road — said she has to drive on the road on a daily basis.

There is a four-way stop sign at the intersection of Nationwide Drive, Graves Mill Road and McConville Road. In her opinion, she said drivers don’t know how to use it.

“When everyone is getting off at 5 o’clock p.m., it’s a madhouse and very dangerous because people don’t wait their turn to go, and it causes others to stop so they don’t get hit,” she said. “It has gotten worse and is more dangerous.”

She thinks there needs to be a stoplight instead of the four-way stop.

“These other stoplights truly do help out this traffic,” she said. “It’s a lot more people using the Graves Mill Road exit to cut through to get to [the U.S.] 221 Forest area or even Timberlake [Road.]”

Wuensch said based off of the data found, traffic is anticipated to grow 1.25 percent per year by 2040, when it will reach traffic capacity.

Don DeBerry, Lynchburg traffic engineer, said the city has submitted a grant application for $500,000 to the Virginia Department of Transportation to install an adaptive signal system on the road that would consist of five signals that would coordinate signals and better utilize green light time during heavy traffic periods.

Smith said data only is being gathered now, but in the next few weeks, the team of transportation planners will be looking at possible solutions.

“It could be as simple as reprogramming traffic signals; it can be as complicated as building new roads,” he said.

There will be another public meeting held in the spring on possible solutions, and then funding for the project will be applied for through VDOT. Since the study is underway, they haven’t offered up figures for how much the traffic work will cost.

“We have to look at our biggest bang for our buck. These things cost a lot of money,” he said.

Source 3 - WSLS:

https://www.wsls.com/news/virginia/lynchburg/lynchburg-officials-need-public-s-input-on-graves-mill-road-cooridor

LYNCHBURG, Va. - Moore’s Country Store has been on Creekside Lane in Lynchburg for almost two years.

Store manager, Mark Emerson says they have three exits for customers to get out onto Graves Mill Road.

“Other than the construction we had a few months ago. But when it got up here close, near the bottom there, it affected us a little bit with people getting in and out of the shop here. But we haven't experienced a lot of wrecks or anything,” Emerson said.

Though Emerson said Moore’s Country Store hasn't seen any accidents lately, officials with Virginia’s Region 2000 say, the Creekside Lane -Graves Mill Road intersection has had the most accidents compared to the city and state average.

"As you can see, a majority of the crashes are rear-end crashes," said Scott Smith, transportation planning director for Virginia's Region 2000 Local Government Council, pointing to a Google image on their corridor study.

Graves Mill Road is a major connector between Lynchburg and Forest and many businesses have been developed over the years. And new developments are coming to the area soon.

"Because of the growth happening all along this corridor. We want to try to work out in the future and get ahead of that growth so that we can make plans to keep this corridor functioning well," Smith said.

Officials say the study will cost about $60,000 paid for by the Local Government Council and a bit by Lynchburg. They will look from Nationwide Drive in Lynchburg to Gristmill Drive in Bedford County.

"We're going to be looking at the width of the lanes, can we add additional lanes without increasing the asphalt. We're going to be looking at synchronizing the traffic signals to make sure they're all working together properly. We're looking at pedestrian and transit accommodations to make sure other folks not using cars can get through here well," Smith said.

On Tuesday from 4 to 6:30 p.m. at the Lynchburg Humane Society, 1211 Old Graves Mill Road, officials will host an open-house format for members of the public to drop in and discuss concerns about Graves Mill Road.

To read more about the study, click here.

Source 4 - WLNI:

https://wlni.com/local-news/public-information-meeting-set-for-graves-mill-road-corridor-study

A public information workshop for the Graves Mill Road Corridor Study is scheduled for a week from tomorrow. The study is focusing on Graves Mill between McConville Road in Lynchburg and Gristmill Drive in Bedford County. The workshop is set for December 12th at the Lynchburg Humane Society on Old Graves Mill Road; it runs between 4:00 and 6:30 pm.

Click here for the Graves Mill Road Corridor Study website.

(Continue reading for the Region 2000 Local Government Council news release.)

LYNCHBURG— A public information workshop for the Graves Mill Road Corridor Study will be held between the hours of 4:00 p.m. and 6:30 p.m. on Tuesday December 12th, 2017 at the

Lynchburg Humane Society at 1211 Old Graves Mill Rd, Lynchburg, VA 24502. The meeting will be held in an open-house format; members of the public may stop by at any time during the event.

Area residents, employees, commuters, shoppers, and business and property owners are encouraged to attend the workshop to learn about the study, review information about the corridor, and share comments regarding concerns, opportunities, and improvement ideas.

The study, which focuses on the Graves Mill Road corridor between McConville Road in Lynchburg and Gristmill Drive in Bedford County, is being conducted by the Region 2000 Local Government Council and Central Virginia Metropolitan Planning Organization in partnership with Bedford County, the City of Lynchburg and the Virginia Department of Transportation. EPR, P.C. of Charlottesville is providing engineering and planning assistance on the project which began in August 2017 and will conclude next spring.

Graves Mill Road is an important roadway that serves heavy commuter traffic while also providing access to commercial interests. This corridor planning study will:

Investigate existing traffic conditions and consider what kinds of road improvements may be needed if future traffic continues to increase,
Assess existing and desired conditions for pedestrians, bicyclists, and users of transit, (multimodal options), and
Address safety issues.
The study effort will develop short and long-term recommendations that will help to minimize congestion and improve travel conditions and safety along this important corridor. Once the study is complete, the projects can be prioritized so that funding and implementation strategies can be pursued.

For more information on the study, please visit www.gravesmillplan.com.

For more information about this public information workshop or the study, please contact Scott Smith (Transportation Planning Director, Region 2000 Local Government Council) prior to the meeting at 434-845-3491 or by email at ssmith@region2000.org.

EPRPC EPR, P,C. "ENGINEERING & PLANNING RESOURCES"
637 BERKMAR CIRCLE, CHARLOTTESVILLE, VA 22901

MEMORANDUM

TO: SCOTT SMITH	FROM: DREW DRAPER, PTP BILL WUENSCH, P.E., PTOE
ORGANIZATION: VIRGINIA'S REGION 2000 LOCAL GOVERNMENT COUNCIL	DATE: MAY 9, 2018
PHONE NUMBER: 434-845-3491	SENDER'S REFERENCE NUMBER:
Re: MEETING SUMMARY – GRAVES MILL ROAD COMMUNITY MEETING #2	YOUR REFERENCE NUMBER:

☐ URGENT X FOR YOUR USE ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

A public meeting for the Graves Mill Road Corridor Study was held on Monday, April 23, 2018 at the Lynchburg Humane Society in Lynchburg, Virginia. The meeting was organized as an open-house format and was open to the general public from 4:00 – 6:00 pm. Advertisement for the meeting included:

- Mail-outs to residents and businesses near the study area approximately two weeks in advance of the meeting
- Deployment of variable message signs on Graves Mill Road approximately one week in advance of the meeting
- Press release
- Advertisement via social media
- Advertisement via local news agencies
- Notice included on the project website (www.gravesmillplan.com)

The goal of this meeting was for the public to **1) learn more about the study and progress to date, 2) review draft short- and long-term roadway improvements, and 3) share comments and thoughts on bicycle and pedestrian needs.** Attendees were encouraged to provide feedback and offer suggestions that would help to inform the project development process. Representatives from the Virginia Department of Transportation (VDOT), City of Lynchburg, Virginia's Region 2000 Local Government Council, and project consultants were available to explain materials, answer questions, and record feedback. Information boards were set up in the meeting space that presented the following subjects:

- Welcome and purpose of the meeting
- Information about the study
- Priority I recommendations

- Priority II recommendations
- Priority III recommendations
- Information on roundabout and diverging diamond interchanges
- Overview of existing multimodal conditions

In addition to the information boards, posters illustrating existing and future traffic conditions, and historical crash data that were shared at the first meeting were also available for review on surrounding tables. Large table-top maps of the corridor were available for attendees to gather around and mark-up regarding multimodal needs and desires. Comment sheets were also made available for participants. The meeting was attended by approximately 30 people (that signed in), including business owners/representatives along the corridor. Local news organizations covered the first meeting extensively, and gathered information via the project website and Virginia's Region 2000 Local Government Council for meeting #2.

A consistent flow of attendees began right at 4:00 PM and continued through approximately 5:30 PM. Representatives were provided sufficient time to walk attendees through the study recommendations and answer questions, as needed. Overall, attendees were very pleased of the recommendations presented and that transportation representatives were attempting to stay in front of potential growth that could exceed 50% over the next 20 years. I key topic that was discussed included project implementation and funding opportunities. While some focus was paid to transit, pedestrian and bicycle accommodations along the corridor, the majority of attention was on the draft recommendations. To note, this was consistent with the first meeting, as many participants recognize this is a higher speed, cut-through road. However, multimodal recommendations included additional sidewalks, signalized pedestrian crossings, and enhanced transit stop amenities.

It was further suggested, in this meeting and at the first, that City (or other agencies) undergo a study along Old Graves Mill Road between Graves Mill Road and Timberlake Road.

Specific Public Comments

The following public comments were **written on comment sheets** that were provided at the meeting, or **emailed via the project website** (specific identifying information has been removed, and at times, comments are paraphrased):

Please address no turn lanes from Graves Mill Road to Lillian. There are many rear end accidents that occur.

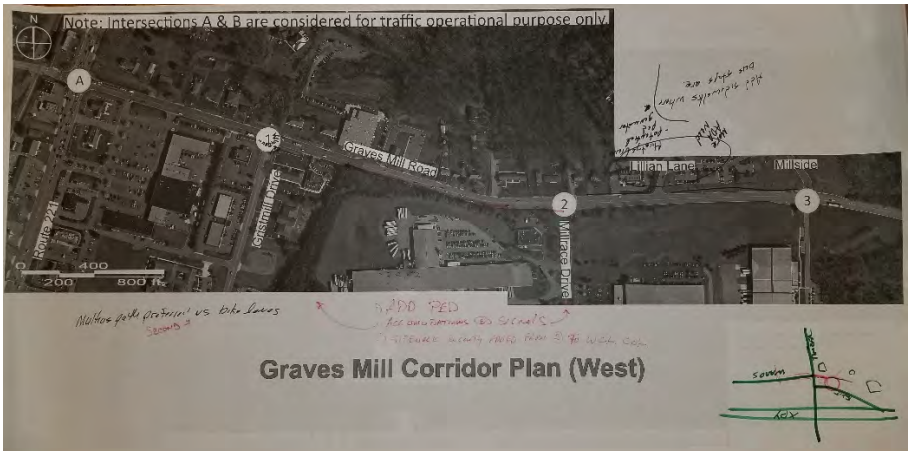
Very difficult to make a left across Graves Mill Road from Lillian during rush hour.

The connector between Old Graves Mill Road and Graves Mill Road is a concern.

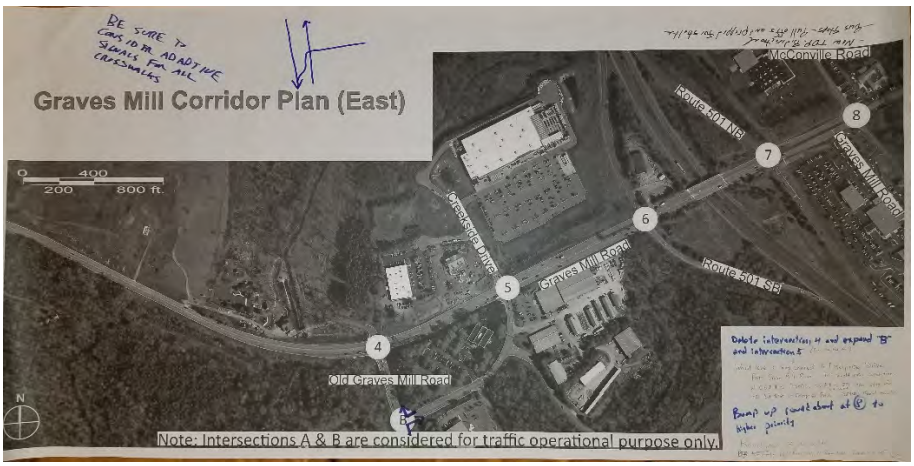
Need a center turn lane on the western side of the project (west of Millside Drive).

Are there any current plans to connect all the sidewalks on Old Graves Mill Rd from humane society to Timberlake Road? A lot of pedestrians walk towards Kroger etc. and there are no sidewalks to accommodate.

The following images depict public comments **provided on table top maps** located between the informational boards. A summary is provided under each.



The comments on this map indicate a greater desire for a multiuse path along portions of Graves Mill Road when compared to a sidewalk. This was a common theme heard from participants as residents feel it would be more utilized because it can also accommodate bikes. In addition to a multiuse path, enhanced pedestrian accommodations should be provided, including ADA. To note, intersection #1 includes a pedestrian crossing and signal as part of the study's Priority I recommendations.



The following comments were noted on the table top map above:

- Be sure to consider adaptive signals. To note, the City has applied for adaptive signal technology that covers the eastern intersections of Graves Mill Road.

- Consider connecting Enterprise Drive with Graves Mill Road. This would ease conditions from Old Graves Mill Road to 221. It would also add relief to Enterprise Drive.
- Bump up the roundabout priority.

End of the memorandum. However, the following attachments are included:

- Sign-in sheets

Note: Public Information Meeting attendee lists (including personal contact information)have been removed to protect privacy.

Appendix F

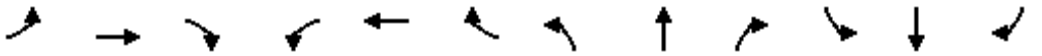
HCM and Queuing Reports

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	649	12	209	434	16	565
Future Volume (vph)	649	12	209	434	16	565
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	12
Grade (%)	0%			0%	2%	
Total Lost time (s)	6.5			6.5	5.3	5.3
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			0.98	0.95	1.00
Satd. Flow (prot)	3565			3528	1630	1583
Flt Permitted	1.00			0.54	0.95	1.00
Satd. Flow (perm)	3565			1951	1630	1583
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	773	14	249	517	19	673
RTOR Reduction (vph)	2	0	0	0	0	234
Lane Group Flow (vph)	785	0	0	766	19	439
Heavy Vehicles (%)	1%	0%	0%	1%	6%	1%
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	4	
Permitted Phases			6			4
Actuated Green, G (s)	19.5			34.5	14.8	14.8
Effective Green, g (s)	19.5			34.5	14.8	14.8
Actuated g/C Ratio	0.32			0.56	0.24	0.24
Clearance Time (s)	6.5			6.5	5.3	5.3
Vehicle Extension (s)	3.0			3.0	2.0	2.0
Lane Grp Cap (vph)	1137			1321	394	383
v/s Ratio Prot	c0.22			c0.08	0.01	
v/s Ratio Perm				0.25		c0.28
v/c Ratio	0.69			0.58	0.05	1.15
Uniform Delay, d1	18.2			8.6	17.7	23.1
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	1.8			0.6	0.0	92.0
Delay (s)	20.0			9.2	17.8	115.1
Level of Service	B			A	B	F
Approach Delay (s)	20.0			9.2	112.4	
Approach LOS	B			A	F	

Intersection Summary			
HCM 2000 Control Delay	44.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	61.1	Sum of lost time (s)	18.3
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

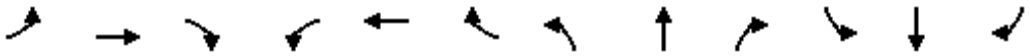
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1124	56	70	684	12	11
Future Volume (vph)	1124	56	70	684	12	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	11	12	11	11
Grade (%)	0%			0%	3%	
Total Lost time (s)	5.0		4.5	5.0	5.0	5.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3550		1728	3574	1719	1411
Flt Permitted	1.00		0.12	1.00	0.95	1.00
Satd. Flow (perm)	3550		225	3574	1719	1411
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	1322	66	82	805	14	13
RTOR Reduction (vph)	3	0	0	0	0	13
Lane Group Flow (vph)	1385	0	82	805	14	0
Heavy Vehicles (%)	1%	0%	1%	1%	0%	9%
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases			2			4
Actuated Green, G (s)	35.2		45.0	45.0	2.0	2.0
Effective Green, g (s)	35.2		45.0	45.0	2.0	2.0
Actuated g/C Ratio	0.62		0.79	0.79	0.04	0.04
Clearance Time (s)	5.0		4.5	5.0	5.0	5.0
Vehicle Extension (s)	3.5		2.0	3.5	2.0	2.0
Lane Grp Cap (vph)	2192		317	2821	60	49
v/s Ratio Prot	c0.39		0.02	c0.23	c0.01	
v/s Ratio Perm			0.18			0.00
v/c Ratio	0.63		0.26	0.29	0.23	0.01
Uniform Delay, d1	6.8		3.7	1.6	26.8	26.5
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6		0.2	0.1	0.7	0.0
Delay (s)	7.5		3.9	1.7	27.5	26.6
Level of Service	A		A	A	C	C
Approach Delay (s)	7.5			1.9	27.0	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	5.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	57.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



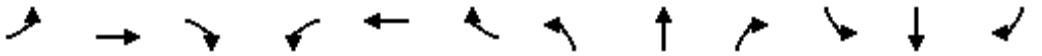
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	921	134	99	690	0	132	0	49	0	0	0
Future Volume (vph)	0	921	134	99	690	0	132	0	49	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	12	12	13	13	12	16	12
Grade (%)		3%			-5%			-5%			3%	
Total Lost time (s)		5.0	5.0	5.0	5.0			5.0	5.0			
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00			
Frt		1.00	0.85	1.00	1.00			1.00	0.85			
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00			
Satd. Flow (prot)		3521	1544	1736	3664			1856	1614			
Flt Permitted		1.00	1.00	0.95	1.00			0.95	1.00			
Satd. Flow (perm)		3521	1544	1736	3664			1856	1614			
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	1035	151	111	775	0	148	0	55	0	0	0
RTOR Reduction (vph)	0	0	79	0	0	0	0	0	46	0	0	0
Lane Group Flow (vph)	0	1035	72	111	775	0	0	148	9	0	0	0
Heavy Vehicles (%)	0%	1%	3%	3%	1%	0%	3%	0%	6%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm			
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)		31.3	31.3	8.3	44.6			11.1	11.1			
Effective Green, g (s)		31.3	31.3	8.3	44.6			11.1	11.1			
Actuated g/C Ratio		0.48	0.48	0.13	0.68			0.17	0.17			
Clearance Time (s)		5.0	5.0	5.0	5.0			5.0	5.0			
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)		1677	735	219	2487			313	272			
v/s Ratio Prot		c0.29		c0.06	0.21			c0.08				
v/s Ratio Perm			0.05						0.01			
v/c Ratio		0.62	0.10	0.51	0.31			0.47	0.03			
Uniform Delay, d1		12.8	9.4	26.8	4.3			24.7	22.8			
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00			
Incremental Delay, d2		0.7	0.1	1.8	0.1			1.1	0.1			
Delay (s)		13.4	9.5	28.6	4.4			25.8	22.9			
Level of Service		B	A	C	A			C	C			
Approach Delay (s)		12.9			7.4			25.0			0.0	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	65.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



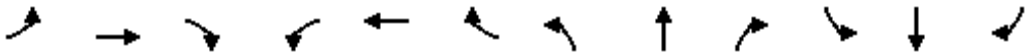
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	936	10	246	750	77	7	13	366	36	9	17
Future Volume (vph)	31	936	10	246	750	77	7	13	366	36	9	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	11	10	11	11	12
Grade (%)		3%			0%			-2%			3%	
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1662	3512		1770	3539	1538		1823	1464	1621	1566	
Flt Permitted	0.33	1.00		0.13	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (perm)	575	3512		233	3539	1538		1823	1464	1621	1566	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	36	1076	11	283	862	89	8	15	421	41	10	20
RTOR Reduction (vph)	0	1	0	0	0	32	0	0	123	0	19	0
Lane Group Flow (vph)	36	1086	0	283	862	57	0	23	298	41	11	0
Heavy Vehicles (%)	7%	1%	10%	2%	2%	5%	0%	0%	4%	6%	0%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases	2			6		6			8			
Actuated Green, G (s)	37.0	34.9		58.0	50.9	50.9		2.4	20.5	4.3	4.3	
Effective Green, g (s)	37.0	34.9		58.0	50.9	50.9		2.4	20.5	4.3	4.3	
Actuated g/C Ratio	0.46	0.44		0.73	0.64	0.64		0.03	0.26	0.05	0.05	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	295	1537		518	2260	982		54	468	87	84	
v/s Ratio Prot	0.00	c0.31		0.12	0.24			0.01	c0.14	c0.03	0.01	
v/s Ratio Perm	0.05			0.27		0.04			0.06			
v/c Ratio	0.12	0.71		0.55	0.38	0.06		0.43	0.64	0.47	0.13	
Uniform Delay, d1	11.7	18.2		11.9	6.9	5.4		38.0	26.3	36.6	35.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	1.5		1.2	0.1	0.0		5.3	2.8	4.0	0.7	
Delay (s)	11.9	19.7		13.1	7.0	5.4		43.3	29.1	40.6	36.6	
Level of Service	B	B		B	A	A		D	C	D	D	
Approach Delay (s)		19.5			8.3			29.9			38.9	
Approach LOS		B			A			C			D	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	79.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



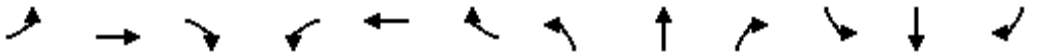
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	523	820	94	866	0	0	0	0	130	1	207
Future Volume (vph)	0	523	820	94	866	0	0	0	0	130	1	207
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	11	11
Grade (%)		0%			0%			3%			3%	
Total Lost time (s)		5.0	5.0	5.0	5.0						5.0	5.0
Lane Util. Factor		0.95	1.00	1.00	0.95						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		3574	1553	1787	3574						1658	1451
Flt Permitted		1.00	1.00	0.33	1.00						0.95	1.00
Satd. Flow (perm)		3574	1553	616	3574						1658	1451
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	0	615	965	111	1019	0	0	0	0	153	1	244
RTOR Reduction (vph)	0	0	496	0	0	0	0	0	0	0	0	117
Lane Group Flow (vph)	0	615	469	111	1019	0	0	0	0	0	154	127
Heavy Vehicles (%)	0%	1%	4%	1%	1%	0%	0%	0%	0%	4%	0%	6%
Turn Type		NA	Perm	pm+pt	NA					Split	NA	Perm
Protected Phases		2		1	6					8	8	
Permitted Phases			2	6								8
Actuated Green, G (s)		28.7	28.7	40.5	40.5						11.8	11.8
Effective Green, g (s)		28.7	28.7	40.5	40.5						11.8	11.8
Actuated g/C Ratio		0.46	0.46	0.65	0.65						0.19	0.19
Clearance Time (s)		5.0	5.0	5.0	5.0						5.0	5.0
Vehicle Extension (s)		5.0	5.0	5.0	5.0						5.0	5.0
Lane Grp Cap (vph)		1646	715	528	2323						314	274
v/s Ratio Prot		0.17		0.02	c0.29						c0.09	
v/s Ratio Perm			c0.30	0.11								0.09
v/c Ratio		0.37	0.66	0.21	0.44						0.49	0.46
Uniform Delay, d1		10.9	13.0	4.6	5.3						22.6	22.4
Progression Factor		1.00	1.00	1.00	1.00						1.00	1.00
Incremental Delay, d2		0.3	2.9	0.4	0.3						2.5	2.6
Delay (s)		11.2	15.9	5.0	5.6						25.1	25.0
Level of Service		B	B	A	A						C	C
Approach Delay (s)		14.1			5.6			0.0			25.1	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	62.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	271	384	0	0	294	53	630	0	183	0	0	0
Future Volume (vph)	271	384	0	0	294	53	630	0	183	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	12	12	12	12	12
Grade (%)		0%			-3%			3%			3%	
Total Lost time (s)	5.0	6.0			6.0	6.0	5.0	5.0				
Lane Util. Factor	1.00	0.95			0.95	1.00	0.95	0.95				
Frt	1.00	1.00			1.00	0.85	1.00	0.93				
Flt Protected	0.95	1.00			1.00	1.00	0.95	0.97				
Satd. Flow (prot)	1770	3574			3523	1546	1585	1586				
Flt Permitted	0.36	1.00			1.00	1.00	0.95	0.97				
Satd. Flow (perm)	667	3574			3523	1546	1585	1586				
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	335	474	0	0	363	65	778	0	226	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	52	0	88	0	0	0	0
Lane Group Flow (vph)	335	474	0	0	363	13	513	403	0	0	0	0
Heavy Vehicles (%)	2%	1%	0%	0%	4%	6%	3%	0%	0%	2%	2%	2%
Turn Type	pm+pt	NA			NA	Perm	Split	NA				
Protected Phases	1	6			2		4	4				
Permitted Phases	6					2						
Actuated Green, G (s)	24.5	24.5			10.1	10.1	15.1	15.1				
Effective Green, g (s)	24.5	24.5			10.1	10.1	15.1	15.1				
Actuated g/C Ratio	0.48	0.48			0.20	0.20	0.30	0.30				
Clearance Time (s)	5.0	6.0			6.0	6.0	5.0	5.0				
Vehicle Extension (s)	2.5	2.5			2.5	2.5	2.5	2.5				
Lane Grp Cap (vph)	527	1730			703	308	472	473				
v/s Ratio Prot	c0.12	0.13			0.10		c0.32	0.25				
v/s Ratio Perm	c0.19					0.01						
v/c Ratio	0.64	0.27			0.52	0.04	1.09	0.85				
Uniform Delay, d1	8.7	7.8			18.1	16.3	17.8	16.7				
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00				
Incremental Delay, d2	2.2	0.1			0.5	0.0	66.9	13.7				
Delay (s)	10.9	7.8			18.6	16.4	84.7	30.4				
Level of Service	B	A			B	B	F	C				
Approach Delay (s)		9.1			18.2			58.1			0.0	
Approach LOS		A			B			E			A	

Intersection Summary			
HCM 2000 Control Delay	32.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	50.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	158	6	249	135	121	32	1221	460	189	741	92
Future Volume (vph)	80	158	6	249	135	121	32	1221	460	189	741	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	12	12	12	11	12	11	11	11	11
Total Lost time (s)	6.7	6.7		7.7	7.7		7.7	5.7	7.7	7.4	5.8	6.7
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1604	3333		1687	1659		1745	3505	1531	1694	3388	1473
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1604	3333		1687	1659		1745	3505	1531	1694	3388	1473
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	95	188	7	296	161	144	38	1454	548	225	882	110
RTOR Reduction (vph)	0	2	0	0	26	0	0	0	40	0	0	45
Lane Group Flow (vph)	95	193	0	296	279	0	38	1454	508	225	882	65
Heavy Vehicles (%)	5%	4%	8%	7%	5%	8%	0%	3%	2%	3%	3%	6%
Turn Type	Split	NA		Split	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	4	4		3	3		1	6	3	5	2	4
Permitted Phases									6			2
Actuated Green, G (s)	12.2	12.2		19.3	19.3		5.9	57.4	76.7	12.6	63.7	75.9
Effective Green, g (s)	12.2	12.2		19.3	19.3		5.9	57.4	76.7	12.6	63.7	75.9
Actuated g/C Ratio	0.09	0.09		0.15	0.15		0.05	0.44	0.59	0.10	0.49	0.59
Clearance Time (s)	6.7	6.7		7.7	7.7		7.7	5.7	7.7	7.4	5.8	6.7
Vehicle Extension (s)	3.5	3.5		3.5	3.5		3.5	5.0	3.5	3.5	5.0	3.5
Lane Grp Cap (vph)	151	315		252	248		79	1559	910	165	1672	866
v/s Ratio Prot	c0.06	0.06		c0.18	0.17		0.02	c0.41	0.08	c0.13	c0.26	0.01
v/s Ratio Perm									0.25			0.04
v/c Ratio	0.63	0.61		1.17	1.13		0.48	0.93	0.56	1.36	0.53	0.07
Uniform Delay, d1	56.2	56.1		54.9	54.9		60.1	34.0	15.9	58.2	22.3	11.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.3	3.7		112.2	95.6		5.4	10.9	0.8	197.5	0.6	0.0
Delay (s)	64.5	59.8		167.1	150.5		65.4	44.9	16.7	255.7	22.9	11.5
Level of Service	E	E		F	F		E	D	B	F	C	B
Approach Delay (s)		61.4			158.6			37.7			64.9	
Approach LOS		E			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	64.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	129.0	Sum of lost time (s)	27.9
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	787	766	19	673
v/c Ratio	0.69	0.58	0.05	1.09
Control Delay	21.5	9.2	20.4	81.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.5	9.2	20.4	81.0
Queue Length 50th (ft)	130	73	5	~193
Queue Length 95th (ft)	165	93	20	#367
Internal Link Dist (ft)	1043	605	674	
Turn Bay Length (ft)				180
Base Capacity (vph)	1963	1775	393	616
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.40	0.43	0.05	1.09

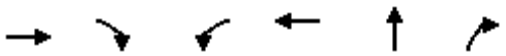
Intersection Summary

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

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

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1388	82	805	14	13
v/c Ratio	0.56	0.22	0.25	0.08	0.09
Control Delay	8.4	2.9	1.7	25.4	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.4	2.9	1.7	25.4	15.0
Queue Length 50th (ft)	84	0	0	4	0
Queue Length 95th (ft)	240	12	50	18	12
Internal Link Dist (ft)	952		1251	593	
Turn Bay Length (ft)		330			240
Base Capacity (vph)	2468	499	3234	507	425
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.56	0.16	0.25	0.03	0.03

Intersection Summary

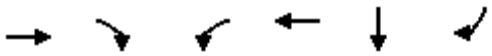


Lane Group	EBT	EBR	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	1035	151	111	775	148	55
v/c Ratio	0.61	0.18	0.41	0.32	0.47	0.13
Control Delay	16.0	2.2	32.1	4.9	31.6	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.0	2.2	32.1	4.9	31.6	0.6
Queue Length 50th (ft)	160	0	40	54	52	0
Queue Length 95th (ft)	269	22	95	92	118	0
Internal Link Dist (ft)	1348			700	365	
Turn Bay Length (ft)		280	310			
Base Capacity (vph)	1955	936	413	2877	589	633
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.16	0.27	0.27	0.25	0.09

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	36	1087	283	862	89	23	421	41	30
v/c Ratio	0.09	0.71	0.49	0.32	0.07	0.13	0.74	0.22	0.15
Control Delay	7.7	23.0	14.4	8.2	1.3	40.1	22.9	39.7	23.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.7	23.0	14.4	8.2	1.3	40.1	22.9	39.7	23.7
Queue Length 50th (ft)	4	210	42	47	0	10	111	18	4
Queue Length 95th (ft)	17	382	156	206	11	36	219	54	31
Internal Link Dist (ft)		700		797		519			443
Turn Bay Length (ft)	250		420		300		160	190	
Base Capacity (vph)	594	1960	719	2706	1204	582	692	284	291
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.55	0.39	0.32	0.07	0.04	0.61	0.14	0.10

Intersection Summary



Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	615	965	111	1019	154	244
v/c Ratio	0.37	0.79	0.20	0.45	0.48	0.62
Control Delay	12.5	7.9	5.0	6.2	30.3	19.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	7.9	5.0	6.2	30.3	19.0
Queue Length 50th (ft)	84	10	14	88	57	36
Queue Length 95th (ft)	115	56	27	111	104	93
Internal Link Dist (ft)	797			663	620	
Turn Bay Length (ft)		280	250			125
Base Capacity (vph)	1826	1242	591	2641	366	433
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.78	0.19	0.39	0.42	0.56

Intersection Summary

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT
Lane Group Flow (vph)	335	474	363	65	513	491
v/c Ratio	0.62	0.27	0.52	0.16	1.09	0.88
Control Delay	13.0	8.1	20.9	2.7	91.5	34.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.0	8.1	20.9	2.7	91.5	34.5
Queue Length 50th (ft)	55	40	51	0	~191	108
Queue Length 95th (ft)	85	54	74	7	#329	#245
Internal Link Dist (ft)		663	458			755
Turn Bay Length (ft)	170			180		
Base Capacity (vph)	555	3120	2026	935	471	559
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.15	0.18	0.07	1.09	0.88

Intersection Summary

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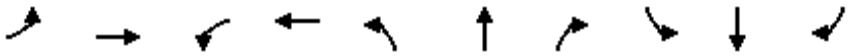

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	95	195	296	305	38	1454	548	225	882	110
v/c Ratio	0.62	0.60	1.15	1.09	0.30	0.96	0.55	1.33	0.51	0.12
Control Delay	72.1	62.2	148.6	125.4	61.5	51.0	13.1	225.8	23.9	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.1	62.2	148.6	125.4	61.5	51.0	13.1	225.8	23.9	1.6
Queue Length 50th (ft)	76	80	~287	~262	30	606	197	~241	275	0
Queue Length 95th (ft)	125	112	#422	#401	61	#644	257	#367	323	12
Internal Link Dist (ft)		661		1043		1143			649	
Turn Bay Length (ft)	90				200		360	250		280
Base Capacity (vph)	169	353	258	279	170	1511	1000	169	1713	933
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.55	1.15	1.09	0.22	0.96	0.55	1.33	0.51	0.12

Intersection Summary

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Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	1043	3	6	802	14	0	0	6	6	0	3
Future Vol, veh/h	4	1043	3	6	802	14	0	0	6	6	0	3
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	-	-	140	-	-	140	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-5	-	-	5	-	-	3	-	-	-5	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	5	1227	4	7	944	16	0	0	7	7	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	944	0	0	1227	0	0	1722	2194	614	1581	2194	472
Stage 1	-	-	-	-	-	-	1236	1236	-	958	958	-
Stage 2	-	-	-	-	-	-	486	958	-	623	1236	-
Critical Hdwy	4.1	-	-	4.1	-	-	8.1	7.1	7.2	6.5	5.5	6.4
Critical Hdwy Stg 1	-	-	-	-	-	-	7.1	6.1	-	5.5	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7.1	6.1	-	5.5	4.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	735	-	-	575	-	-	44	32	418	116	84	581
Stage 1	-	-	-	-	-	-	154	204	-	366	442	-
Stage 2	-	-	-	-	-	-	495	288	-	529	353	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	735	-	-	575	-	-	42	30	418	110	80	581
Mov Cap-2 Maneuver	-	-	-	-	-	-	42	30	-	110	80	-
Stage 1	-	-	-	-	-	-	151	200	-	358	431	-
Stage 2	-	-	-	-	-	-	479	281	-	509	345	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	13.8	30.6
HCM LOS			B	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	418	735	-	-	575	-	-	151
HCM Lane V/C Ratio	0.017	0.006	-	-	0.012	-	-	0.07
HCM Control Delay (s)	13.8	9.9	0.1	-	11.3	0.1	-	30.6
HCM Lane LOS	B	A	A	-	B	A	-	D
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.2

Intersection	
Intersection Delay, s/veh	20
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	306	206	3	56	2	130	16	73	10	35	116
Future Vol, veh/h	35	306	206	3	56	2	130	16	73	10	35	116
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	0	0	4	0	7	0	3	0	4	0	6	0
Mvmt Flow	47	408	275	4	75	3	173	21	97	13	47	155
Number of Lanes	0	1	1	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	2
HCM Control Delay	23.9	12	18.5	11.9
HCM LOS	C	B	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	59%	10%	0%	5%	22%	0%
Vol Thru, %	7%	90%	0%	92%	78%	0%
Vol Right, %	33%	0%	100%	3%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	219	341	206	61	45	116
LT Vol	130	35	0	3	10	0
Through Vol	16	306	0	56	35	0
RT Vol	73	0	206	2	0	116
Lane Flow Rate	292	455	275	81	60	155
Geometry Grp	6	7	7	6	7	7
Degree of Util (X)	0.56	0.806	0.429	0.169	0.125	0.29
Departure Headway (Hd)	6.904	6.382	5.619	7.479	7.476	6.75
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	520	564	634	481	482	535
Service Time	4.996	4.171	3.407	5.491	5.176	4.45
HCM Lane V/C Ratio	0.562	0.807	0.434	0.168	0.124	0.29
HCM Control Delay	18.5	30.7	12.6	12	11.2	12.2
HCM Lane LOS	C	D	B	B	B	B
HCM 95th-tile Q	3.4	7.9	2.2	0.6	0.4	1.2

Intersection	
Int Delay, s/veh	4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	129	3	214	419	62	185
Future Vol, veh/h	129	3	214	419	62	185
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	255	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	6	0	3	2	2	5
Mvmt Flow	145	3	240	471	70	208

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	823	476	0	0	711	0
Stage 1	476	-	-	-	-	-
Stage 2	347	-	-	-	-	-
Critical Hdwy	6.46	6.2	-	-	4.12	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.3	-	-	2.218	-
Pot Cap-1 Maneuver	338	593	-	-	888	-
Stage 1	617	-	-	-	-	-
Stage 2	707	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	308	593	-	-	888	-
Mov Cap-2 Maneuver	308	-	-	-	-	-
Stage 1	617	-	-	-	-	-
Stage 2	644	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	26.3	0	2.4
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	308	593	888	-
HCM Lane V/C Ratio	-	-	0.471	0.006	0.078	-
HCM Control Delay (s)	-	-	26.7	11.1	9.4	0
HCM Lane LOS	-	-	D	B	A	A
HCM 95th %tile Q(veh)	-	-	2.4	0	0.3	-

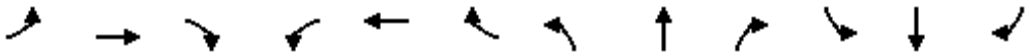
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	497	48	329	804	36	350
Future Volume (vph)	497	48	329	804	36	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	12
Grade (%)	0%			0%	2%	
Total Lost time (s)	6.5			6.5	5.3	5.3
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	0.99			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3530			3533	1727	1599
Flt Permitted	1.00			0.59	0.95	1.00
Satd. Flow (perm)	3530			2099	1727	1599
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	565	55	374	914	41	398
RTOR Reduction (vph)	12	0	0	0	0	329
Lane Group Flow (vph)	608	0	0	1288	41	69
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	4	
Permitted Phases			6			4
Actuated Green, G (s)	17.6			32.7	7.8	7.8
Effective Green, g (s)	17.6			32.7	7.8	7.8
Actuated g/C Ratio	0.34			0.63	0.15	0.15
Clearance Time (s)	6.5			6.5	5.3	5.3
Vehicle Extension (s)	3.0			3.0	2.0	2.0
Lane Grp Cap (vph)	1187			1548	257	238
v/s Ratio Prot	0.17			c0.14	0.02	
v/s Ratio Perm				c0.38		c0.04
v/c Ratio	0.51			0.83	0.16	0.29
Uniform Delay, d1	13.9			7.7	19.4	19.8
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.4			4.0	0.1	0.2
Delay (s)	14.3			11.6	19.5	20.0
Level of Service	B			B	B	C
Approach Delay (s)	14.3			11.6	20.0	
Approach LOS	B			B	B	

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	52.3	Sum of lost time (s)	18.3
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	846	14	28	950	78	178
Future Volume (vph)	846	14	28	950	78	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	11	12	11	11
Grade (%)	0%			0%	3%	
Total Lost time (s)	5.0		4.5	5.0	5.0	5.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3552		1745	3574	1702	1508
Flt Permitted	1.00		0.22	1.00	0.95	1.00
Satd. Flow (perm)	3552		396	3574	1702	1508
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	920	15	30	1033	85	193
RTOR Reduction (vph)	1	0	0	0	0	164
Lane Group Flow (vph)	934	0	30	1033	85	29
Heavy Vehicles (%)	1%	0%	0%	1%	1%	2%
Bus Blockages (#/hr)	2	0	0	0	0	0
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases			2			4
Actuated Green, G (s)	23.6		29.9	29.9	7.0	7.0
Effective Green, g (s)	23.6		29.9	29.9	7.0	7.0
Actuated g/C Ratio	0.50		0.64	0.64	0.15	0.15
Clearance Time (s)	5.0		4.5	5.0	5.0	5.0
Vehicle Extension (s)	3.5		2.0	3.5	2.0	2.0
Lane Grp Cap (vph)	1787		304	2278	254	225
v/s Ratio Prot	c0.26		0.00	c0.29	c0.05	
v/s Ratio Perm			0.06			0.02
v/c Ratio	0.52		0.10	0.45	0.33	0.13
Uniform Delay, d1	7.9		3.9	4.3	17.9	17.3
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		0.1	0.2	0.3	0.1
Delay (s)	8.2		4.0	4.5	18.1	17.4
Level of Service	A		A	A	B	B
Approach Delay (s)	8.2			4.5	17.6	
Approach LOS	A			A	B	

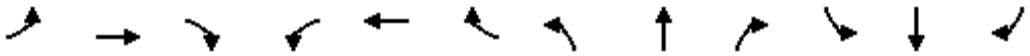
Intersection Summary			
HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	46.9	Sum of lost time (s)	14.5
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	921	196	255	830	0	117	0	50	0	1	2
Future Volume (vph)	1	921	196	255	830	0	117	0	50	0	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	12	12	13	13	12	16	12
Grade (%)		3%			-5%			-5%			3%	
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (prot)	1778	3521	1575	1753	3664			1874	1677		1930	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (perm)	1778	3521	1575	1753	3664			1874	1677		1930	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1	1012	215	280	912	0	129	0	55	0	1	2
RTOR Reduction (vph)	0	0	127	0	0	0	0	0	48	0	2	0
Lane Group Flow (vph)	1	1012	88	280	912	0	0	129	7	0	1	0
Heavy Vehicles (%)	0%	1%	1%	2%	1%	0%	2%	0%	2%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm		NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)	0.3	32.7	32.7	15.4	47.8			10.6	10.6		1.0	
Effective Green, g (s)	0.3	32.7	32.7	15.4	47.8			10.6	10.6		1.0	
Actuated g/C Ratio	0.00	0.41	0.41	0.19	0.60			0.13	0.13		0.01	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	6	1444	646	338	2197			249	223		24	
v/s Ratio Prot	0.00	c0.29		c0.16	0.25			c0.07			c0.00	
v/s Ratio Perm			0.06						0.00			
v/c Ratio	0.17	0.70	0.14	0.83	0.42			0.52	0.03		0.04	
Uniform Delay, d1	39.6	19.5	14.7	30.9	8.5			32.2	30.1		38.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	12.8	1.6	0.1	15.3	0.1			1.8	0.1		0.7	
Delay (s)	52.3	21.0	14.8	46.2	8.6			34.0	30.1		39.6	
Level of Service	D	C	B	D	A			C	C		D	
Approach Delay (s)		19.9			17.4			32.8			39.6	
Approach LOS		B			B			C			D	

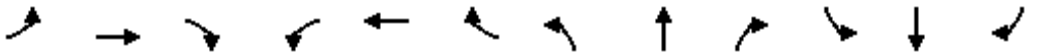
Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	79.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	871	5	203	991	110	45	21	339	94	15	35
Future Volume (vph)	39	871	5	203	991	110	45	21	339	94	15	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	11	10	11	11	12
Grade (%)		3%			0%			-2%			3%	
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1778	3474		1770	3574	1615		1694	1507	1702	1555	
Flt Permitted	0.25	1.00		0.16	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (perm)	459	3474		292	3574	1615		1694	1507	1702	1555	
Peak-hour factor, PHF	0.95	0.95	0.90	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	41	917	6	214	1043	116	47	22	357	99	16	37
RTOR Reduction (vph)	0	1	0	0	0	58	0	0	98	0	33	0
Lane Group Flow (vph)	41	922	0	214	1043	58	0	69	259	99	20	0
Heavy Vehicles (%)	0%	2%	40%	2%	1%	0%	4%	10%	1%	1%	0%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases	2			6		6			8			
Actuated Green, G (s)	31.8	28.7		44.9	36.8	36.8		6.6	17.8	7.2	7.2	
Effective Green, g (s)	31.8	28.7		44.9	36.8	36.8		6.6	17.8	7.2	7.2	
Actuated g/C Ratio	0.43	0.39		0.61	0.50	0.50		0.09	0.24	0.10	0.10	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	253	1352		402	1784	806		151	466	166	151	
v/s Ratio Prot	0.01	c0.27		0.08	c0.29			0.04	c0.08	c0.06	0.01	
v/s Ratio Perm	0.06			0.24		0.04			0.09			
v/c Ratio	0.16	0.68		0.53	0.58	0.07		0.46	0.56	0.60	0.13	
Uniform Delay, d1	12.3	18.7		9.4	13.0	9.6		31.8	24.5	31.9	30.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	1.4		1.4	0.5	0.0		2.2	1.4	5.7	0.4	
Delay (s)	12.6	20.1		10.7	13.5	9.6		34.0	25.9	37.5	30.8	
Level of Service	B	C		B	B	A		C	C	D	C	
Approach Delay (s)		19.8			12.8			27.2			35.2	
Approach LOS		B			B			C			D	

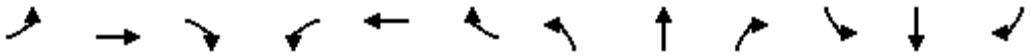
Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	73.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



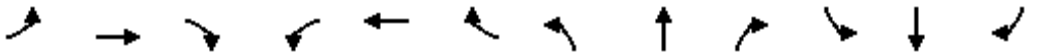
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	394	912	213	954	0	0	0	0	47	3	350
Future Volume (vph)	0	394	912	213	954	0	0	0	0	47	3	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	11	11
Grade (%)		0%			0%			3%			3%	
Total Lost time (s)		5.0	5.0	5.0	5.0						5.0	5.0
Lane Util. Factor		0.95	1.00	1.00	0.95						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		3574	1583	1787	3574						1665	1523
Flt Permitted		1.00	1.00	0.42	1.00						0.95	1.00
Satd. Flow (perm)		3574	1583	788	3574						1665	1523
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	424	981	229	1026	0	0	0	0	51	3	376
RTOR Reduction (vph)	0	0	482	0	0	0	0	0	0	0	0	113
Lane Group Flow (vph)	0	424	499	229	1026	0	0	0	0	0	54	263
Heavy Vehicles (%)	0%	1%	2%	1%	1%	0%	0%	0%	0%	4%	0%	1%
Turn Type		NA	Perm	pm+pt	NA					Split	NA	Perm
Protected Phases		2		1	6					8	8	
Permitted Phases			2	6								8
Actuated Green, G (s)		26.5	26.5	41.2	41.2						13.1	13.1
Effective Green, g (s)		26.5	26.5	41.2	41.2						13.1	13.1
Actuated g/C Ratio		0.41	0.41	0.64	0.64						0.20	0.20
Clearance Time (s)		5.0	5.0	5.0	5.0						5.0	5.0
Vehicle Extension (s)		5.0	5.0	5.0	5.0						5.0	5.0
Lane Grp Cap (vph)		1472	652	655	2290						339	310
v/s Ratio Prot		0.12		0.05	c0.29						0.03	
v/s Ratio Perm			c0.32	0.17								c0.17
v/c Ratio		0.29	0.77	0.35	0.45						0.16	0.85
Uniform Delay, d1		12.6	16.2	5.1	5.8						21.1	24.6
Progression Factor		1.00	1.00	1.00	1.00						1.00	1.00
Incremental Delay, d2		0.2	6.3	0.7	0.3						0.5	20.6
Delay (s)		12.8	22.5	5.7	6.1						21.5	45.3
Level of Service		B	C	A	A						C	D
Approach Delay (s)		19.6			6.0			0.0			42.3	
Approach LOS		B			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	64.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	253	220	0	0	475	131	685	1	66	0	0	0
Future Volume (vph)	253	220	0	0	475	131	685	1	66	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	12	12	12	12	12
Grade (%)		0%			-3%			3%			3%	
Total Lost time (s)	5.0	6.0			6.0	6.0	5.0	5.0				
Lane Util. Factor	1.00	0.95			0.95	1.00	0.95	0.95				
Frt	1.00	1.00			1.00	0.85	1.00	0.97				
Flt Protected	0.95	1.00			1.00	1.00	0.95	0.96				
Satd. Flow (prot)	1787	3574			3628	1623	1617	1649				
Flt Permitted	0.30	1.00			1.00	1.00	0.95	0.96				
Satd. Flow (perm)	570	3574			3628	1623	1617	1649				
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	278	242	0	0	522	144	753	1	73	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	108	0	10	0	0	0	0
Lane Group Flow (vph)	278	242	0	0	522	36	414	403	0	0	0	0
Heavy Vehicles (%)	1%	1%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA			NA	Perm	Split	NA				
Protected Phases	1	6			2		4	4				
Permitted Phases	6					2						
Actuated Green, G (s)	27.2	27.2			13.3	13.3	15.1	15.1				
Effective Green, g (s)	27.2	27.2			13.3	13.3	15.1	15.1				
Actuated g/C Ratio	0.51	0.51			0.25	0.25	0.28	0.28				
Clearance Time (s)	5.0	6.0			6.0	6.0	5.0	5.0				
Vehicle Extension (s)	2.5	2.5			2.5	2.5	2.5	2.5				
Lane Grp Cap (vph)	494	1823			905	404	458	467				
v/s Ratio Prot	c0.09	0.07			0.14		c0.26	0.24				
v/s Ratio Perm	c0.19					0.02						
v/c Ratio	0.56	0.13			0.58	0.09	0.90	0.86				
Uniform Delay, d1	8.1	6.9			17.5	15.4	18.4	18.1				
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00				
Incremental Delay, d2	1.2	0.0			0.7	0.1	20.9	15.0				
Delay (s)	9.3	6.9			18.3	15.4	39.3	33.1				
Level of Service	A	A			B	B	D	C				
Approach Delay (s)		8.2			17.7			36.2			0.0	
Approach LOS		A			B			D			A	

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	53.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	176	54	440	164	249	37	979	247	221	1279	95
Future Volume (vph)	120	176	54	440	164	249	37	979	247	221	1279	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	12	12	12	11	12	11	11	11	11
Total Lost time (s)	6.7	6.7		7.7	7.7		7.7	5.7	7.7	7.4	5.8	6.7
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1636	3233		1752	1711		1694	3539	1473	1711	3421	1516
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1636	3233		1752	1711		1694	3539	1473	1711	3421	1516
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	136	200	61	500	186	283	42	1112	281	251	1453	108
RTOR Reduction (vph)	0	18	0	0	33	0	0	0	74	0	0	38
Lane Group Flow (vph)	136	243	0	500	436	0	42	1113	207	251	1453	70
Heavy Vehicles (%)	3%	3%	8%	3%	1%	1%	3%	2%	6%	2%	2%	3%
Turn Type	Split	NA		Split	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	4	4		3	3		1	6	3	5	2	4
Permitted Phases									6			2
Actuated Green, G (s)	19.5	19.5		37.4	37.4		8.1	55.2	92.6	17.6	64.3	83.8
Effective Green, g (s)	19.5	19.5		37.4	37.4		8.1	55.2	92.6	17.6	64.3	83.8
Actuated g/C Ratio	0.12	0.12		0.24	0.24		0.05	0.35	0.59	0.11	0.41	0.53
Clearance Time (s)	6.7	6.7		7.7	7.7		7.7	5.7	7.7	7.4	5.8	6.7
Vehicle Extension (s)	3.5	3.5		3.5	3.5		3.5	5.0	3.5	3.5	5.0	3.5
Lane Grp Cap (vph)	202	401		416	407		87	1242	867	191	1399	808
v/s Ratio Prot	c0.08	0.08		c0.29	0.25		0.02	0.31	0.06	c0.15	c0.42	0.01
v/s Ratio Perm									0.08			0.04
v/c Ratio	0.67	0.60		1.20	1.07		0.48	0.90	0.24	1.31	1.04	0.09
Uniform Delay, d1	65.8	65.2		59.9	59.9		72.5	48.3	15.4	69.8	46.4	18.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.9	2.7		111.8	65.1		4.9	9.3	0.2	173.5	34.7	0.1
Delay (s)	74.7	67.9		171.7	125.0		77.4	57.6	15.6	243.3	81.1	18.0
Level of Service	E	E		F	F		E	E	B	F	F	B
Approach Delay (s)		70.2			149.1			49.9			99.8	
Approach LOS		E			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	92.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	157.2	Sum of lost time (s)	27.9
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	620	1288	41	398
v/c Ratio	0.52	0.83	0.16	0.70
Control Delay	15.6	13.9	21.3	10.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.6	13.9	21.3	10.7
Queue Length 50th (ft)	71	87	12	3
Queue Length 95th (ft)	131	#225	33	60
Internal Link Dist (ft)	1043	605	674	
Turn Bay Length (ft)				180
Base Capacity (vph)	2285	2160	489	730
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.27	0.60	0.08	0.55

Intersection Summary

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

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	935	30	1033	85	193
v/c Ratio	0.50	0.07	0.48	0.32	0.48
Control Delay	9.0	3.8	5.7	21.8	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	3.8	5.7	21.8	8.8
Queue Length 50th (ft)	48	2	56	14	0
Queue Length 95th (ft)	162	9	106	62	47
Internal Link Dist (ft)	952		1251	593	
Turn Bay Length (ft)		330			240
Base Capacity (vph)	2523	579	3309	603	659
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.37	0.05	0.31	0.14	0.29

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	1	1012	215	280	912	129	55	3
v/c Ratio	0.02	0.72	0.29	0.74	0.37	0.47	0.14	0.02
Control Delay	41.0	22.4	3.7	43.6	7.2	35.9	0.7	30.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.0	22.4	3.7	43.6	7.2	35.9	0.7	30.0
Queue Length 50th (ft)	0	178	0	113	63	51	0	0
Queue Length 95th (ft)	6	340	43	#321	216	122	0	10
Internal Link Dist (ft)		1348			700	355		176
Turn Bay Length (ft)	380		280	310				
Base Capacity (vph)	51	1770	898	377	2593	538	608	417
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.57	0.24	0.74	0.35	0.24	0.09	0.01

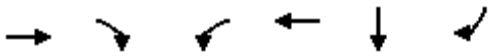
Intersection Summary

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

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	41	923	214	1043	116	69	357	99	53
v/c Ratio	0.12	0.71	0.51	0.52	0.12	0.33	0.64	0.44	0.22
Control Delay	10.3	26.2	14.2	16.7	2.1	36.7	18.7	38.3	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.3	26.2	14.2	16.7	2.1	36.7	18.7	38.3	18.0
Queue Length 50th (ft)	8	196	47	207	0	30	86	43	7
Queue Length 95th (ft)	23	#368	99	296	20	72	164	96	40
Internal Link Dist (ft)		700		797		519			443
Turn Bay Length (ft)	250		420		300		160	190	
Base Capacity (vph)	339	1306	804	2340	1107	291	914	292	298
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.71	0.27	0.45	0.10	0.24	0.39	0.34	0.18

Intersection Summary

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



Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	424	981	229	1026	54	376
v/c Ratio	0.29	0.87	0.35	0.45	0.16	0.89
Control Delay	13.0	13.2	6.2	6.4	24.3	43.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.0	13.2	6.2	6.4	24.3	43.0
Queue Length 50th (ft)	56	40	31	89	19	98
Queue Length 95th (ft)	84	#356	55	122	47	#256
Internal Link Dist (ft)	797			663	620	
Turn Bay Length (ft)		280	250			125
Base Capacity (vph)	1677	1178	660	2517	338	423
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.83	0.35	0.41	0.16	0.89

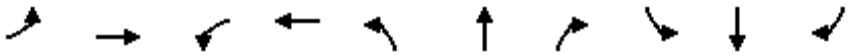
Intersection Summary

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

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT
Lane Group Flow (vph)	278	242	522	144	414	413
v/c Ratio	0.55	0.13	0.58	0.28	0.91	0.87
Control Delay	11.2	6.8	20.4	5.1	48.6	41.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.2	6.8	20.4	5.1	48.6	41.8
Queue Length 50th (ft)	44	18	77	0	133	127
Queue Length 95th (ft)	78	32	117	32	#330	#322
Internal Link Dist (ft)		663	458			755
Turn Bay Length (ft)	170			180		
Base Capacity (vph)	530	2968	1986	953	457	476
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.08	0.26	0.15	0.91	0.87

Intersection Summary

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



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	136	261	500	469	42	1113	281	251	1453	108
v/c Ratio	0.67	0.62	1.19	1.06	0.39	0.91	0.29	1.30	1.03	0.13
Control Delay	80.8	65.6	156.1	109.4	82.4	61.2	5.8	217.8	75.9	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.8	65.6	156.1	109.4	82.4	61.2	5.8	217.8	75.9	3.7
Queue Length 50th (ft)	135	124	~616	~491	42	570	40	~327	~864	8
Queue Length 95th (ft)	206	169	#877	#747	87	#731	92	#528	#1082	28
Internal Link Dist (ft)		661		1043		1143			649	
Turn Bay Length (ft)	90				200		360	250		280
Base Capacity (vph)	298	606	420	443	134	1237	982	193	1413	909
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.43	1.19	1.06	0.31	0.90	0.29	1.30	1.03	0.12

Intersection Summary

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

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

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	1088	1	4	937	8	1	0	12	18	0	8
Future Vol, veh/h	3	1088	1	4	937	8	1	0	12	18	0	8
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	-	-	140	-	-	140	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-5	-	-	5	-	-	3	-	-	-5	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	3	1183	1	4	1018	9	1	0	13	20	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1018	0	0	1183	0	0	1707	2216	591	1625	2216	509
Stage 1	-	-	-	-	-	-	1189	1189	-	1027	1027	-
Stage 2	-	-	-	-	-	-	518	1027	-	598	1189	-
Critical Hdwy	4.1	-	-	4.1	-	-	8.1	7.1	7.2	6.5	5.5	6.4
Critical Hdwy Stg 1	-	-	-	-	-	-	7.1	6.1	-	5.5	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7.1	6.1	-	5.5	4.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	689	-	-	597	-	-	45	31	433	109	82	552
Stage 1	-	-	-	-	-	-	166	216	-	339	418	-
Stage 2	-	-	-	-	-	-	471	265	-	544	367	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	689	-	-	597	-	-	43	30	433	103	80	552
Mov Cap-2 Maneuver	-	-	-	-	-	-	43	30	-	103	80	-
Stage 1	-	-	-	-	-	-	164	213	-	335	411	-
Stage 2	-	-	-	-	-	-	456	261	-	521	362	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	19.9	38
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	255	689	-	-	597	-	-	137
HCM Lane V/C Ratio	0.055	0.005	-	-	0.007	-	-	0.206
HCM Control Delay (s)	19.9	10.2	0	-	11.1	0.1	-	38
HCM Lane LOS	C	B	A	-	B	A	-	E
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.7

Intersection	
Intersection Delay, s/veh	31.9
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	101	30	155	44	261	8	251	53	13	0	24	112
Future Vol, veh/h	101	30	155	44	261	8	251	53	13	0	24	112
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	0	0	3	0	1	0	1	0	8	0	0	0
Mvmt Flow	128	38	196	56	330	10	318	67	16	0	30	142
Number of Lanes	0	1	1	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	2
HCM Control Delay	15.3	41.3	45.6	13.5
HCM LOS	C	E	E	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	79%	77%	0%	14%	0%	0%
Vol Thru, %	17%	23%	0%	83%	100%	0%
Vol Right, %	4%	0%	100%	3%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	317	131	155	313	24	112
LT Vol	251	101	0	44	0	0
Through Vol	53	30	0	261	24	0
RT Vol	13	0	155	8	0	112
Lane Flow Rate	401	166	196	396	30	142
Geometry Grp	6	7	7	6	7	7
Degree of Util (X)	0.877	0.384	0.393	0.851	0.072	0.306
Departure Headway (Hd)	7.866	8.33	7.208	7.732	8.493	7.766
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	461	431	498	468	421	462
Service Time	5.915	6.088	4.966	5.784	6.257	5.531
HCM Lane V/C Ratio	0.87	0.385	0.394	0.846	0.071	0.307
HCM Control Delay	45.6	16.2	14.6	41.3	11.9	13.9
HCM Lane LOS	E	C	B	E	B	B
HCM 95th-tile Q	9.2	1.8	1.9	8.6	0.2	1.3

Intersection	
Int Delay, s/veh	19

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	307	16	141	231	13	449
Future Vol, veh/h	307	16	141	231	13	449
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	255	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	0	1	3	8	3
Mvmt Flow	334	17	153	251	14	488

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	795	279	0	0	404	0
Stage 1	279	-	-	-	-	-
Stage 2	516	-	-	-	-	-
Critical Hdwy	6.41	6.2	-	-	4.18	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.3	-	-	2.272	-
Pot Cap-1 Maneuver	358	765	-	-	1123	-
Stage 1	770	-	-	-	-	-
Stage 2	601	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	352	765	-	-	1123	-
Mov Cap-2 Maneuver	352	-	-	-	-	-
Stage 1	770	-	-	-	-	-
Stage 2	591	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	67.6	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	352	765	1123	-
HCM Lane V/C Ratio	-	-	0.948	0.023	0.013	-
HCM Control Delay (s)	-	-	70.6	9.8	8.2	0
HCM Lane LOS	-	-	F	A	A	A
HCM 95th %tile Q(veh)	-	-	10.1	0.1	0	-

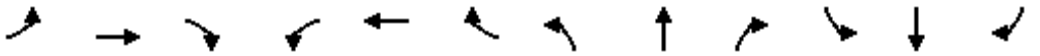
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	958	15	311	644	21	827
Future Volume (vph)	958	15	311	644	21	827
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	12
Grade (%)	0%			0%	2%	
Total Lost time (s)	6.5			6.5	5.3	5.3
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			0.98	0.95	1.00
Satd. Flow (prot)	3567			3528	1630	1583
Flt Permitted	1.00			0.52	0.95	1.00
Satd. Flow (perm)	3567			1878	1630	1583
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	1089	17	353	732	24	940
RTOR Reduction (vph)	1	0	0	0	0	82
Lane Group Flow (vph)	1105	0	0	1085	24	858
Heavy Vehicles (%)	1%	0%	0%	1%	6%	1%
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	4	
Permitted Phases			6			4
Actuated Green, G (s)	41.9			53.5	44.7	44.7
Effective Green, g (s)	41.9			53.5	44.7	44.7
Actuated g/C Ratio	0.38			0.49	0.41	0.41
Clearance Time (s)	6.5			6.5	5.3	5.3
Vehicle Extension (s)	3.0			3.0	2.0	2.0
Lane Grp Cap (vph)	1358			989	662	643
v/s Ratio Prot	0.31			c0.05	0.01	
v/s Ratio Perm				c0.48		c0.54
v/c Ratio	0.81			2.29dl	0.04	1.33
Uniform Delay, d1	30.5			28.2	19.7	32.6
Progression Factor	1.01			0.39	1.00	1.00
Incremental Delay, d2	1.9			58.4	0.0	161.0
Delay (s)	32.7			69.5	19.7	193.6
Level of Service	C			E	B	F
Approach Delay (s)	32.7			69.5	189.3	
Approach LOS	C			E	F	

Intersection Summary			
HCM 2000 Control Delay	93.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.3
Intersection Capacity Utilization	88.0%	ICU Level of Service	E
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

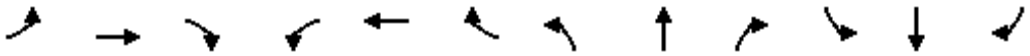
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1669	72	90	1008	15	14
Future Volume (vph)	1669	72	90	1008	15	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	11	12	11	11
Grade (%)	0%			0%	3%	
Total Lost time (s)	5.0		4.5	5.0	5.0	5.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3554		1728	3574	1719	1411
Flt Permitted	1.00		0.07	1.00	0.95	1.00
Satd. Flow (perm)	3554		122	3574	1719	1411
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	1897	82	102	1145	17	16
RTOR Reduction (vph)	2	0	0	0	0	16
Lane Group Flow (vph)	1977	0	102	1145	17	0
Heavy Vehicles (%)	1%	0%	1%	1%	0%	9%
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases			2			4
Actuated Green, G (s)	85.5		96.6	96.6	3.4	3.4
Effective Green, g (s)	85.5		96.6	96.6	3.4	3.4
Actuated g/C Ratio	0.78		0.88	0.88	0.03	0.03
Clearance Time (s)	5.0		4.5	5.0	5.0	5.0
Vehicle Extension (s)	3.5		2.0	3.5	2.0	2.0
Lane Grp Cap (vph)	2762		203	3138	53	43
v/s Ratio Prot	c0.56		c0.03	0.32	c0.01	
v/s Ratio Perm			0.41			0.00
v/c Ratio	0.72		0.50	0.36	0.32	0.01
Uniform Delay, d1	6.1		11.5	1.2	52.2	51.7
Progression Factor	1.16		3.37	0.06	1.00	1.00
Incremental Delay, d2	0.1		0.6	0.3	1.3	0.0
Delay (s)	7.3		39.2	0.3	53.4	51.7
Level of Service	A		D	A	D	D
Approach Delay (s)	7.3			3.5	52.6	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	6.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



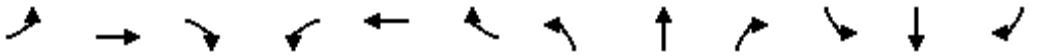
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1332	207	135	1006	0	216	0	75	0	0	0
Future Volume (vph)	0	1332	207	135	1006	0	216	0	75	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	12	12	13	13	12	16	12
Grade (%)		3%			-5%			-5%			3%	
Total Lost time (s)		5.0	5.0	5.0	5.0			5.0	5.0			
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00			
Frt		1.00	0.85	1.00	1.00			1.00	0.85			
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00			
Satd. Flow (prot)		3521	1544	1736	3664			1856	1614			
Flt Permitted		1.00	1.00	0.95	1.00			0.95	1.00			
Satd. Flow (perm)		3521	1544	1736	3664			1856	1614			
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	1497	233	152	1130	0	243	0	84	0	0	0
RTOR Reduction (vph)	0	0	57	0	0	0	0	0	69	0	0	0
Lane Group Flow (vph)	0	1497	176	152	1130	0	0	243	15	0	0	0
Heavy Vehicles (%)	0%	1%	3%	3%	1%	0%	3%	0%	6%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm			
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)		68.2	68.2	7.0	80.2			19.8	19.8			
Effective Green, g (s)		68.2	68.2	7.0	80.2			19.8	19.8			
Actuated g/C Ratio		0.62	0.62	0.06	0.73			0.18	0.18			
Clearance Time (s)		5.0	5.0	5.0	5.0			5.0	5.0			
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)		2183	957	110	2671			334	290			
v/s Ratio Prot		c0.43		c0.09	0.31			c0.13				
v/s Ratio Perm			0.11						0.01			
v/c Ratio		0.69	0.18	1.38	0.42			0.73	0.05			
Uniform Delay, d1		13.8	9.0	51.5	5.8			42.6	37.3			
Progression Factor		0.70	0.67	0.67	0.12			1.00	1.00			
Incremental Delay, d2		1.5	0.4	214.8	0.4			7.7	0.1			
Delay (s)		11.1	6.4	249.3	1.1			50.2	37.4			
Level of Service		B	A	F	A			D	D			
Approach Delay (s)		10.5			30.6			46.9			0.0	
Approach LOS		B			C			D			A	

Intersection Summary			
HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



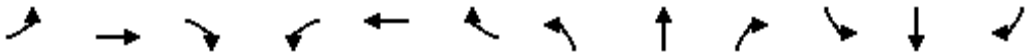
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1363	13	335	1091	99	9	17	544	46	12	22
Future Volume (vph)	40	1363	13	335	1091	99	9	17	544	46	12	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	11	10	11	11	12
Grade (%)		3%			0%			-2%			3%	
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1662	3513		1770	3539	1538		1824	1464	1621	1575	
Flt Permitted	0.23	1.00		0.08	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (perm)	394	3513		149	3539	1538		1824	1464	1621	1575	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	45	1549	15	381	1240	112	10	19	618	52	14	25
RTOR Reduction (vph)	0	1	0	0	0	32	0	0	43	0	24	0
Lane Group Flow (vph)	45	1563	0	381	1240	81	0	29	575	52	15	0
Heavy Vehicles (%)	7%	1%	10%	2%	2%	5%	0%	0%	4%	6%	0%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases	2			6		6			8			
Actuated Green, G (s)	49.2	45.1		88.0	78.9	78.9		3.0	40.9	4.0	4.0	
Effective Green, g (s)	49.2	45.1		88.0	78.9	78.9		3.0	40.9	4.0	4.0	
Actuated g/C Ratio	0.45	0.41		0.80	0.72	0.72		0.03	0.37	0.04	0.04	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	223	1440		677	2538	1103		49	610	58	57	
v/s Ratio Prot	0.01	c0.45		0.19	0.35			0.02	c0.32	c0.03	0.01	
v/s Ratio Perm	0.08			0.26		0.05			0.07			
v/c Ratio	0.20	1.09		0.56	0.49	0.07		0.59	0.94	0.90	0.26	
Uniform Delay, d1	19.0	32.5		22.8	6.8	4.6		52.9	33.4	52.8	51.6	
Progression Factor	0.41	0.64		1.26	0.36	0.48		1.03	0.96	1.00	1.00	
Incremental Delay, d2	0.3	48.2		0.8	0.5	0.1		17.7	23.0	80.9	2.4	
Delay (s)	8.2	69.1		29.5	3.0	2.3		72.2	55.1	133.7	54.0	
Level of Service	A	E		C	A	A		E	E	F	D	
Approach Delay (s)		67.4			8.8			55.9			99.6	
Approach LOS		E			A			E			F	

Intersection Summary			
HCM 2000 Control Delay	41.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	88.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



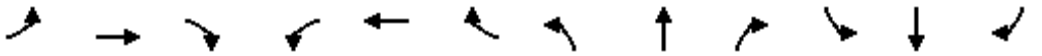
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	766	1194	121	1230	0	0	0	0	167	1	295
Future Volume (vph)	0	766	1194	121	1230	0	0	0	0	167	1	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	11	11
Grade (%)		0%			0%			3%			3%	
Total Lost time (s)		5.0	5.0	5.0	5.0						5.0	5.0
Lane Util. Factor		0.95	1.00	1.00	0.95						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		3574	1553	1787	3574						1657	1451
Flt Permitted		1.00	1.00	0.27	1.00						0.95	1.00
Satd. Flow (perm)		3574	1553	510	3574						1657	1451
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	870	1357	138	1398	0	0	0	0	190	1	335
RTOR Reduction (vph)	0	0	319	0	0	0	0	0	0	0	0	82
Lane Group Flow (vph)	0	870	1038	138	1398	0	0	0	0	0	191	253
Heavy Vehicles (%)	0%	1%	4%	1%	1%	0%	0%	0%	0%	4%	0%	6%
Turn Type		NA	Perm	pm+pt	NA					Split	NA	Perm
Protected Phases		2		1	6					8	8	
Permitted Phases			2	6								8
Actuated Green, G (s)		72.0	72.0	84.0	84.0						16.0	16.0
Effective Green, g (s)		72.0	72.0	84.0	84.0						16.0	16.0
Actuated g/C Ratio		0.65	0.65	0.76	0.76						0.15	0.15
Clearance Time (s)		5.0	5.0	5.0	5.0						5.0	5.0
Vehicle Extension (s)		5.0	5.0	5.0	5.0						5.0	5.0
Lane Grp Cap (vph)		2339	1016	470	2729						241	211
v/s Ratio Prot		0.24		0.02	c0.39						0.12	
v/s Ratio Perm			c0.67	0.21								c0.17
v/c Ratio		0.37	1.02	0.29	0.51						0.79	1.20
Uniform Delay, d1		8.7	19.0	4.3	5.0						45.4	47.0
Progression Factor		0.58	1.96	1.05	1.58						1.00	1.00
Incremental Delay, d2		0.1	19.4	0.4	0.4						18.4	126.0
Delay (s)		5.1	56.7	5.0	8.4						63.8	173.0
Level of Service		A	E	A	A						E	F
Approach Delay (s)		36.6			8.1			0.0			133.3	
Approach LOS		D			A			A			F	

Intersection Summary			
HCM 2000 Control Delay	38.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	102.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	386	550	0	0	413	68	891	0	236	0	0	0
Future Volume (vph)	386	550	0	0	413	68	891	0	236	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	12	12	12	12	12
Grade (%)		0%			-3%			3%			3%	
Total Lost time (s)	5.0	6.0			6.0	6.0	5.0	5.0				
Lane Util. Factor	1.00	0.95			0.95	1.00	0.95	0.95				
Frt	1.00	1.00			1.00	0.85	1.00	0.94				
Flt Protected	0.95	1.00			1.00	1.00	0.95	0.97				
Satd. Flow (prot)	1770	3574			3523	1546	1585	1590				
Flt Permitted	0.24	1.00			1.00	1.00	0.95	0.97				
Satd. Flow (perm)	438	3574			3523	1546	1585	1590				
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	439	625	0	0	469	77	1012	0	268	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	63	0	43	0	0	0	0
Lane Group Flow (vph)	439	625	0	0	469	14	658	580	0	0	0	0
Heavy Vehicles (%)	2%	1%	0%	0%	4%	6%	3%	0%	0%	2%	2%	2%
Turn Type	pm+pt	NA			NA	Perm	Split	NA				
Protected Phases	1	6			2		4	4				
Permitted Phases	6					2						
Actuated Green, G (s)	49.4	49.4			20.7	20.7	49.6	49.6				
Effective Green, g (s)	49.4	49.4			20.7	20.7	49.6	49.6				
Actuated g/C Ratio	0.45	0.45			0.19	0.19	0.45	0.45				
Clearance Time (s)	5.0	6.0			6.0	6.0	5.0	5.0				
Vehicle Extension (s)	2.5	2.5			2.5	2.5	2.5	2.5				
Lane Grp Cap (vph)	483	1605			662	290	714	716				
v/s Ratio Prot	c0.20	0.17			0.13		c0.42	0.36				
v/s Ratio Perm	c0.21					0.01						
v/c Ratio	0.91	0.39			0.71	0.05	0.92	0.81				
Uniform Delay, d1	23.8	20.2			41.8	36.6	28.4	26.1				
Progression Factor	0.85	0.56			1.00	1.00	1.00	1.00				
Incremental Delay, d2	19.3	0.7			6.3	0.3	17.3	6.6				
Delay (s)	39.6	11.9			48.1	36.9	45.7	32.7				
Level of Service	D	B			D	D	D	C				
Approach Delay (s)		23.3			46.5			39.4			0.0	
Approach LOS		C			D			D			A	

Intersection Summary			
HCM 2000 Control Delay	34.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	102.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	227	8	363	196	177	41	1572	665	268	954	119
Future Volume (vph)	103	227	8	363	196	177	41	1572	665	268	954	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	12	12	12	11	12	11	11	11	11
Total Lost time (s)	6.7	6.7		7.7	7.7	7.7	7.7	5.7	7.7	7.4	5.8	6.7
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1604	3334		3273	1810	1495	1745	5036	1531	1694	4868	1473
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1604	3334		3273	1810	1495	1745	5036	1531	1694	4868	1473
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	117	258	9	412	223	201	47	1786	756	305	1084	135
RTOR Reduction (vph)	0	2	0	0	0	173	0	0	94	0	0	61
Lane Group Flow (vph)	117	265	0	413	223	28	47	1786	662	305	1084	74
Heavy Vehicles (%)	5%	4%	8%	7%	5%	8%	0%	3%	2%	3%	3%	6%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	4	4		3	3		1	6	3	5	2	4
Permitted Phases						3			6			2
Actuated Green, G (s)	9.1	9.1		15.3	15.3	15.3	6.4	38.9	54.2	19.2	51.3	60.4
Effective Green, g (s)	9.1	9.1		15.3	15.3	15.3	6.4	38.9	54.2	19.2	51.3	60.4
Actuated g/C Ratio	0.08	0.08		0.14	0.14	0.14	0.06	0.35	0.49	0.17	0.47	0.55
Clearance Time (s)	6.7	6.7		7.7	7.7	7.7	7.7	5.7	7.7	7.4	5.8	6.7
Vehicle Extension (s)	3.5	3.5		3.5	3.5	3.5	3.5	5.0	3.5	3.5	5.0	3.5
Lane Grp Cap (vph)	132	275		455	251	207	101	1780	754	295	2270	808
v/s Ratio Prot	0.07	c0.08		c0.13	0.12		0.03	c0.35	0.12	c0.18	0.22	0.01
v/s Ratio Perm						0.02			0.31			0.04
v/c Ratio	0.89	0.96		0.91	0.89	0.14	0.47	1.00	0.88	1.03	0.48	0.09
Uniform Delay, d1	49.9	50.3		46.7	46.5	41.5	50.1	35.5	24.9	45.4	20.1	11.8
Progression Factor	1.00	1.00		0.53	0.53	2.91	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	46.2	44.4		8.4	11.6	0.1	4.0	22.1	11.5	61.5	0.7	0.1
Delay (s)	96.2	94.6		33.3	36.4	120.9	54.1	57.7	36.4	106.9	20.9	11.8
Level of Service	F	F		C	D	F	D	E	D	F	C	B
Approach Delay (s)		95.1			55.2			51.4			37.3	
Approach LOS		F			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	51.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	27.9
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	1106	1085	24	940
v/c Ratio	0.81	2.29dl	0.04	1.30
Control Delay	33.1	72.5	20.0	169.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	33.1	72.5	20.0	169.8
Queue Length 50th (ft)	352	~90	10	~794
Queue Length 95th (ft)	m384	#407	27	#1007
Internal Link Dist (ft)	1043	605	674	
Turn Bay Length (ft)				180
Base Capacity (vph)	1360	990	662	725
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.81	1.10	0.04	1.30

Intersection Summary

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

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

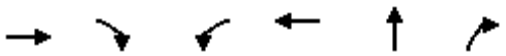
m Volume for 95th percentile queue is metered by upstream signal.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1979	102	1145	17	16
v/c Ratio	0.70	0.50	0.35	0.21	0.20
Control Delay	7.7	29.4	0.3	56.5	27.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.7	29.4	0.3	56.5	27.6
Queue Length 50th (ft)	414	23	3	12	0
Queue Length 95th (ft)	m342	m48	3	35	23
Internal Link Dist (ft)	952		1251	593	
Turn Bay Length (ft)		330			240
Base Capacity (vph)	2831	267	3281	83	83
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.70	0.38	0.35	0.20	0.19

Intersection Summary

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



Lane Group	EBT	EBR	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	1497	233	152	1130	243	84
v/c Ratio	0.69	0.23	1.38	0.42	0.73	0.20
Control Delay	12.0	3.2	246.0	1.2	54.7	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.0	3.2	246.0	1.2	54.7	1.0
Queue Length 50th (ft)	132	4	~142	7	164	0
Queue Length 95th (ft)	289	22	#269	16	228	0
Internal Link Dist (ft)	1348			700	365	
Turn Bay Length (ft)		280	310			
Base Capacity (vph)	2182	1013	110	2670	506	563
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.23	1.38	0.42	0.48	0.15

Intersection Summary

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

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

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	45	1564	381	1240	113	29	618	52	39
v/c Ratio	0.18	1.02	0.56	0.46	0.09	0.35	0.99	0.71	0.41
Control Delay	5.1	47.1	28.0	2.9	0.6	64.0	62.0	98.3	39.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.1	47.1	28.0	2.9	0.6	64.0	62.0	98.3	39.9
Queue Length 50th (ft)	5	~641	162	31	0	20	397	37	10
Queue Length 95th (ft)	m7	#750	m226	m88	m4	m49	m#597	#102	44
Internal Link Dist (ft)		700		797		519			443
Turn Bay Length (ft)	250		420		300		160	190	
Base Capacity (vph)	251	1536	682	2697	1200	84	626	73	95
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	1.02	0.56	0.46	0.09	0.35	0.99	0.71	0.41

Intersection Summary

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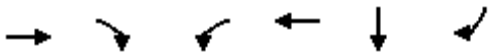
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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



Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	870	1357	138	1398	191	335
v/c Ratio	0.37	1.02	0.29	0.51	0.79	1.14
Control Delay	5.2	28.3	4.5	8.5	69.3	128.3
Queue Delay	0.0	3.6	0.0	0.3	0.0	0.0
Total Delay	5.2	32.0	4.5	8.8	69.3	128.3
Queue Length 50th (ft)	78	~372	21	278	132	~216
Queue Length 95th (ft)	m78	m#340	m31	311	#238	#383
Internal Link Dist (ft)	797			663	620	
Turn Bay Length (ft)		280	250			125
Base Capacity (vph)	2339	1335	470	2729	241	293
Starvation Cap Reductn	0	15	0	592	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	1.03	0.29	0.65	0.79	1.14

Intersection Summary

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

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

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

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT
Lane Group Flow (vph)	439	625	469	77	658	623
v/c Ratio	0.90	0.39	0.71	0.22	0.92	0.82
Control Delay	42.8	12.4	49.8	10.8	47.8	32.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.8	12.4	49.8	10.8	47.8	32.6
Queue Length 50th (ft)	207	73	170	0	428	334
Queue Length 95th (ft)	m#393	94	#235	40	#645	484
Internal Link Dist (ft)		663	458			755
Turn Bay Length (ft)	170			180		
Base Capacity (vph)	497	1604	664	354	749	792
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.39	0.71	0.22	0.88	0.79

Intersection Summary

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

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	117	267	413	223	201	47	1786	756	305	1084	135
v/c Ratio	0.89	0.96	0.91	0.89	0.48	0.37	1.04	0.94	0.96	0.46	0.14
Control Delay	103.7	96.3	36.5	41.4	8.8	57.6	69.9	34.3	86.3	20.7	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	103.7	96.3	36.5	41.4	8.8	57.6	69.9	34.3	86.3	20.7	2.1
Queue Length 50th (ft)	83	100	138	144	37	32	~501	239	215	192	0
Queue Length 95th (ft)	#187	#180	m130	m140	m35	70	#575	#485	#374	226	23
Internal Link Dist (ft)		661		1043			1143			649	
Turn Bay Length (ft)	90		300		300	200		360	250		280
Base Capacity (vph)	132	277	455	251	418	126	1712	805	318	2338	958
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.96	0.91	0.89	0.48	0.37	1.04	0.94	0.96	0.46	0.14

Intersection Summary

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

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

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

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1565	4	8	1160	18	0	0	8	8	0	4
Future Vol, veh/h	5	1565	4	8	1160	18	0	0	8	8	0	4
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	-	-	140	-	-	140	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-5	-	-	5	-	-	3	-	-	-5	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	6	1778	5	9	1318	20	0	0	9	9	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1318	0	0	1778	0	0	2467	3126	889	2237	3126	659
Stage 1	-	-	-	-	-	-	1790	1790	-	1336	1336	-
Stage 2	-	-	-	-	-	-	677	1336	-	901	1790	-
Critical Hdwy	4.1	-	-	4.1	-	-	8.1	7.1	7.2	6.5	5.5	6.4
Critical Hdwy Stg 1	-	-	-	-	-	-	7.1	6.1	-	5.5	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7.1	6.1	-	5.5	4.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	531	-	-	354	-	-	11	7	270	44	27	450
Stage 1	-	-	-	-	-	-	64	100	-	239	325	-
Stage 2	-	-	-	-	-	-	369	180	-	390	221	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	531	-	-	354	-	-	-	0	270	-	0	450
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	0	-	-	0	-
Stage 1	-	-	-	-	-	-	64	0	-	239	293	-
Stage 2	-	-	-	-	-	-	329	162	-	-	0	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.9	0.6		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	531	-	-	354	-	-	-
HCM Lane V/C Ratio	-	0.011	-	-	0.026	-	-	-
HCM Control Delay (s)	-	11.9	3.9	-	15.4	0.5	-	-
HCM Lane LOS	-	B	A	-	C	A	-	-
HCM 95th %tile Q(veh)	-	0	-	-	0.1	-	-	-

Intersection	
Intersection Delay, s/veh	37.5
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	424	287	4	79	3	181	21	94	13	45	163
Future Vol, veh/h	48	424	287	4	79	3	181	21	94	13	45	163
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	0	0	4	0	7	0	3	0	4	0	6	0
Mvmt Flow	55	482	326	5	90	3	206	24	107	15	51	185
Number of Lanes	0	1	1	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	2
HCM Control Delay	51.8	13.5	25.4	13.7
HCM LOS	F	B	D	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	61%	10%	0%	5%	22%	0%
Vol Thru, %	7%	90%	0%	92%	78%	0%
Vol Right, %	32%	0%	100%	3%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	296	472	287	86	58	163
LT Vol	181	48	0	4	13	0
Through Vol	21	424	0	79	45	0
RT Vol	94	0	287	3	0	163
Lane Flow Rate	336	536	326	98	66	185
Geometry Grp	6	7	7	6	7	7
Degree of Util (X)	0.688	1.03	0.557	0.218	0.145	0.37
Departure Headway (Hd)	7.49	6.915	6.149	8.215	8.084	7.352
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	484	531	590	440	446	493
Service Time	5.49	4.615	3.849	6.215	5.784	5.052
HCM Lane V/C Ratio	0.694	1.009	0.553	0.223	0.148	0.375
HCM Control Delay	25.4	73.4	16.3	13.5	12.2	14.3
HCM Lane LOS	D	F	C	B	B	B
HCM 95th-tile Q	5.2	15.2	3.4	0.8	0.5	1.7

Intersection	
Int Delay, s/veh	26.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	184	4	333	613	80	281
Future Vol, veh/h	184	4	333	613	80	281
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	255	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	6	0	3	2	2	5
Mvmt Flow	207	4	374	689	90	316

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1215	719	0	0	1063	0
Stage 1	719	-	-	-	-	-
Stage 2	496	-	-	-	-	-
Critical Hdwy	6.46	6.2	-	-	4.12	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.3	-	-	2.218	-
Pot Cap-1 Maneuver	~ 197	432	-	-	655	-
Stage 1	475	-	-	-	-	-
Stage 2	604	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 164	432	-	-	655	-
Mov Cap-2 Maneuver	~ 164	-	-	-	-	-
Stage 1	475	-	-	-	-	-
Stage 2	503	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	207.5	0	2.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	164	432	655	-
HCM Lane V/C Ratio	-	-	1.261	0.01	0.137	-
HCM Control Delay (s)	-	-	211.7	13.4	11.4	0
HCM Lane LOS	-	-	F	B	B	A
HCM 95th %tile Q(veh)	-	-	11.9	0	0.5	-

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

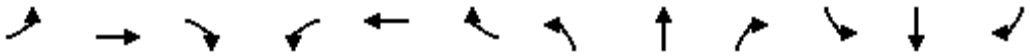
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	843	62	498	1208	46	586
Future Volume (vph)	843	62	498	1208	46	586
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	12
Grade (%)	0%			0%	2%	
Total Lost time (s)	6.5			6.5	5.3	5.3
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	0.99			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3540			3533	1727	1599
Flt Permitted	1.00			0.50	0.95	1.00
Satd. Flow (perm)	3540			1791	1727	1599
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	958	70	566	1373	52	666
RTOR Reduction (vph)	6	0	0	0	0	168
Lane Group Flow (vph)	1022	0	0	1939	52	498
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	4	
Permitted Phases			6			4
Actuated Green, G (s)	57.7			108.5	29.7	29.7
Effective Green, g (s)	57.7			108.5	29.7	29.7
Actuated g/C Ratio	0.38			0.72	0.20	0.20
Clearance Time (s)	6.5			6.5	5.3	5.3
Vehicle Extension (s)	3.0			3.0	2.0	2.0
Lane Grp Cap (vph)	1361			1809	341	316
v/s Ratio Prot	0.29			c0.32	0.03	
v/s Ratio Perm				c0.46		c0.31
v/c Ratio	0.75			1.07	0.15	1.58
Uniform Delay, d1	39.9			20.8	49.7	60.1
Progression Factor	0.91			0.77	1.00	1.00
Incremental Delay, d2	1.9			42.1	0.1	274.5
Delay (s)	38.4			58.1	49.8	334.6
Level of Service	D			E	D	F
Approach Delay (s)	38.4			58.1	314.0	
Approach LOS	D			E	F	

Intersection Summary			
HCM 2000 Control Delay	102.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	18.3
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1427	18	36	1471	100	229
Future Volume (vph)	1427	18	36	1471	100	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	11	12	11	11
Grade (%)	0%			0%	3%	
Total Lost time (s)	5.0		4.5	5.0	5.0	5.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3554		1745	3574	1702	1508
Flt Permitted	1.00		0.10	1.00	0.95	1.00
Satd. Flow (perm)	3554		189	3574	1702	1508
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1551	20	39	1599	109	249
RTOR Reduction (vph)	1	0	0	0	0	93
Lane Group Flow (vph)	1570	0	39	1599	109	156
Heavy Vehicles (%)	1%	0%	0%	1%	1%	2%
Bus Blockages (#/hr)	2	0	0	0	0	0
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases			2			4
Actuated Green, G (s)	46.9		54.4	53.9	11.1	11.1
Effective Green, g (s)	46.9		54.4	53.9	11.1	11.1
Actuated g/C Ratio	0.63		0.73	0.72	0.15	0.15
Clearance Time (s)	5.0		4.5	5.0	5.0	5.0
Vehicle Extension (s)	3.5		2.0	3.5	2.0	2.0
Lane Grp Cap (vph)	2222		188	2568	251	223
v/s Ratio Prot	c0.44		0.01	c0.45	0.06	
v/s Ratio Perm			0.14			c0.10
v/c Ratio	0.71		0.21	0.62	0.43	0.70
Uniform Delay, d1	9.4		12.0	5.4	29.1	30.4
Progression Factor	1.75		1.21	1.25	1.00	1.00
Incremental Delay, d2	1.0		0.2	0.9	0.4	7.8
Delay (s)	17.5		14.6	7.6	29.5	38.2
Level of Service	B		B	A	C	D
Approach Delay (s)	17.5			7.8	35.6	
Approach LOS	B			A	D	

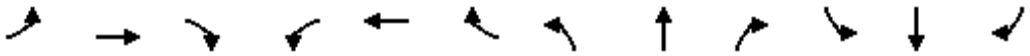
Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



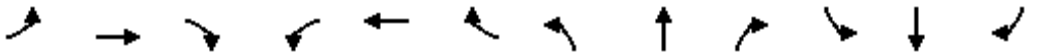
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1467	341	345	1251	0	200	0	68	0	1	3
Future Volume (vph)	1	1467	341	345	1251	0	200	0	68	0	1	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	12	12	13	13	12	16	12
Grade (%)		3%			-5%			-5%			3%	
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (prot)	1778	3521	1575	1753	3664			1874	1677		1906	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (perm)	1778	3521	1575	1753	3664			1874	1677		1906	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1	1612	375	379	1375	0	220	0	75	0	1	3
RTOR Reduction (vph)	0	0	90	0	0	0	0	0	64	0	3	0
Lane Group Flow (vph)	1	1612	285	379	1375	0	0	220	11	0	1	0
Heavy Vehicles (%)	0%	1%	1%	2%	1%	0%	2%	0%	2%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm		NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)	1.4	78.9	78.9	27.0	104.5			22.8	22.8		1.3	
Effective Green, g (s)	1.4	78.9	78.9	27.0	104.5			22.8	22.8		1.3	
Actuated g/C Ratio	0.01	0.53	0.53	0.18	0.70			0.15	0.15		0.01	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	16	1852	828	315	2552			284	254		16	
v/s Ratio Prot	0.00	c0.46		c0.22	0.38			c0.12			c0.00	
v/s Ratio Perm			0.18						0.01			
v/c Ratio	0.06	0.87	0.34	1.20	0.54			0.77	0.04		0.06	
Uniform Delay, d1	73.6	31.1	20.6	61.5	11.0			61.1	54.3		73.7	
Progression Factor	1.18	0.58	0.32	0.76	0.38			1.00	1.00		1.00	
Incremental Delay, d2	1.3	4.8	0.9	113.4	0.7			12.4	0.1		1.7	
Delay (s)	88.5	22.7	7.5	160.1	4.8			73.5	54.4		75.4	
Level of Service	F	C	A	F	A			E	D		E	
Approach Delay (s)		19.9			38.4			68.7			75.4	
Approach LOS		B			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	31.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



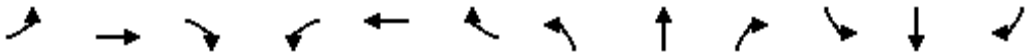
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	1406	6	285	1476	142	58	27	472	121	19	45
Future Volume (vph)	50	1406	6	285	1476	142	58	27	472	121	19	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	11	10	11	11	12
Grade (%)		3%			0%			-2%			3%	
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1778	3478		1770	3574	1615		1694	1507	1702	1553	
Flt Permitted	0.07	1.00		0.05	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (perm)	136	3478		99	3574	1615		1694	1507	1702	1553	
Peak-hour factor, PHF	0.95	0.95	0.90	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	1480	7	300	1554	149	61	28	497	127	20	47
RTOR Reduction (vph)	0	0	0	0	0	53	0	0	35	0	43	0
Lane Group Flow (vph)	53	1487	0	300	1554	96	0	89	462	127	24	0
Heavy Vehicles (%)	0%	2%	40%	2%	1%	0%	4%	10%	1%	1%	0%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases	2			6		6			8			
Actuated Green, G (s)	81.4	70.4		113.0	97.0	97.0		9.2	46.8	12.8	12.8	
Effective Green, g (s)	81.4	70.4		113.0	97.0	97.0		9.2	46.8	12.8	12.8	
Actuated g/C Ratio	0.54	0.47		0.75	0.65	0.65		0.06	0.31	0.09	0.09	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	194	1632		493	2311	1044		103	520	145	132	
v/s Ratio Prot	0.02	c0.43		0.15	0.43			0.05	c0.22	c0.07	0.02	
v/s Ratio Perm	0.13			0.31		0.06			0.08			
v/c Ratio	0.27	0.91		0.61	0.67	0.09		0.86	0.89	0.88	0.18	
Uniform Delay, d1	46.8	36.9		40.2	16.6	10.0		69.8	49.1	67.8	63.7	
Progression Factor	0.78	0.41		1.03	0.32	0.25		1.00	0.99	1.00	1.00	
Incremental Delay, d2	0.5	6.1		1.3	1.0	0.1		48.2	16.7	40.3	0.7	
Delay (s)	37.0	21.2		42.9	6.2	2.6		117.7	65.2	108.1	64.4	
Level of Service	D	C		D	A	A		F	E	F	E	
Approach Delay (s)		21.8			11.4			73.1			93.0	
Approach LOS		C			B			E			F	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



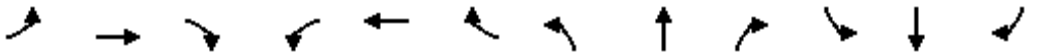
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	604	1399	274	1407	0	0	0	0	61	4	495
Future Volume (vph)	0	604	1399	274	1407	0	0	0	0	61	4	495
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	11	11
Grade (%)		0%			0%			3%			3%	
Total Lost time (s)		5.0	5.0	5.0	5.0						5.0	5.0
Lane Util. Factor		0.95	1.00	1.00	0.95						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		3574	1583	1787	3574						1665	1523
Flt Permitted		1.00	1.00	0.34	1.00						0.95	1.00
Satd. Flow (perm)		3574	1583	643	3574						1665	1523
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	649	1504	295	1513	0	0	0	0	66	4	532
RTOR Reduction (vph)	0	0	393	0	0	0	0	0	0	0	0	38
Lane Group Flow (vph)	0	649	1111	295	1513	0	0	0	0	0	70	494
Heavy Vehicles (%)	0%	1%	2%	1%	1%	0%	0%	0%	0%	4%	0%	1%
Turn Type		NA	Perm	pm+pt	NA					Split	NA	Perm
Protected Phases		2		1	6					8	8	
Permitted Phases			2	6								8
Actuated Green, G (s)		88.0	88.0	100.0	100.0						40.0	40.0
Effective Green, g (s)		88.0	88.0	100.0	100.0						40.0	40.0
Actuated g/C Ratio		0.59	0.59	0.67	0.67						0.27	0.27
Clearance Time (s)		5.0	5.0	5.0	5.0						5.0	5.0
Vehicle Extension (s)		5.0	5.0	5.0	5.0						5.0	5.0
Lane Grp Cap (vph)		2096	928	482	2382						444	406
v/s Ratio Prot		0.18		0.03	c0.42						0.04	
v/s Ratio Perm			c0.70	0.38								c0.32
v/c Ratio		0.31	1.20	0.61	0.64						0.16	1.22
Uniform Delay, d1		15.7	31.0	13.7	14.5						42.1	55.0
Progression Factor		0.59	1.62	0.64	0.91						1.00	1.00
Incremental Delay, d2		0.2	94.0	2.0	0.8						0.3	118.0
Delay (s)		9.4	144.1	10.8	14.0						42.5	173.0
Level of Service		A	F	B	B						D	F
Approach Delay (s)		103.5			13.5			0.0			157.8	
Approach LOS		F			B			A			F	

Intersection Summary			
HCM 2000 Control Delay	75.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	120.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	383	322	0	0	683	169	989	1	85	0	0	0
Future Volume (vph)	383	322	0	0	683	169	989	1	85	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	12	12	12	12	12
Grade (%)		0%			-3%			3%			3%	
Total Lost time (s)	5.0	6.0			6.0	6.0	5.0	5.0				
Lane Util. Factor	1.00	0.95			0.95	1.00	0.95	0.95				
Frt	1.00	1.00			1.00	0.85	1.00	0.98				
Flt Protected	0.95	1.00			1.00	1.00	0.95	0.96				
Satd. Flow (prot)	1787	3574			3628	1623	1617	1652				
Flt Permitted	0.20	1.00			1.00	1.00	0.95	0.96				
Satd. Flow (perm)	379	3574			3628	1623	1617	1652				
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	421	354	0	0	751	186	1087	1	93	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	87	0	5	0	0	0	0
Lane Group Flow (vph)	421	354	0	0	751	99	598	578	0	0	0	0
Heavy Vehicles (%)	1%	1%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA			NA	Perm	Split	NA				
Protected Phases	1	6			2		4	4				
Permitted Phases	6					2						
Actuated Green, G (s)	80.3	79.3			45.8	45.8	59.7	59.7				
Effective Green, g (s)	80.3	79.3			45.8	45.8	59.7	59.7				
Actuated g/C Ratio	0.54	0.53			0.31	0.31	0.40	0.40				
Clearance Time (s)	5.0	6.0			6.0	6.0	5.0	5.0				
Vehicle Extension (s)	2.5	2.5			2.5	2.5	2.5	2.5				
Lane Grp Cap (vph)	470	1889			1107	495	643	657				
v/s Ratio Prot	c0.17	0.10			0.21		c0.37	0.35				
v/s Ratio Perm	c0.31					0.06						
v/c Ratio	0.90	0.19			0.68	0.20	0.93	0.88				
Uniform Delay, d1	43.5	18.5			45.6	38.6	43.2	41.8				
Progression Factor	0.65	0.43			1.00	1.00	1.00	1.00				
Incremental Delay, d2	18.8	0.2			3.4	0.9	20.1	13.0				
Delay (s)	47.3	8.1			49.0	39.5	63.3	54.9				
Level of Service	D	A			D	D	E	D				
Approach Delay (s)		29.4			47.1			59.1			0.0	
Approach LOS		C			D			E			A	

Intersection Summary			
HCM 2000 Control Delay	47.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	120.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	278	69	653	246	372	47	1260	399	355	1647	122
Future Volume (vph)	154	278	69	653	246	372	47	1260	399	355	1647	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	12	12	12	11	12	11	11	11	11
Total Lost time (s)	6.7	6.7		7.7	7.7	7.7	7.7	5.7	7.7	7.4	5.8	6.7
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1636	3256		3400	1881	1599	1694	5085	1473	1711	4916	1516
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1636	3256		3400	1881	1599	1694	5085	1473	1711	4916	1516
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	175	316	78	742	280	423	53	1432	453	403	1872	139
RTOR Reduction (vph)	0	14	0	0	0	307	0	0	71	0	0	61
Lane Group Flow (vph)	175	380	0	742	280	116	53	1432	382	403	1872	78
Heavy Vehicles (%)	3%	3%	8%	3%	1%	1%	3%	2%	6%	2%	2%	3%
Turn Type	Split	NA		Split	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	4	4		3	3		1	6	3	5	2	4
Permitted Phases						3			6			2
Actuated Green, G (s)	16.6	16.6		31.3	31.3	31.3	6.4	40.8	72.1	33.8	67.8	84.4
Effective Green, g (s)	16.6	16.6		31.3	31.3	31.3	6.4	40.8	72.1	33.8	67.8	84.4
Actuated g/C Ratio	0.11	0.11		0.21	0.21	0.21	0.04	0.27	0.48	0.23	0.45	0.56
Clearance Time (s)	6.7	6.7		7.7	7.7	7.7	7.7	5.7	7.7	7.4	5.8	6.7
Vehicle Extension (s)	3.5	3.5		3.5	3.5	3.5	3.5	5.0	3.5	3.5	5.0	3.5
Lane Grp Cap (vph)	181	360		709	392	333	72	1383	708	385	2222	853
v/s Ratio Prot	0.11	c0.12		c0.22	0.15		0.03	c0.28	0.11	c0.24	0.38	0.01
v/s Ratio Perm						0.07			0.15			0.04
v/c Ratio	0.97	1.05		1.05	0.71	0.35	0.74	1.04	0.54	1.05	0.84	0.09
Uniform Delay, d1	66.4	66.7		59.4	55.2	50.6	71.0	54.6	27.3	58.1	36.4	15.1
Progression Factor	1.00	1.00		0.63	0.62	0.47	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	56.9	62.6		25.2	0.6	0.1	32.9	33.9	0.9	58.6	4.1	0.1
Delay (s)	123.3	129.3		62.8	35.0	23.7	103.8	88.5	28.2	116.7	40.5	15.2
Level of Service	F	F		E	D	C	F	F	C	F	D	B
Approach Delay (s)		127.5			45.9			74.8			51.7	
Approach LOS		F			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	64.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	27.9
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	1028	1939	52	666
v/c Ratio	0.75	1.07	0.15	1.38
Control Delay	37.4	65.9	51.2	211.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	37.4	65.9	51.2	211.8
Queue Length 50th (ft)	436	~776	43	~690
Queue Length 95th (ft)	m397	#850	82	#902
Internal Link Dist (ft)	1043	605	674	
Turn Bay Length (ft)				180
Base Capacity (vph)	2262	1810	341	484
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.45	1.07	0.15	1.38

Intersection Summary

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

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

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

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1571	39	1599	109	249
v/c Ratio	0.68	0.17	0.62	0.43	0.79
Control Delay	18.2	7.4	8.4	33.2	34.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	18.2	7.4	8.4	33.2	34.5
Queue Length 50th (ft)	672	7	285	46	61
Queue Length 95th (ft)	m575	m16	430	88	134
Internal Link Dist (ft)	952		1251	593	
Turn Bay Length (ft)		330			240
Base Capacity (vph)	2310	229	2568	340	388
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.68	0.17	0.62	0.32	0.64

Intersection Summary

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

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	1	1612	375	379	1375	220	75	4
v/c Ratio	0.01	0.79	0.38	1.41	0.50	0.77	0.21	0.05
Control Delay	81.0	18.3	3.8	239.9	4.2	78.8	2.0	49.8
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Delay	81.0	18.4	3.8	239.9	4.2	78.8	2.0	49.8
Queue Length 50th (ft)	1	493	14	~495	19	210	0	1
Queue Length 95th (ft)	m1	#974	112	m#705	196	290	6	14
Internal Link Dist (ft)		1348			700	355		176
Turn Bay Length (ft)	380		280	310				
Base Capacity (vph)	82	2039	992	268	2747	374	434	383
Starvation Cap Reductn	0	0	0	0	264	0	0	0
Spillback Cap Reductn	0	16	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.80	0.38	1.41	0.55	0.59	0.17	0.01

Intersection Summary

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

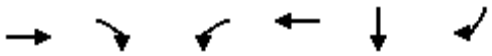
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	53	1487	300	1554	149	89	497	127	67
v/c Ratio	0.26	0.90	0.62	0.67	0.13	0.86	0.91	0.88	0.38
Control Delay	13.8	20.7	47.6	6.3	0.5	124.4	64.4	114.3	31.8
Queue Delay	0.0	0.5	0.0	0.1	0.0	0.0	4.8	0.0	0.0
Total Delay	13.8	21.2	47.6	6.4	0.5	124.4	69.2	114.3	31.8
Queue Length 50th (ft)	6	635	255	216	0	87	426	125	18
Queue Length 95th (ft)	m14	164	m252	m210	m5	m#197	m#647	#248	70
Internal Link Dist (ft)		700		797		519			443
Turn Bay Length (ft)	250		420		300		160	190	
Base Capacity (vph)	208	1668	482	2481	1166	104	544	147	177
Starvation Cap Reductn	0	31	0	178	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	24	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.91	0.62	0.67	0.13	0.86	0.96	0.86	0.38

Intersection Summary

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



Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	649	1504	295	1513	70	532
v/c Ratio	0.31	1.14	0.61	0.64	0.16	1.20
Control Delay	9.5	84.1	10.7	14.2	43.4	151.1
Queue Delay	0.0	0.3	0.0	0.8	0.0	0.0
Total Delay	9.5	84.4	10.7	15.0	43.4	151.1
Queue Length 50th (ft)	97	~1467	72	437	53	~591
Queue Length 95th (ft)	m108	#1698	m77	372	96	#826
Internal Link Dist (ft)	797			663	620	
Turn Bay Length (ft)		280	250			125
Base Capacity (vph)	2096	1321	482	2382	444	444
Starvation Cap Reductn	0	86	0	509	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	1.22	0.61	0.81	0.16	1.20

Intersection Summary

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

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

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

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT
Lane Group Flow (vph)	421	354	751	186	598	583
v/c Ratio	0.90	0.19	0.68	0.32	0.93	0.88
Control Delay	52.6	8.4	51.2	17.1	64.8	56.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.6	8.4	51.2	17.1	64.8	56.8
Queue Length 50th (ft)	293	42	370	47	562	525
Queue Length 95th (ft)	#452	56	442	117	#804	#713
Internal Link Dist (ft)		663	458			755
Turn Bay Length (ft)	170			180		
Base Capacity (vph)	517	1889	1116	586	679	698
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.19	0.67	0.32	0.88	0.84

Intersection Summary

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

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	175	394	742	280	423	53	1432	453	403	1872	139
v/c Ratio	0.97	1.05	1.05	0.71	0.66	0.59	1.08	0.61	1.00	0.82	0.14
Control Delay	123.9	120.8	62.7	35.9	3.8	94.9	99.1	14.7	101.9	39.7	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	123.9	120.8	62.7	35.9	3.8	94.9	99.1	14.7	101.9	39.7	2.3
Queue Length 50th (ft)	173	~213	~396	216	15	52	~569	133	~398	598	0
Queue Length 95th (ft)	#319	#314	m321	m194	m12	#109	#641	194	#600	642	27
Internal Link Dist (ft)		661		1043			1143			649	
Turn Bay Length (ft)	90		300		300	200		360	250		280
Base Capacity (vph)	181	374	709	392	640	90	1332	747	402	2272	981
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.97	1.05	1.05	0.71	0.66	0.59	1.08	0.61	1.00	0.82	0.14

Intersection Summary

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

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

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

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↑	↱		↕↑	↱		↕			↕	
Traffic Vol, veh/h	4	1739	1	5	1454	10	1	0	15	23	0	10
Future Vol, veh/h	4	1739	1	5	1454	10	1	0	15	23	0	10
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	-	-	140	-	-	140	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-5	-	-	5	-	-	3	-	-	-5	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	4	1890	1	5	1580	11	1	0	16	25	0	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1580	0	0	1890	0	0	2700	3490	945	2545	3490	790
Stage 1	-	-	-	-	-	-	1899	1899	-	1591	1591	-
Stage 2	-	-	-	-	-	-	801	1591	-	954	1899	-
Critical Hdwy	4.1	-	-	4.1	-	-	8.1	7.1	7.2	6.5	5.5	6.4
Critical Hdwy Stg 1	-	-	-	-	-	-	7.1	6.1	-	5.5	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7.1	6.1	-	5.5	4.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	422	-	-	321	-	-	7	4	246	28	17	376
Stage 1	-	-	-	-	-	-	53	87	-	178	263	-
Stage 2	-	-	-	-	-	-	305	129	-	367	201	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	422	-	-	321	-	-	6	3	246	~ 23	15	376
Mov Cap-2 Maneuver	-	-	-	-	-	-	6	3	-	~ 23	15	-
Stage 1	-	-	-	-	-	-	53	87	-	178	227	-
Stage 2	-	-	-	-	-	-	256	111	-	343	201	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.7	72.7	$ 384.5
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	70	422	-	-	321	-	-	32
HCM Lane V/C Ratio	0.248	0.01	-	-	0.017	-	-	1.121
HCM Control Delay (s)	72.7	13.6	0	-	16.4	0.7	-	$ 384.5
HCM Lane LOS	F	B	A	-	C	A	-	F
HCM 95th %tile Q(veh)	0.9	0	-	-	0.1	-	-	3.9

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

Intersection	
Intersection Delay, s/veh	84.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	144	42	221	57	365	10	352	68	17	0	31	159
Future Vol, veh/h	144	42	221	57	365	10	352	68	17	0	31	159
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	0	0	3	0	1	0	1	0	8	0	0	0
Mvmt Flow	164	48	251	65	415	11	400	77	19	0	35	181
Number of Lanes	0	1	1	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	2
HCM Control Delay	22.2	122.2	134.1	18.1
HCM LOS	C	F	F	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	81%	77%	0%	13%	0%	0%
Vol Thru, %	16%	23%	0%	84%	100%	0%
Vol Right, %	4%	0%	100%	2%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	437	186	221	432	31	159
LT Vol	352	144	0	57	0	0
Through Vol	68	42	0	365	31	0
RT Vol	17	0	221	10	0	159
Lane Flow Rate	497	211	251	491	35	181
Geometry Grp	6	7	7	6	7	7
Degree of Util (X)	1.183	0.523	0.546	1.15	0.09	0.425
Departure Headway (Hd)	9.083	9.925	8.786	9.065	10.179	9.442
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	402	366	414	403	354	385
Service Time	7.083	7.625	6.486	7.065	7.879	7.142
HCM Lane V/C Ratio	1.236	0.577	0.606	1.218	0.099	0.47
HCM Control Delay	134.1	23	21.6	122.2	13.9	18.9
HCM Lane LOS	F	C	C	F	B	C
HCM 95th-tile Q	18.5	2.9	3.2	17.3	0.3	2.1

Intersection	
Int Delay, s/veh	162.2

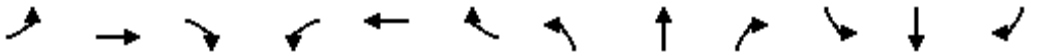
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	419	21	235	333	17	684
Future Vol, veh/h	419	21	235	333	17	684
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	255	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	0	1	3	8	3
Mvmt Flow	455	23	255	362	18	743

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1216	436	0	0	617	0
Stage 1	436	-	-	-	-	-
Stage 2	780	-	-	-	-	-
Critical Hdwy	6.41	6.2	-	-	4.18	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.3	-	-	2.272	-
Pot Cap-1 Maneuver	~ 201	625	-	-	934	-
Stage 1	654	-	-	-	-	-
Stage 2	~ 454	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 194	625	-	-	934	-
Mov Cap-2 Maneuver	~ 194	-	-	-	-	-
Stage 1	654	-	-	-	-	-
Stage 2	~ 439	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 629.7	0	0.2
HCM LOS	F		

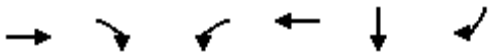
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	194	625	934	-
HCM Lane V/C Ratio	-	-	2.348	0.037	0.02	-
HCM Control Delay (s)	-	-	$ 660.7	11	8.9	0
HCM Lane LOS	-	-	F	B	A	A
HCM 95th %tile Q(veh)	-	-	37.3	0.1	0.1	-

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	766	1194	121	1230	0	0	0	0	167	1	295
Future Volume (vph)	0	766	1194	121	1230	0	0	0	0	167	1	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	11	11
Grade (%)		0%			0%			3%			3%	
Total Lost time (s)		5.0	5.0	5.0	5.0						5.0	4.0
Lane Util. Factor		1.00	0.88	1.00	0.95						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		1881	2733	1787	3574						1657	1451
Flt Permitted		1.00	1.00	0.16	1.00						0.95	1.00
Satd. Flow (perm)		1881	2733	298	3574						1657	1451
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	870	1357	138	1398	0	0	0	0	190	1	335
RTOR Reduction (vph)	0	0	516	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	870	841	138	1398	0	0	0	0	0	191	335
Heavy Vehicles (%)	0%	1%	4%	1%	1%	0%	0%	0%	0%	4%	0%	6%
Turn Type		NA	Perm	pm+pt	NA					Split	NA	Free
Protected Phases		2		1	6					8	8	
Permitted Phases			2	6								Free
Actuated Green, G (s)		68.2	68.2	81.7	81.7						18.3	110.0
Effective Green, g (s)		68.2	68.2	81.7	81.7						18.3	110.0
Actuated g/C Ratio		0.62	0.62	0.74	0.74						0.17	1.00
Clearance Time (s)		5.0	5.0	5.0	5.0						5.0	
Vehicle Extension (s)		5.0	5.0	5.0	5.0						5.0	
Lane Grp Cap (vph)		1166	1694	336	2654						275	1451
v/s Ratio Prot		c0.46		0.03	c0.39						c0.12	
v/s Ratio Perm			0.31	0.27								0.23
v/c Ratio		0.75	0.50	0.41	0.53						0.69	0.23
Uniform Delay, d1		14.8	11.5	12.8	6.0						43.2	0.0
Progression Factor		0.67	0.07	1.59	1.81						1.00	1.00
Incremental Delay, d2		1.0	0.2	1.0	0.5						9.3	0.4
Delay (s)		10.9	1.1	21.4	11.3						52.5	0.4
Level of Service		B	A	C	B						D	A
Approach Delay (s)		4.9			12.2			0.0			19.3	
Approach LOS		A			B			A			B	

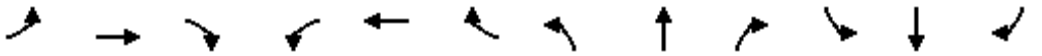
Intersection Summary			
HCM 2000 Control Delay	9.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	870	1357	138	1398	191	335
v/c Ratio	0.75	0.61	0.41	0.53	0.69	0.23
Control Delay	11.9	0.3	9.2	12.1	56.4	0.4
Queue Delay	0.9	0.0	0.0	0.4	0.0	0.0
Total Delay	12.7	0.3	9.2	12.4	56.4	0.4
Queue Length 50th (ft)	283	0	33	388	127	0
Queue Length 95th (ft)	m279	m0	m48	458	196	0
Internal Link Dist (ft)	797			663	620	
Turn Bay Length (ft)			250			300
Base Capacity (vph)	1165	2209	336	2653	316	1451
Starvation Cap Reductn	103	0	0	632	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.61	0.41	0.69	0.60	0.23

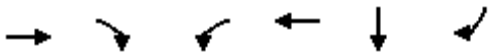
Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	604	1399	274	1407	0	0	0	0	61	4	495
Future Volume (vph)	0	604	1399	274	1407	0	0	0	0	61	4	495
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	11	11
Grade (%)		0%			0%			3%			3%	
Total Lost time (s)		5.0	5.0	5.0	5.0						5.0	4.0
Lane Util. Factor		1.00	0.88	1.00	0.95						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		1881	2787	1787	3574						1665	1523
Flt Permitted		1.00	1.00	0.34	1.00						0.95	1.00
Satd. Flow (perm)		1881	2787	644	3574						1665	1523
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	649	1504	295	1513	0	0	0	0	66	4	532
RTOR Reduction (vph)	0	0	294	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	649	1210	295	1513	0	0	0	0	0	70	532
Heavy Vehicles (%)	0%	1%	2%	1%	1%	0%	0%	0%	0%	4%	0%	1%
Turn Type		NA	Perm	pm+pt	NA					Split	NA	Free
Protected Phases		2		1	6					8	8	
Permitted Phases			2	6								Free
Actuated Green, G (s)		112.2	112.2	129.0	129.0						11.0	150.0
Effective Green, g (s)		112.2	112.2	129.0	129.0						11.0	150.0
Actuated g/C Ratio		0.75	0.75	0.86	0.86						0.07	1.00
Clearance Time (s)		5.0	5.0	5.0	5.0						5.0	
Vehicle Extension (s)		5.0	5.0	5.0	5.0						5.0	
Lane Grp Cap (vph)		1406	2084	643	3073						122	1523
v/s Ratio Prot		0.34		0.04	c0.42						c0.04	
v/s Ratio Perm			c0.43	0.36								0.35
v/c Ratio		0.46	0.58	0.46	0.49						0.57	0.35
Uniform Delay, d1		7.3	8.4	4.2	2.5						67.2	0.0
Progression Factor		0.53	0.00	0.23	0.42						1.00	1.00
Incremental Delay, d2		0.5	0.5	0.6	0.3						10.0	0.6
Delay (s)		4.4	0.6	1.6	1.4						77.2	0.6
Level of Service		A	A	A	A						E	A
Approach Delay (s)		1.7			1.4			0.0			9.5	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	2.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	649	1504	295	1513	70	532
v/c Ratio	0.46	0.63	0.46	0.48	0.49	0.35
Control Delay	4.9	0.6	1.9	1.5	77.0	0.6
Queue Delay	0.4	0.3	0.0	0.4	0.0	0.0
Total Delay	5.3	0.9	1.9	1.9	77.0	0.6
Queue Length 50th (ft)	116	0	0	0	66	0
Queue Length 95th (ft)	m159	0	m0	0	119	0
Internal Link Dist (ft)	797			663	620	
Turn Bay Length (ft)			250			300
Base Capacity (vph)	1418	2388	732	3120	166	1523
Starvation Cap Reductn	335	289	0	914	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.72	0.40	0.69	0.42	0.35

Intersection Summary

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

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	958	15	311	644	21	827
Future Volume (vph)	958	15	311	644	21	827
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	12
Grade (%)	0%			0%	2%	
Total Lost time (s)	6.5		6.5	6.5	5.3	6.5
Lane Util. Factor	0.95		1.00	0.95	1.00	0.88
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3567		1805	3574	1630	2786
Flt Permitted	1.00		0.14	1.00	0.95	1.00
Satd. Flow (perm)	3567		262	3574	1630	2786
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	1089	17	353	732	24	940
RTOR Reduction (vph)	1	0	0	0	0	39
Lane Group Flow (vph)	1105	0	353	732	24	901
Heavy Vehicles (%)	1%	0%	0%	1%	6%	1%
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	2		1	6	4	1
Permitted Phases			6			4
Actuated Green, G (s)	52.5		94.3	94.3	3.9	39.2
Effective Green, g (s)	52.5		94.3	94.3	3.9	39.2
Actuated g/C Ratio	0.48		0.86	0.86	0.04	0.36
Clearance Time (s)	6.5		6.5	6.5	5.3	6.5
Vehicle Extension (s)	3.0		1.5	3.0	2.0	1.5
Lane Grp Cap (vph)	1702		719	3063	57	992
v/s Ratio Prot	c0.31		0.16	0.20	0.01	c0.29
v/s Ratio Perm			0.26			0.03
v/c Ratio	0.65		0.49	0.24	0.42	0.91
Uniform Delay, d1	21.8		13.9	1.4	51.9	33.7
Progression Factor	0.96		2.99	0.74	1.00	1.00
Incremental Delay, d2	0.6		0.2	0.2	1.8	11.5
Delay (s)	21.6		41.8	1.2	53.8	45.2
Level of Service	C		D	A	D	D
Approach Delay (s)	21.6			14.4	45.4	
Approach LOS	C			B	D	

Intersection Summary			
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.3
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1106	353	732	24	940
v/c Ratio	0.62	0.49	0.23	0.26	0.85
Control Delay	21.7	29.7	1.1	56.8	36.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	29.7	1.1	56.8	36.1
Queue Length 50th (ft)	320	176	50	17	304
Queue Length 95th (ft)	m350	230	15	44	352
Internal Link Dist (ft)	1043		605	674	
Turn Bay Length (ft)		300			180
Base Capacity (vph)	1772	769	3221	96	1189
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.62	0.46	0.23	0.25	0.79

Intersection Summary

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

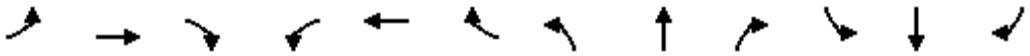
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	843	62	498	1208	46	586
Future Volume (vph)	843	62	498	1208	46	586
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	12
Grade (%)	0%			0%	2%	
Total Lost time (s)	6.5		6.5	6.5	5.3	6.5
Lane Util. Factor	0.95		1.00	0.95	1.00	0.88
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3540		1805	3574	1727	2814
Flt Permitted	1.00		0.21	1.00	0.95	1.00
Satd. Flow (perm)	3540		407	3574	1727	2814
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	958	70	566	1373	52	666
RTOR Reduction (vph)	3	0	0	0	0	57
Lane Group Flow (vph)	1025	0	566	1373	52	609
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	2		1	6	4	1
Permitted Phases			6			4
Actuated Green, G (s)	85.4		130.3	130.3	7.9	46.3
Effective Green, g (s)	85.4		130.3	130.3	7.9	46.3
Actuated g/C Ratio	0.57		0.87	0.87	0.05	0.31
Clearance Time (s)	6.5		6.5	6.5	5.3	6.5
Vehicle Extension (s)	3.0		1.5	3.0	2.0	1.5
Lane Grp Cap (vph)	2015		711	3104	90	990
v/s Ratio Prot	0.29		c0.20	0.38	0.03	c0.16
v/s Ratio Perm			c0.49			0.06
v/c Ratio	0.51		0.80	0.44	0.58	0.62
Uniform Delay, d1	19.6		18.6	2.1	69.4	44.3
Progression Factor	0.91		0.68	1.07	1.00	1.00
Incremental Delay, d2	0.4		5.0	0.4	5.5	0.8
Delay (s)	18.2		17.6	2.6	74.9	45.1
Level of Service	B		B	A	E	D
Approach Delay (s)	18.2			7.0	47.2	
Approach LOS	B			A	D	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	18.3
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1028	566	1373	52	666
v/c Ratio	0.50	0.79	0.43	0.50	0.67
Control Delay	20.0	23.4	2.8	83.6	38.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	23.4	2.8	83.6	38.9
Queue Length 50th (ft)	308	260	158	50	278
Queue Length 95th (ft)	m372	206	51	94	269
Internal Link Dist (ft)	1043		605	674	
Turn Bay Length (ft)		300			180
Base Capacity (vph)	2044	948	3169	129	1208
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.50	0.60	0.43	0.40	0.55

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1363	13	335	1091	99	9	17	544	46	12	22
Future Volume (vph)	40	1363	13	335	1091	99	9	17	544	46	12	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	11	10	11	11	12
Grade (%)		3%			0%			-2%			3%	
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1662	3513		1770	3539	1538		1824	1464	1621	1575	
Flt Permitted	0.23	1.00		0.08	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (perm)	394	3513		149	3539	1538		1824	1464	1621	1575	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	45	1549	15	381	1240	112	10	19	618	52	14	25
RTOR Reduction (vph)	0	1	0	0	0	32	0	0	43	0	24	0
Lane Group Flow (vph)	45	1563	0	381	1240	81	0	29	575	52	15	0
Heavy Vehicles (%)	7%	1%	10%	2%	2%	5%	0%	0%	4%	6%	0%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases	2			6		6			8			
Actuated Green, G (s)	49.2	45.1		88.0	78.9	78.9		3.0	40.9	4.0	4.0	
Effective Green, g (s)	49.2	45.1		88.0	78.9	78.9		3.0	40.9	4.0	4.0	
Actuated g/C Ratio	0.45	0.41		0.80	0.72	0.72		0.03	0.37	0.04	0.04	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	223	1440		677	2538	1103		49	610	58	57	
v/s Ratio Prot	0.01	c0.45		0.19	0.35			0.02	c0.32	c0.03	0.01	
v/s Ratio Perm	0.08			0.26		0.05			0.07			
v/c Ratio	0.20	1.09		0.56	0.49	0.07		0.59	0.94	0.90	0.26	
Uniform Delay, d1	19.0	32.5		22.8	6.8	4.6		52.9	33.4	52.8	51.6	
Progression Factor	0.40	0.52		1.32	0.72	1.56		1.03	0.96	1.00	1.00	
Incremental Delay, d2	0.3	48.2		1.0	0.6	0.1		17.7	23.0	80.9	2.4	
Delay (s)	7.9	65.2		31.1	5.5	7.3		72.0	55.2	133.7	54.0	
Level of Service	A	E		C	A	A		E	E	F	D	
Approach Delay (s)		63.6			11.2			56.0			99.6	
Approach LOS		E			B			E			F	

Intersection Summary			
HCM 2000 Control Delay	40.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	88.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

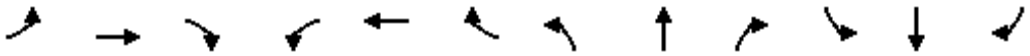
Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	45	1564	381	1240	113	29	618	52	39
v/c Ratio	0.18	1.02	0.56	0.46	0.09	0.35	0.99	0.71	0.41
Control Delay	5.0	43.9	29.6	5.4	1.7	63.8	62.1	98.3	39.9
Queue Delay	0.0	1.7	0.0	0.0	0.0	0.0	0.0	5.2	0.0
Total Delay	5.0	45.6	29.6	5.4	1.7	63.8	62.1	103.5	39.9
Queue Length 50th (ft)	5	~633	193	64	0	20	397	37	10
Queue Length 95th (ft)	m7	#747	288	184	14	m49	m#596	#102	44
Internal Link Dist (ft)		700		797		519			443
Turn Bay Length (ft)	250		420				160	190	
Base Capacity (vph)	251	1536	682	2697	1200	84	626	73	95
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	8	0	0	0	0	0	5	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	1.02	0.56	0.46	0.09	0.35	0.99	0.76	0.41

Intersection Summary

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

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

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



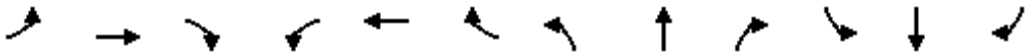
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	1406	6	285	1476	142	58	27	472	121	19	45
Future Volume (vph)	50	1406	6	285	1476	142	58	27	472	121	19	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	11	10	11	11	12
Grade (%)		3%			0%			-2%			3%	
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1778	3478		1770	3574	1615		1694	1507	1702	1553	
Flt Permitted	0.07	1.00		0.05	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (perm)	136	3478		99	3574	1615		1694	1507	1702	1553	
Peak-hour factor, PHF	0.95	0.95	0.90	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	1480	7	300	1554	149	61	28	497	127	20	47
RTOR Reduction (vph)	0	0	0	0	0	53	0	0	35	0	43	0
Lane Group Flow (vph)	53	1487	0	300	1554	96	0	89	462	127	24	0
Heavy Vehicles (%)	0%	2%	40%	2%	1%	0%	4%	10%	1%	1%	0%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA	pm+ov	Split	NA	
Protected Phases	5	2		1	6		8	8	1	7	7	
Permitted Phases	2			6		6			8			
Actuated Green, G (s)	81.4	70.4		113.0	97.0	97.0		9.2	46.8	12.8	12.8	
Effective Green, g (s)	81.4	70.4		113.0	97.0	97.0		9.2	46.8	12.8	12.8	
Actuated g/C Ratio	0.54	0.47		0.75	0.65	0.65		0.06	0.31	0.09	0.09	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	194	1632		493	2311	1044		103	520	145	132	
v/s Ratio Prot	0.02	c0.43		0.15	0.43			0.05	c0.22	c0.07	0.02	
v/s Ratio Perm	0.13			0.31		0.06			0.08			
v/c Ratio	0.27	0.91		0.61	0.67	0.09		0.86	0.89	0.88	0.18	
Uniform Delay, d1	46.8	36.9		40.2	16.6	10.0		69.8	49.1	67.8	63.7	
Progression Factor	0.76	0.37		0.97	0.41	0.04		1.00	0.99	1.00	1.00	
Incremental Delay, d2	0.5	6.1		1.9	1.4	0.2		48.2	16.7	40.3	0.7	
Delay (s)	36.1	19.8		41.0	8.2	0.6		117.8	65.2	108.1	64.4	
Level of Service	D	B		D	A	A		F	E	F	E	
Approach Delay (s)		20.3			12.5			73.2			93.0	
Approach LOS		C			B			E			F	

Intersection Summary			
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	53	1487	300	1554	149	89	497	127	67
v/c Ratio	0.26	0.90	0.62	0.67	0.13	0.86	0.91	0.88	0.38
Control Delay	13.5	19.2	46.7	8.2	0.3	124.4	64.5	114.3	31.8
Queue Delay	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.5	19.8	46.7	8.3	0.3	124.4	64.5	114.3	31.8
Queue Length 50th (ft)	3	644	244	287	0	87	425	125	18
Queue Length 95th (ft)	m14	164	350	214	0	m#197	m#647	#248	70
Internal Link Dist (ft)		700		797		519			443
Turn Bay Length (ft)	250		420				160	190	
Base Capacity (vph)	208	1668	482	2481	1166	104	544	147	177
Starvation Cap Reductn	0	31	0	17	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.91	0.62	0.63	0.13	0.86	0.91	0.86	0.38

Intersection Summary

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



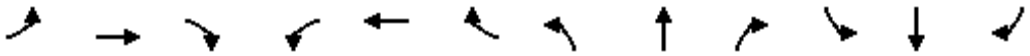
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1363	13	335	1091	99	9	17	544	46	12	22
Future Volume (vph)	40	1363	13	335	1091	99	9	17	544	46	12	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	11	10	11	11	12
Grade (%)		3%			0%			-2%			3%	
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	0.88	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1662	3513		1770	3539	1538		1824	2576	1621	1575	
Flt Permitted	0.23	1.00		0.07	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (perm)	394	3513		129	3539	1538		1824	2576	1621	1575	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	45	1549	15	381	1240	112	10	19	618	52	14	25
RTOR Reduction (vph)	0	1	0	0	0	36	0	0	0	0	24	0
Lane Group Flow (vph)	45	1563	0	381	1240	77	0	29	618	52	15	0
Heavy Vehicles (%)	7%	1%	10%	2%	2%	5%	0%	0%	4%	6%	0%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA	pt+ov	Split	NA	
Protected Phases	5	2		1	6		8	8	8 1	7	7	
Permitted Phases	2			6		6						
Actuated Green, G (s)	56.8	52.8		84.0	75.0	75.0		7.0	38.2	4.0	4.0	
Effective Green, g (s)	56.8	52.8		84.0	75.0	75.0		7.0	38.2	4.0	4.0	
Actuated g/C Ratio	0.52	0.48		0.76	0.68	0.68		0.06	0.35	0.04	0.04	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	249	1686		489	2412	1048		116	894	58	57	
v/s Ratio Prot	0.01	c0.45		c0.19	0.35			0.02	c0.24	c0.03	0.01	
v/s Ratio Perm	0.09			0.41		0.05						
v/c Ratio	0.18	0.93		0.78	0.51	0.07		0.25	0.69	0.90	0.26	
Uniform Delay, d1	14.5	26.8		31.6	8.6	5.9		49.0	30.8	52.8	51.6	
Progression Factor	0.36	0.43		1.14	0.65	1.56		1.03	0.96	1.00	1.00	
Incremental Delay, d2	0.3	8.3		6.9	0.7	0.1		1.1	2.3	80.9	2.4	
Delay (s)	5.5	19.7		42.9	6.3	9.2		51.4	31.8	133.7	54.0	
Level of Service	A	B		D	A	A		D	C	F	D	
Approach Delay (s)		19.3			14.5			32.7			99.6	
Approach LOS		B			B			C			F	

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	45	1564	381	1240	113	29	618	52	39
v/c Ratio	0.17	0.91	0.78	0.50	0.10	0.25	0.69	0.71	0.41
Control Delay	4.0	21.0	40.3	5.9	1.7	58.0	33.6	98.3	39.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.0	21.0	40.3	5.9	1.7	58.0	33.6	98.3	39.9
Queue Length 50th (ft)	3	288	197	64	0	20	205	37	10
Queue Length 95th (ft)	m7	#747	296	184	14	m49	m234	#102	44
Internal Link Dist (ft)		700		797		519			443
Turn Bay Length (ft)	250		420				160	190	
Base Capacity (vph)	268	1719	606	2476	1112	115	1077	73	95
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.91	0.63	0.50	0.10	0.25	0.57	0.71	0.41

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	1406	6	285	1476	142	58	27	472	121	19	45
Future Volume (vph)	50	1406	6	285	1476	142	58	27	472	121	19	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	11	10	11	11	12
Grade (%)		3%			0%			-2%			3%	
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	0.88	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1778	3478		1770	3574	1615		1694	2653	1702	1553	
Flt Permitted	0.08	1.00		0.06	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (perm)	148	3478		108	3574	1615		1694	2653	1702	1553	
Peak-hour factor, PHF	0.95	0.95	0.90	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	1480	7	300	1554	149	61	28	497	127	20	47
RTOR Reduction (vph)	0	0	0	0	0	52	0	0	0	0	43	0
Lane Group Flow (vph)	53	1487	0	300	1554	97	0	89	497	127	24	0
Heavy Vehicles (%)	0%	2%	40%	2%	1%	0%	4%	10%	1%	1%	0%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA	pt+ov	Split	NA	
Protected Phases	5	2		1	6		8	8	8 1	7	7	
Permitted Phases	2			6		6						
Actuated Green, G (s)	81.1	74.3		109.6	97.8	97.8		12.0	47.3	13.4	13.4	
Effective Green, g (s)	81.1	74.3		109.6	97.8	97.8		12.0	47.3	13.4	13.4	
Actuated g/C Ratio	0.54	0.50		0.73	0.65	0.65		0.08	0.32	0.09	0.09	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	153	1722		414	2330	1052		135	836	152	138	
v/s Ratio Prot	0.02	c0.43		c0.15	0.43			0.05	c0.19	c0.07	0.02	
v/s Ratio Perm	0.17			0.38		0.06						
v/c Ratio	0.35	0.86		0.72	0.67	0.09		0.66	0.59	0.84	0.18	
Uniform Delay, d1	46.4	33.4		43.1	16.1	9.7		67.0	43.3	67.2	63.2	
Progression Factor	0.66	0.34		0.86	0.29	0.03		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	3.9		5.6	1.4	0.2		11.1	1.1	30.9	0.6	
Delay (s)	31.4	15.1		42.8	6.1	0.4		78.1	44.2	98.1	63.8	
Level of Service	C	B		D	A	A		E	D	F	E	
Approach Delay (s)		15.6			11.2			49.4			86.3	
Approach LOS		B			B			D			F	

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	53	1487	300	1554	149	89	497	127	67
v/c Ratio	0.32	0.85	0.75	0.66	0.13	0.66	0.61	0.84	0.37
Control Delay	12.7	15.1	50.6	6.1	0.3	88.8	47.0	106.6	31.3
Queue Delay	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	15.4	50.6	6.1	0.3	88.8	47.0	106.6	31.3
Queue Length 50th (ft)	3	640	242	287	0	83	223	125	18
Queue Length 95th (ft)	m12	164	244	214	0	m#197	m285	#248	70
Internal Link Dist (ft)		700		797		519			443
Turn Bay Length (ft)	250		420				160	190	
Base Capacity (vph)	168	1748	482	2482	1166	135	811	153	182
Starvation Cap Reductn	0	31	0	17	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.87	0.62	0.63	0.13	0.66	0.61	0.83	0.37

Intersection Summary

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

Intersection	
Intersection Delay, s/veh	37.5
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	424	287	4	79	3	181	21	94	13	45	163
Future Vol, veh/h	48	424	287	4	79	3	181	21	94	13	45	163
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	0	0	4	0	7	0	3	0	4	0	6	0
Mvmt Flow	55	482	326	5	90	3	206	24	107	15	51	185
Number of Lanes	0	1	1	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	2
HCM Control Delay	51.8	13.5	25.4	13.7
HCM LOS	F	B	D	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	61%	10%	0%	5%	22%	0%
Vol Thru, %	7%	90%	0%	92%	78%	0%
Vol Right, %	32%	0%	100%	3%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	296	472	287	86	58	163
LT Vol	181	48	0	4	13	0
Through Vol	21	424	0	79	45	0
RT Vol	94	0	287	3	0	163
Lane Flow Rate	336	536	326	98	66	185
Geometry Grp	6	7	7	6	7	7
Degree of Util (X)	0.688	1.03	0.557	0.218	0.145	0.37
Departure Headway (Hd)	7.49	6.915	6.149	8.215	8.084	7.352
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	484	531	590	440	446	493
Service Time	5.49	4.615	3.849	6.215	5.784	5.052
HCM Lane V/C Ratio	0.694	1.009	0.553	0.223	0.148	0.375
HCM Control Delay	25.4	73.4	16.3	13.5	12.2	14.3
HCM Lane LOS	D	F	C	B	B	B
HCM 95th-tile Q	5.2	15.2	3.4	0.8	0.5	1.7

Intersection	
Intersection Delay, s/veh	84.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	144	42	221	57	365	10	352	68	17	0	31	159
Future Vol, veh/h	144	42	221	57	365	10	352	68	17	0	31	159
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	0	0	3	0	1	0	1	0	8	0	0	0
Mvmt Flow	164	48	251	65	415	11	400	77	19	0	35	181
Number of Lanes	0	1	1	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	2
HCM Control Delay	22.2	122.2	134.1	18.1
HCM LOS	C	F	F	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	81%	77%	0%	13%	0%	0%
Vol Thru, %	16%	23%	0%	84%	100%	0%
Vol Right, %	4%	0%	100%	2%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	437	186	221	432	31	159
LT Vol	352	144	0	57	0	0
Through Vol	68	42	0	365	31	0
RT Vol	17	0	221	10	0	159
Lane Flow Rate	497	211	251	491	35	181
Geometry Grp	6	7	7	6	7	7
Degree of Util (X)	1.183	0.523	0.546	1.15	0.09	0.425
Departure Headway (Hd)	9.083	9.925	8.786	9.065	10.179	9.442
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	402	366	414	403	354	385
Service Time	7.083	7.625	6.486	7.065	7.879	7.142
HCM Lane V/C Ratio	1.236	0.577	0.606	1.218	0.099	0.47
HCM Control Delay	134.1	23	21.6	122.2	13.9	18.9
HCM Lane LOS	F	C	C	F	B	C
HCM 95th-tile Q	18.5	2.9	3.2	17.3	0.3	2.1

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	863	98	337	251
Demand Flow Rate, veh/h	876	104	347	254
Vehicles Circulating, veh/h	74	291	552	313
Vehicles Exiting, veh/h	493	608	59	82
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.9	5.8	14.7	7.9
Approach LOS	A	A	B	A

Lane	Left	Bypass	Left	Left	Left
Designated Moves	LT	R	LTR	LTR	LTR
Assumed Moves	LT	R	LTR	LTR	LTR
RT Channelized		Free			
Lane Util	1.000		1.000	1.000	1.000
Critical Headway, s	5.193		5.193	5.193	5.193
Entry Flow, veh/h	537	339	104	347	254
Cap Entry Lane, veh/h	1049	1976	845	651	826
Entry HV Adj Factor	1.000	0.962	0.940	0.971	0.988
Flow Entry, veh/h	537	326	98	337	251
Cap Entry, veh/h	1049	1900	794	632	816
V/C Ratio	0.512	0.172	0.123	0.533	0.307
Control Delay, s/veh	9.5	0.0	5.8	14.7	7.9
LOS	A	A	A	B	A
95th %tile Queue, veh	3	1	0	3	1

Intersection	
Intersection Delay, s/veh	16.2
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	463	491	496	216
Demand Flow Rate, veh/h	471	495	502	216
Vehicles Circulating, veh/h	100	645	212	888
Vehicles Exiting, veh/h	1004	69	100	252
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	2.5	33.8	11.5	16.6
Approach LOS	A	D	B	C

Lane	Left	Bypass	Left	Left	Left
Designated Moves	LT	R	LTR	LTR	LTR
Assumed Moves	LT	R	LTR	LTR	LTR
RT Channelized		Free			
Lane Util	1.000		1.000	1.000	1.000
Critical Headway, s	5.193		5.193	5.193	5.193
Entry Flow, veh/h	212	259	495	502	216
Cap Entry Lane, veh/h	1022	1957	593	914	465
Entry HV Adj Factor	1.000	0.971	0.992	0.988	1.000
Flow Entry, veh/h	212	251	491	496	216
Cap Entry, veh/h	1022	1900	588	903	465
V/C Ratio	0.207	0.132	0.835	0.549	0.465
Control Delay, s/veh	5.5	0.0	33.8	11.5	16.6
LOS	A	A	D	B	C
95th %tile Queue, veh	1	0	9	3	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1669	72	90	1008	15	14
Future Volume (vph)	1669	72	90	1008	15	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	11	12	11	11
Grade (%)	0%			0%	3%	
Total Lost time (s)	5.0		4.5	5.0	5.0	5.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3554		1728	3574	1719	1411
Flt Permitted	1.00		0.07	1.00	0.95	1.00
Satd. Flow (perm)	3554		122	3574	1719	1411
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	1897	82	102	1145	17	16
RTOR Reduction (vph)	2	0	0	0	0	16
Lane Group Flow (vph)	1977	0	102	1145	17	0
Heavy Vehicles (%)	1%	0%	1%	1%	0%	9%
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases			2			4
Actuated Green, G (s)	85.5		96.6	96.6	3.4	3.4
Effective Green, g (s)	85.5		96.6	96.6	3.4	3.4
Actuated g/C Ratio	0.78		0.88	0.88	0.03	0.03
Clearance Time (s)	5.0		4.5	5.0	5.0	5.0
Vehicle Extension (s)	3.5		2.0	3.5	2.0	2.0
Lane Grp Cap (vph)	2762		203	3138	53	43
v/s Ratio Prot	c0.56		c0.03	0.32	c0.01	
v/s Ratio Perm			0.41			0.00
v/c Ratio	0.72		0.50	0.36	0.32	0.01
Uniform Delay, d1	6.1		11.5	1.2	52.2	51.7
Progression Factor	0.69		3.32	0.06	1.00	1.00
Incremental Delay, d2	1.1		0.6	0.3	1.3	0.0
Delay (s)	5.4		38.6	0.3	53.4	51.7
Level of Service	A		D	A	D	D
Approach Delay (s)	5.4			3.5	52.6	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	5.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1979	102	1145	17	16
v/c Ratio	0.70	0.50	0.35	0.21	0.20
Control Delay	5.6	29.1	0.3	56.5	27.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	29.1	0.3	56.5	27.6
Queue Length 50th (ft)	119	25	3	12	0
Queue Length 95th (ft)	410	m47	3	35	23
Internal Link Dist (ft)	952		1251	593	
Turn Bay Length (ft)		330			240
Base Capacity (vph)	2831	267	3281	83	83
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.70	0.38	0.35	0.20	0.19

Intersection Summary

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

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1427	18	36	1471	100	229
Future Volume (vph)	1427	18	36	1471	100	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	11	12	11	11
Grade (%)	0%			0%	3%	
Total Lost time (s)	5.0		4.5	5.0	5.0	5.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3554		1745	3574	1702	1508
Flt Permitted	1.00		0.10	1.00	0.95	1.00
Satd. Flow (perm)	3554		189	3574	1702	1508
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1551	20	39	1599	109	249
RTOR Reduction (vph)	1	0	0	0	0	93
Lane Group Flow (vph)	1570	0	39	1599	109	156
Heavy Vehicles (%)	1%	0%	0%	1%	1%	2%
Bus Blockages (#/hr)	2	0	0	0	0	0
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases			2			4
Actuated Green, G (s)	46.9		54.4	53.9	11.1	11.1
Effective Green, g (s)	46.9		54.4	53.9	11.1	11.1
Actuated g/C Ratio	0.63		0.73	0.72	0.15	0.15
Clearance Time (s)	5.0		4.5	5.0	5.0	5.0
Vehicle Extension (s)	3.5		2.0	3.5	2.0	2.0
Lane Grp Cap (vph)	2222		188	2568	251	223
v/s Ratio Prot	c0.44		0.01	c0.45	0.06	
v/s Ratio Perm			0.14			c0.10
v/c Ratio	0.71		0.21	0.62	0.43	0.70
Uniform Delay, d1	9.4		12.0	5.4	29.1	30.4
Progression Factor	1.22		1.20	1.27	1.00	1.00
Incremental Delay, d2	1.7		0.2	0.9	0.4	7.8
Delay (s)	13.2		14.5	7.7	29.5	38.2
Level of Service	B		B	A	C	D
Approach Delay (s)	13.2			7.9	35.6	
Approach LOS	B			A	D	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1571	39	1599	109	249
v/c Ratio	0.68	0.17	0.62	0.43	0.79
Control Delay	13.5	7.4	8.5	33.2	34.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.5	7.4	8.5	33.2	34.5
Queue Length 50th (ft)	155	7	250	46	61
Queue Length 95th (ft)	562	m16	429	88	134
Internal Link Dist (ft)	952		1251	593	
Turn Bay Length (ft)		330			240
Base Capacity (vph)	2310	229	2568	340	388
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.68	0.17	0.62	0.32	0.64

Intersection Summary

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

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	1669	72	8	90	1008	15	14
Future Volume (vph)	1669	72	8	90	1008	15	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	11	11
Grade (%)	0%				0%	3%	
Total Lost time (s)	5.0	5.0		4.5	5.0	5.0	5.0
Lane Util. Factor	0.95	1.00		1.00	0.95	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3574	1615		1726	3574	1719	1411
Flt Permitted	1.00	1.00		0.08	1.00	0.95	1.00
Satd. Flow (perm)	3574	1615		141	3574	1719	1411
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	1897	82	9	102	1145	17	16
RTOR Reduction (vph)	0	18	0	0	0	0	16
Lane Group Flow (vph)	1897	64	0	111	1145	17	0
Heavy Vehicles (%)	1%	0%	2%	1%	1%	0%	9%
Turn Type	NA	Perm	custom	pm+pt	NA	Prot	Perm
Protected Phases	6			5	2	4	
Permitted Phases		6	5	2			4
Actuated Green, G (s)	85.7	85.7		96.6	96.6	3.4	3.4
Effective Green, g (s)	85.7	85.7		96.6	96.6	3.4	3.4
Actuated g/C Ratio	0.78	0.78		0.88	0.88	0.03	0.03
Clearance Time (s)	5.0	5.0		4.5	5.0	5.0	5.0
Vehicle Extension (s)	3.5	3.5		2.0	3.5	2.0	2.0
Lane Grp Cap (vph)	2784	1258		216	3138	53	43
v/s Ratio Prot	c0.53			c0.03	0.32	c0.01	
v/s Ratio Perm		0.04		0.42			0.00
v/c Ratio	0.68	0.05		0.51	0.36	0.32	0.01
Uniform Delay, d1	5.7	2.8		9.4	1.2	52.2	51.7
Progression Factor	0.74	0.83		3.62	0.06	1.00	1.00
Incremental Delay, d2	1.0	0.1		0.7	0.3	1.3	0.0
Delay (s)	5.2	2.4		34.8	0.3	53.4	51.7
Level of Service	A	A		C	A	D	D
Approach Delay (s)	5.1				3.4	52.6	
Approach LOS	A				A	D	

Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1897	82	111	1145	17	16
v/c Ratio	0.67	0.06	0.51	0.35	0.21	0.20
Control Delay	5.4	0.8	25.3	0.3	56.5	27.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.4	0.8	25.3	0.3	56.5	27.6
Queue Length 50th (ft)	145	1	28	3	12	0
Queue Length 95th (ft)	362	m2	m44	3	35	23
Internal Link Dist (ft)	952			1251	593	
Turn Bay Length (ft)		300	330			240
Base Capacity (vph)	2849	1303	281	3281	83	83
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.06	0.40	0.35	0.20	0.19

Intersection Summary

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

Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	1427	18	23	36	1471	100	229
Future Volume (vph)	1427	18	23	36	1471	100	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	11	11
Grade (%)	0%				0%	3%	
Total Lost time (s)	5.0	5.0		4.5	5.0	5.0	5.0
Lane Util. Factor	0.95	1.00		1.00	0.95	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3560	1615		1731	3574	1702	1508
Flt Permitted	1.00	1.00		0.10	1.00	0.95	1.00
Satd. Flow (perm)	3560	1615		189	3574	1702	1508
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1551	20	25	39	1599	109	249
RTOR Reduction (vph)	0	8	0	0	0	0	75
Lane Group Flow (vph)	1551	12	0	64	1599	109	174
Heavy Vehicles (%)	1%	0%	2%	0%	1%	1%	2%
Bus Blockages (#/hr)	2	0	0	0	0	0	0
Turn Type	NA	Perm	custom	pm+pt	NA	Prot	Perm
Protected Phases	6			5	2	4	
Permitted Phases		6	5	2			4
Actuated Green, G (s)	46.2	46.2		53.7	53.2	11.8	11.8
Effective Green, g (s)	46.2	46.2		53.7	53.2	11.8	11.8
Actuated g/C Ratio	0.62	0.62		0.72	0.71	0.16	0.16
Clearance Time (s)	5.0	5.0		4.5	5.0	5.0	5.0
Vehicle Extension (s)	3.5	3.5		2.0	3.5	2.0	2.0
Lane Grp Cap (vph)	2192	994		186	2535	267	237
v/s Ratio Prot	c0.44			0.01	c0.45	0.06	
v/s Ratio Perm		0.01		0.23			c0.12
v/c Ratio	0.71	0.01		0.34	0.63	0.41	0.73
Uniform Delay, d1	9.8	5.6		13.7	5.7	28.5	30.1
Progression Factor	1.17	1.60		1.21	1.53	1.00	1.00
Incremental Delay, d2	1.7	0.0		0.3	0.9	0.4	9.7
Delay (s)	13.2	8.9		16.9	9.7	28.8	39.8
Level of Service	B	A		B	A	C	D
Approach Delay (s)	13.1				10.0	36.5	
Approach LOS	B				A	D	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1551	20	64	1599	109	249
v/c Ratio	0.68	0.02	0.28	0.63	0.41	0.80
Control Delay	13.3	4.6	10.3	10.5	32.0	38.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.3	4.6	10.3	10.5	32.0	38.4
Queue Length 50th (ft)	153	1	13	348	45	70
Queue Length 95th (ft)	553	m7	m22	428	88	#160
Internal Link Dist (ft)	952			1251	593	
Turn Bay Length (ft)		300	330			240
Base Capacity (vph)	2281	1041	229	2536	340	372
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.02	0.28	0.63	0.32	0.67

Intersection Summary

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

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1565	4	8	1160	18	0	0	8	8	0	4
Future Vol, veh/h	5	1565	4	8	1160	18	0	0	8	8	0	4
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	-	-	140	-	-	140	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-5	-	-	5	-	-	3	-	-	-5	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	6	1778	5	9	1318	20	0	0	9	9	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1318	0	0	1778	0	0	2467	3126	889	2237	3126	659
Stage 1	-	-	-	-	-	-	1790	1790	-	1336	1336	-
Stage 2	-	-	-	-	-	-	677	1336	-	901	1790	-
Critical Hdwy	4.1	-	-	4.1	-	-	8.1	7.1	7.2	6.5	5.5	6.4
Critical Hdwy Stg 1	-	-	-	-	-	-	7.1	6.1	-	5.5	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7.1	6.1	-	5.5	4.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	531	-	-	354	-	-	11	7	270	44	27	450
Stage 1	-	-	-	-	-	-	64	100	-	239	325	-
Stage 2	-	-	-	-	-	-	369	180	-	390	221	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	531	-	-	354	-	-	-	0	270	-	0	450
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	0	-	-	0	-
Stage 1	-	-	-	-	-	-	64	0	-	239	293	-
Stage 2	-	-	-	-	-	-	329	162	-	-	0	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.9	0.6		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	531	-	-	354	-	-	-
HCM Lane V/C Ratio	-	0.011	-	-	0.026	-	-	-
HCM Control Delay (s)	-	11.9	3.9	-	15.4	0.5	-	-
HCM Lane LOS	-	B	A	-	C	A	-	-
HCM 95th %tile Q(veh)	-	0	-	-	0.1	-	-	-

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	1739	1	5	1454	10	1	0	15	23	0	10
Future Vol, veh/h	4	1739	1	5	1454	10	1	0	15	23	0	10
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	-	-	140	-	-	140	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-5	-	-	5	-	-	3	-	-	-5	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	4	1890	1	5	1580	11	1	0	16	25	0	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1580	0	0	1890	0	0	2700	3490	945	2545	3490	790
Stage 1	-	-	-	-	-	-	1899	1899	-	1591	1591	-
Stage 2	-	-	-	-	-	-	801	1591	-	954	1899	-
Critical Hdwy	4.1	-	-	4.1	-	-	8.1	7.1	7.2	6.5	5.5	6.4
Critical Hdwy Stg 1	-	-	-	-	-	-	7.1	6.1	-	5.5	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7.1	6.1	-	5.5	4.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	422	-	-	321	-	-	7	4	246	28	17	376
Stage 1	-	-	-	-	-	-	53	87	-	178	263	-
Stage 2	-	-	-	-	-	-	305	129	-	367	201	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	422	-	-	321	-	-	6	3	246	~ 23	15	376
Mov Cap-2 Maneuver	-	-	-	-	-	-	6	3	-	~ 23	15	-
Stage 1	-	-	-	-	-	-	53	87	-	178	227	-
Stage 2	-	-	-	-	-	-	256	111	-	343	201	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.7	72.7	$ 384.5
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	70	422	-	-	321	-	-	32
HCM Lane V/C Ratio	0.248	0.01	-	-	0.017	-	-	1.121
HCM Control Delay (s)	72.7	13.6	0	-	16.4	0.7	-	$ 384.5
HCM Lane LOS	F	B	A	-	C	A	-	F
HCM 95th %tile Q(veh)	0.9	0	-	-	0.1	-	-	3.9

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

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1573	4	8	1160	18	0	0	8	0	0	4
Future Vol, veh/h	5	1573	4	8	1160	18	0	0	8	0	0	4
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	300	-	140	300	-	140	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-5	-	-	5	-	-	3	-	-	-5	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	6	1788	5	9	1318	20	0	0	9	0	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1318	0	0	1788	0	0	-	-	894	-	-	659
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	7.2	-	-	6.4
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	-	-	3.3
Pot Cap-1 Maneuver	531	-	-	351	-	-	0	0	267	0	0	450
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	531	-	-	351	-	-	-	-	267	-	-	450
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	19	13.1
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	267	531	-	-	351	-	-	450
HCM Lane V/C Ratio	0.034	0.011	-	-	0.026	-	-	0.01
HCM Control Delay (s)	19	11.9	-	-	15.5	-	-	13.1
HCM Lane LOS	C	B	-	-	C	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0

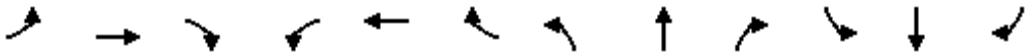
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	1762	1	5	1455	10	0	0	16	0	0	33
Future Vol, veh/h	4	1762	1	5	1455	10	0	0	16	0	0	33
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	300	-	140	300	-	140	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-5	-	-	5	-	-	3	-	-	-5	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	4	1915	1	5	1582	11	0	0	17	0	0	36

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1582	0	0	1915	0	0	-	-	958	-	-	791
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	7.2	-	-	6.4
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	-	-	3.3
Pot Cap-1 Maneuver	421	-	-	314	-	-	0	0	241	0	0	376
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	421	-	-	314	-	-	-	-	241	-	-	376
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	21.1	15.6
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	241	421	-	-	314	-	-	376
HCM Lane V/C Ratio	0.072	0.01	-	-	0.017	-	-	0.095
HCM Control Delay (s)	21.1	13.6	-	-	16.7	-	-	15.6
HCM Lane LOS	C	B	-	-	C	-	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.3



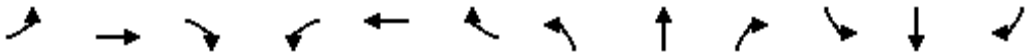
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1363	13	335	1091	99	9	17	544	46	12	22
Future Volume (vph)	40	1363	13	335	1091	99	9	17	544	46	12	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	11	10	11	11	12
Grade (%)		3%			0%			-2%			3%	
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	0.88	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1662	3513		1770	3539	1538		1824	2576	1621	1575	
Flt Permitted	0.23	1.00		0.07	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (perm)	394	3513		129	3539	1538		1824	2576	1621	1575	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	45	1549	15	381	1240	112	10	19	618	52	14	25
RTOR Reduction (vph)	0	1	0	0	0	36	0	0	0	0	24	0
Lane Group Flow (vph)	45	1563	0	381	1240	77	0	29	618	52	15	0
Heavy Vehicles (%)	7%	1%	10%	2%	2%	5%	0%	0%	4%	6%	0%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA	pt+ov	Split	NA	
Protected Phases	5	2		1	6		8	8	8 1	7	7	
Permitted Phases	2			6		6						
Actuated Green, G (s)	56.8	52.8		84.0	75.0	75.0		7.0	38.2	4.0	4.0	
Effective Green, g (s)	56.8	52.8		84.0	75.0	75.0		7.0	38.2	4.0	4.0	
Actuated g/C Ratio	0.52	0.48		0.76	0.68	0.68		0.06	0.35	0.04	0.04	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	249	1686		489	2412	1048		116	894	58	57	
v/s Ratio Prot	0.01	c0.45		c0.19	0.35			0.02	c0.24	c0.03	0.01	
v/s Ratio Perm	0.09			0.41		0.05						
v/c Ratio	0.18	0.93		0.78	0.51	0.07		0.25	0.69	0.90	0.26	
Uniform Delay, d1	14.5	26.8		31.6	8.6	5.9		49.0	30.8	52.8	51.6	
Progression Factor	0.36	0.43		1.14	0.65	1.56		1.03	0.96	1.00	1.00	
Incremental Delay, d2	0.3	8.3		6.9	0.7	0.1		1.1	2.3	80.9	2.4	
Delay (s)	5.5	19.7		42.9	6.3	9.2		51.4	31.8	133.7	54.0	
Level of Service	A	B		D	A	A		D	C	F	D	
Approach Delay (s)		19.3			14.5			32.7			99.6	
Approach LOS		B			B			C			F	

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	45	1564	381	1240	113	29	618	52	39
v/c Ratio	0.17	0.91	0.78	0.50	0.10	0.25	0.69	0.71	0.41
Control Delay	4.0	21.0	40.3	5.9	1.7	58.0	33.6	98.3	39.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.0	21.0	40.3	5.9	1.7	58.0	33.6	98.3	39.9
Queue Length 50th (ft)	3	288	197	64	0	20	205	37	10
Queue Length 95th (ft)	m7	#747	296	184	14	m49	m234	#102	44
Internal Link Dist (ft)		700		797		519			443
Turn Bay Length (ft)	250		420				160	190	
Base Capacity (vph)	268	1719	606	2476	1112	115	1077	73	95
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.91	0.63	0.50	0.10	0.25	0.57	0.71	0.41

Intersection Summary

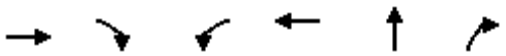
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1332	207	135	1006	0	216	0	75	0	0	0
Future Volume (vph)	0	1332	207	135	1006	0	216	0	75	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	12	12	13	13	12	16	12
Grade (%)		3%			-5%			-5%			3%	
Total Lost time (s)		5.0	5.0	5.0	5.0			5.0	5.0			
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00			
Frt		1.00	0.85	1.00	1.00			1.00	0.85			
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00			
Satd. Flow (prot)		3521	1544	1736	3664			1856	1614			
Flt Permitted		1.00	1.00	0.95	1.00			0.95	1.00			
Satd. Flow (perm)		3521	1544	1736	3664			1856	1614			
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	1497	233	152	1130	0	243	0	84	0	0	0
RTOR Reduction (vph)	0	0	57	0	0	0	0	0	69	0	0	0
Lane Group Flow (vph)	0	1497	176	152	1130	0	0	243	15	0	0	0
Heavy Vehicles (%)	0%	1%	3%	3%	1%	0%	3%	0%	6%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm			
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)		68.2	68.2	7.0	80.2			19.8	19.8			
Effective Green, g (s)		68.2	68.2	7.0	80.2			19.8	19.8			
Actuated g/C Ratio		0.62	0.62	0.06	0.73			0.18	0.18			
Clearance Time (s)		5.0	5.0	5.0	5.0			5.0	5.0			
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)		2183	957	110	2671			334	290			
v/s Ratio Prot		c0.43		c0.09	0.31			c0.13				
v/s Ratio Perm			0.11						0.01			
v/c Ratio		0.69	0.18	1.38	0.42			0.73	0.05			
Uniform Delay, d1		13.8	9.0	51.5	5.8			42.6	37.3			
Progression Factor		0.56	0.49	0.67	0.12			1.00	1.00			
Incremental Delay, d2		1.5	0.4	213.9	0.4			7.7	0.1			
Delay (s)		9.2	4.7	248.5	1.1			50.2	37.4			
Level of Service		A	A	F	A			D	D			
Approach Delay (s)		8.6			30.5			46.9			0.0	
Approach LOS		A			C			D			A	

Intersection Summary			
HCM 2000 Control Delay	20.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

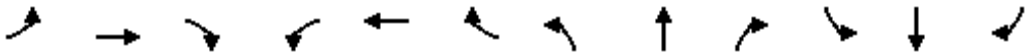


Lane Group	EBT	EBR	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	1497	233	152	1130	243	84
v/c Ratio	0.69	0.23	1.38	0.42	0.73	0.20
Control Delay	9.9	2.4	245.1	1.2	54.7	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.9	2.4	245.1	1.2	54.7	1.0
Queue Length 50th (ft)	171	7	~139	13	164	0
Queue Length 95th (ft)	263	20	#268	16	228	0
Internal Link Dist (ft)	1348			700	365	
Turn Bay Length (ft)		280	310			
Base Capacity (vph)	2182	1013	110	2670	506	563
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.23	1.38	0.42	0.48	0.15

Intersection Summary

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	1406	6	285	1476	142	58	27	472	121	19	45
Future Volume (vph)	50	1406	6	285	1476	142	58	27	472	121	19	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	11	10	11	11	12
Grade (%)		3%			0%			-2%			3%	
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	0.88	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1778	3478		1770	3574	1615		1694	2653	1702	1553	
Flt Permitted	0.08	1.00		0.06	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (perm)	148	3478		108	3574	1615		1694	2653	1702	1553	
Peak-hour factor, PHF	0.95	0.95	0.90	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	1480	7	300	1554	149	61	28	497	127	20	47
RTOR Reduction (vph)	0	0	0	0	0	52	0	0	0	0	43	0
Lane Group Flow (vph)	53	1487	0	300	1554	97	0	89	497	127	24	0
Heavy Vehicles (%)	0%	2%	40%	2%	1%	0%	4%	10%	1%	1%	0%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA	pt+ov	Split	NA	
Protected Phases	5	2		1	6		8	8	8 1	7	7	
Permitted Phases	2			6		6						
Actuated Green, G (s)	81.1	74.3		109.6	97.8	97.8		12.0	47.3	13.4	13.4	
Effective Green, g (s)	81.1	74.3		109.6	97.8	97.8		12.0	47.3	13.4	13.4	
Actuated g/C Ratio	0.54	0.50		0.73	0.65	0.65		0.08	0.32	0.09	0.09	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	153	1722		414	2330	1052		135	836	152	138	
v/s Ratio Prot	0.02	c0.43		c0.15	0.43			0.05	c0.19	c0.07	0.02	
v/s Ratio Perm	0.17			0.38		0.06						
v/c Ratio	0.35	0.86		0.72	0.67	0.09		0.66	0.59	0.84	0.18	
Uniform Delay, d1	46.4	33.4		43.1	16.1	9.7		67.0	43.3	67.2	63.2	
Progression Factor	0.66	0.34		0.86	0.29	0.03		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	3.9		5.6	1.4	0.2		11.1	1.1	30.9	0.6	
Delay (s)	31.4	15.1		42.8	6.1	0.4		78.1	44.2	98.1	63.8	
Level of Service	C	B		D	A	A		E	D	F	E	
Approach Delay (s)		15.6			11.2			49.4			86.3	
Approach LOS		B			B			D			F	

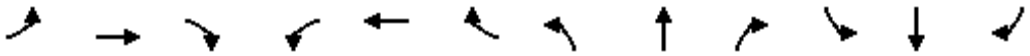
Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	53	1487	300	1554	149	89	497	127	67
v/c Ratio	0.32	0.85	0.75	0.66	0.13	0.66	0.61	0.84	0.37
Control Delay	12.7	15.1	50.6	6.1	0.3	88.8	47.0	106.6	31.3
Queue Delay	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	15.4	50.6	6.1	0.3	88.8	47.0	106.6	31.3
Queue Length 50th (ft)	3	640	242	287	0	83	223	125	18
Queue Length 95th (ft)	m12	164	244	214	0	m#197	m285	#248	70
Internal Link Dist (ft)		700		797		519			443
Turn Bay Length (ft)	250		420				160	190	
Base Capacity (vph)	168	1748	482	2482	1166	135	811	153	182
Starvation Cap Reductn	0	31	0	17	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.87	0.62	0.63	0.13	0.66	0.61	0.83	0.37

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1467	341	345	1251	0	200	0	68	0	1	3
Future Volume (vph)	1	1467	341	345	1251	0	200	0	68	0	1	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	12	12	13	13	12	16	12
Grade (%)		3%			-5%			-5%			3%	
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (prot)	1778	3521	1575	1753	3664			1874	1677		1906	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (perm)	1778	3521	1575	1753	3664			1874	1677		1906	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1	1612	375	379	1375	0	220	0	75	0	1	3
RTOR Reduction (vph)	0	0	90	0	0	0	0	0	64	0	3	0
Lane Group Flow (vph)	1	1612	285	379	1375	0	0	220	11	0	1	0
Heavy Vehicles (%)	0%	1%	1%	2%	1%	0%	2%	0%	2%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm		NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)	1.4	78.9	78.9	27.0	104.5			22.8	22.8		1.3	
Effective Green, g (s)	1.4	78.9	78.9	27.0	104.5			22.8	22.8		1.3	
Actuated g/C Ratio	0.01	0.53	0.53	0.18	0.70			0.15	0.15		0.01	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	16	1852	828	315	2552			284	254		16	
v/s Ratio Prot	0.00	c0.46		c0.22	0.38			c0.12			c0.00	
v/s Ratio Perm			0.18						0.01			
v/c Ratio	0.06	0.87	0.34	1.20	0.54			0.77	0.04		0.06	
Uniform Delay, d1	73.6	31.1	20.6	61.5	11.0			61.1	54.3		73.7	
Progression Factor	0.98	0.71	0.39	0.83	0.48			1.00	1.00		1.00	
Incremental Delay, d2	1.3	4.8	0.9	113.6	0.7			12.4	0.1		1.7	
Delay (s)	73.4	26.9	8.9	164.9	6.0			73.5	54.4		75.4	
Level of Service	E	C	A	F	A			E	D		E	
Approach Delay (s)		23.5			40.3			68.7			75.4	
Approach LOS		C			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	34.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

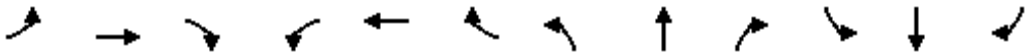
Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	1	1612	375	379	1375	220	75	4
v/c Ratio	0.01	0.79	0.38	1.41	0.50	0.77	0.21	0.05
Control Delay	67.0	21.6	4.4	242.4	5.2	78.8	2.0	49.8
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Delay	67.0	21.7	4.4	242.4	5.2	78.8	2.0	49.8
Queue Length 50th (ft)	1	407	9	~494	47	210	0	1
Queue Length 95th (ft)	m1	#974	113	#706	250	290	6	14
Internal Link Dist (ft)		1348			700	355		176
Turn Bay Length (ft)	380		280	310				
Base Capacity (vph)	82	2039	992	268	2747	374	434	383
Starvation Cap Reductn	0	0	0	0	264	0	0	0
Spillback Cap Reductn	0	16	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.80	0.38	1.41	0.55	0.59	0.17	0.01

Intersection Summary

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

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1363	13	335	1091	99	9	17	544	46	12	22
Future Volume (vph)	40	1363	13	335	1091	99	9	17	544	46	12	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	11	10	11	11	12
Grade (%)		3%			0%			-2%			3%	
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00		1.00	0.88	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1662	5047		1770	3539	1538		1824	2576	1621	1575	
Flt Permitted	0.23	1.00		0.07	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (perm)	394	5047		137	3539	1538		1824	2576	1621	1575	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	45	1549	15	381	1240	112	10	19	618	52	14	25
RTOR Reduction (vph)	0	1	0	0	0	40	0	0	0	0	24	0
Lane Group Flow (vph)	45	1563	0	381	1240	73	0	29	618	52	15	0
Heavy Vehicles (%)	7%	1%	10%	2%	2%	5%	0%	0%	4%	6%	0%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA	pt+ov	Split	NA	
Protected Phases	5	2		1	6		8	8	8 1	7	7	
Permitted Phases	2			6		6						
Actuated Green, G (s)	53.8	49.8		80.3	71.3	71.3		9.1	39.6	5.6	5.6	
Effective Green, g (s)	53.8	49.8		80.3	71.3	71.3		9.1	39.6	5.6	5.6	
Actuated g/C Ratio	0.49	0.45		0.73	0.65	0.65		0.08	0.36	0.05	0.05	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	238	2284		478	2293	996		150	927	82	80	
v/s Ratio Prot	0.01	0.31		c0.18	0.35			0.02	c0.24	c0.03	0.01	
v/s Ratio Perm	0.09			c0.40		0.05						
v/c Ratio	0.19	0.68		0.80	0.54	0.07		0.19	0.67	0.63	0.19	
Uniform Delay, d1	14.8	23.9		29.9	10.5	7.1		47.0	29.6	51.2	50.0	
Progression Factor	0.43	0.45		1.13	0.77	1.72		1.03	0.97	1.00	1.00	
Incremental Delay, d2	0.4	1.5		8.1	0.8	0.1		0.6	1.8	14.9	1.2	
Delay (s)	6.6	12.4		42.0	8.9	12.4		49.2	30.5	66.1	51.2	
Level of Service	A	B		D	A	B		D	C	E	D	
Approach Delay (s)		12.2			16.4			31.4			59.7	
Approach LOS		B			B			C			E	

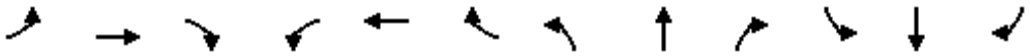
Intersection Summary			
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	45	1564	381	1240	113	29	618	52	39
v/c Ratio	0.17	0.67	0.79	0.53	0.11	0.19	0.67	0.52	0.32
Control Delay	5.1	12.4	41.2	8.2	1.9	55.5	32.5	70.0	34.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.1	12.4	41.2	8.2	1.9	55.5	32.5	70.0	34.0
Queue Length 50th (ft)	5	193	200	123	1	20	205	35	9
Queue Length 95th (ft)	m9	305	292	184	14	m49	238	#102	44
Internal Link Dist (ft)		700		797		519			443
Turn Bay Length (ft)	250		420				160	190	
Base Capacity (vph)	259	2335	606	2453	1102	149	1125	100	121
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.67	0.63	0.51	0.10	0.19	0.55	0.52	0.32

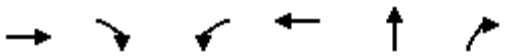
Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1332	207	135	1006	0	216	0	75	0	0	0
Future Volume (vph)	0	1332	207	135	1006	0	216	0	75	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	12	12	13	13	12	16	12
Grade (%)		3%			-5%			-5%			3%	
Total Lost time (s)		5.0	5.0	5.0	5.0			5.0	5.0			
Lane Util. Factor		0.91	1.00	0.97	0.95			1.00	1.00			
Frt		1.00	0.85	1.00	1.00			1.00	0.85			
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00			
Satd. Flow (prot)		5059	1544	3369	3664			1856	1614			
Flt Permitted		1.00	1.00	0.95	1.00			0.95	1.00			
Satd. Flow (perm)		5059	1544	3369	3664			1856	1614			
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	1497	233	152	1130	0	243	0	84	0	0	0
RTOR Reduction (vph)	0	0	82	0	0	0	0	0	69	0	0	0
Lane Group Flow (vph)	0	1497	151	152	1130	0	0	243	15	0	0	0
Heavy Vehicles (%)	0%	1%	3%	3%	1%	0%	3%	0%	6%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm			
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)		68.2	68.2	7.0	80.2			19.8	19.8			
Effective Green, g (s)		68.2	68.2	7.0	80.2			19.8	19.8			
Actuated g/C Ratio		0.62	0.62	0.06	0.73			0.18	0.18			
Clearance Time (s)		5.0	5.0	5.0	5.0			5.0	5.0			
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)		3136	957	214	2671			334	290			
v/s Ratio Prot		c0.30		c0.05	0.31			c0.13				
v/s Ratio Perm			0.10						0.01			
v/c Ratio		0.48	0.16	0.71	0.42			0.73	0.05			
Uniform Delay, d1		11.3	8.8	50.5	5.8			42.6	37.3			
Progression Factor		0.58	0.53	0.72	0.16			1.00	1.00			
Incremental Delay, d2		0.4	0.3	9.4	0.4			7.7	0.1			
Delay (s)		7.0	4.9	45.9	1.4			50.2	37.4			
Level of Service		A	A	D	A			D	D			
Approach Delay (s)		6.7			6.7			46.9			0.0	
Approach LOS		A			A			D			A	

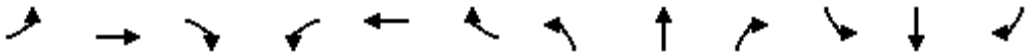
Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBT	EBR	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	1497	233	152	1130	243	84
v/c Ratio	0.48	0.22	0.71	0.42	0.73	0.20
Control Delay	7.4	1.5	53.7	1.5	54.7	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	1.5	53.7	1.5	54.7	1.0
Queue Length 50th (ft)	116	4	55	5	164	0
Queue Length 95th (ft)	147	14	#96	16	228	0
Internal Link Dist (ft)	1348			700	365	
Turn Bay Length (ft)		280	310			
Base Capacity (vph)	3135	1038	214	2670	506	563
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.22	0.71	0.42	0.48	0.15

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	1406	6	285	1476	142	58	27	472	121	19	45
Future Volume (vph)	50	1406	6	285	1476	142	58	27	472	121	19	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	11	10	11	11	12
Grade (%)		3%			0%			-2%			3%	
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00		1.00	0.88	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1778	4997		1770	3574	1615		1694	2653	1702	1553	
Flt Permitted	0.07	1.00		0.09	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (perm)	131	4997		176	3574	1615		1694	2653	1702	1553	
Peak-hour factor, PHF	0.95	0.95	0.90	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	1480	7	300	1554	149	61	28	497	127	20	47
RTOR Reduction (vph)	0	1	0	0	0	52	0	0	0	0	42	0
Lane Group Flow (vph)	53	1486	0	300	1554	97	0	89	497	127	25	0
Heavy Vehicles (%)	0%	2%	40%	2%	1%	0%	4%	10%	1%	1%	0%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA	pt+ov	Split	NA	
Protected Phases	5	2		1	6		8	8	8 1	7	7	
Permitted Phases	2			6		6						
Actuated Green, G (s)	72.5	67.4		107.7	97.6	97.6		12.7	53.0	14.6	14.6	
Effective Green, g (s)	72.5	67.4		107.7	97.6	97.6		12.7	53.0	14.6	14.6	
Actuated g/C Ratio	0.48	0.45		0.72	0.65	0.65		0.08	0.35	0.10	0.10	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	119	2245		501	2325	1050		143	937	165	151	
v/s Ratio Prot	0.02	0.30		0.14	c0.43			0.05	c0.19	c0.07	0.02	
v/s Ratio Perm	0.20			0.29		0.06						
v/c Ratio	0.45	0.66		0.60	0.67	0.09		0.62	0.53	0.77	0.16	
Uniform Delay, d1	54.3	32.4		31.7	16.2	9.7		66.3	38.6	66.1	62.1	
Progression Factor	0.90	0.45		0.69	0.35	0.05		1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.3	1.3		1.8	1.4	0.2		8.2	0.6	19.2	0.5	
Delay (s)	51.1	15.8		23.7	7.1	0.7		74.7	39.1	85.3	62.6	
Level of Service	D	B		C	A	A		E	D	F	E	
Approach Delay (s)		17.0			9.1			44.5			77.4	
Approach LOS		B			A			D			E	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
5: Connector/Creekside & Graves Mill

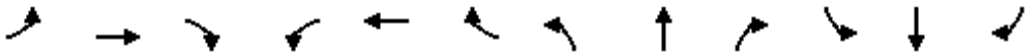
03/07/2018

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	53	1487	300	1554	149	89	497	127	67
v/c Ratio	0.40	0.65	0.61	0.66	0.13	0.62	0.54	0.77	0.35
Control Delay	26.1	16.1	30.6	7.2	0.3	84.3	41.0	93.8	30.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	16.1	30.6	7.2	0.3	84.3	41.0	93.8	30.0
Queue Length 50th (ft)	9	351	125	311	0	83	210	120	18
Queue Length 95th (ft)	m52	102	206	214	0	m#197	268	#248	70
Internal Link Dist (ft)		700		797		519			443
Turn Bay Length (ft)	250		420				160	190	
Base Capacity (vph)	134	2492	536	2482	1167	143	919	167	195
Starvation Cap Reductn	0	0	0	17	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.60	0.56	0.63	0.13	0.62	0.54	0.76	0.34

Intersection Summary

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1467	341	345	1251	0	200	0	68	0	1	3
Future Volume (vph)	1	1467	341	345	1251	0	200	0	68	0	1	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	12	12	13	13	12	16	12
Grade (%)		3%			-5%			-5%			3%	
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.95			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (prot)	1778	5059	1575	3402	3664			1874	1677		1906	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (perm)	1778	5059	1575	3402	3664			1874	1677		1906	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1	1612	375	379	1375	0	220	0	75	0	1	3
RTOR Reduction (vph)	0	0	124	0	0	0	0	0	64	0	3	0
Lane Group Flow (vph)	1	1612	251	379	1375	0	0	220	11	0	1	0
Heavy Vehicles (%)	0%	1%	1%	2%	1%	0%	2%	0%	2%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm		NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)	1.4	81.1	81.1	24.8	104.5			22.8	22.8		1.3	
Effective Green, g (s)	1.4	81.1	81.1	24.8	104.5			22.8	22.8		1.3	
Actuated g/C Ratio	0.01	0.54	0.54	0.17	0.70			0.15	0.15		0.01	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	16	2735	851	562	2552			284	254		16	
v/s Ratio Prot	0.00	c0.32		c0.11	0.38			c0.12			c0.00	
v/s Ratio Perm			0.16						0.01			
v/c Ratio	0.06	0.59	0.29	0.67	0.54			0.77	0.04		0.06	
Uniform Delay, d1	73.6	23.2	18.8	58.8	11.0			61.1	54.3		73.7	
Progression Factor	0.98	0.65	0.33	0.83	0.49			1.00	1.00		1.00	
Incremental Delay, d2	1.3	0.8	0.7	2.6	0.7			12.4	0.1		1.7	
Delay (s)	73.4	16.0	6.8	51.5	6.1			73.5	54.4		75.4	
Level of Service	E	B	A	D	A			E	D		E	
Approach Delay (s)		14.3			15.9			68.7			75.4	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	1	1612	375	379	1375	220	75	4
v/c Ratio	0.01	0.54	0.36	0.80	0.50	0.77	0.21	0.05
Control Delay	67.0	13.6	2.5	63.2	5.3	78.8	2.0	49.8
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Delay	67.0	13.6	2.5	63.2	5.4	78.8	2.0	49.8
Queue Length 50th (ft)	1	265	6	185	36	210	0	1
Queue Length 95th (ft)	m1	369	71	236	250	290	6	14
Internal Link Dist (ft)		1348			700	355		176
Turn Bay Length (ft)	380		280	310				
Base Capacity (vph)	82	3004	1045	521	2747	374	434	383
Starvation Cap Reductn	0	0	0	0	320	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.54	0.36	0.73	0.57	0.59	0.17	0.01

Intersection Summary

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

Appendix G

Turn Lane Warrants

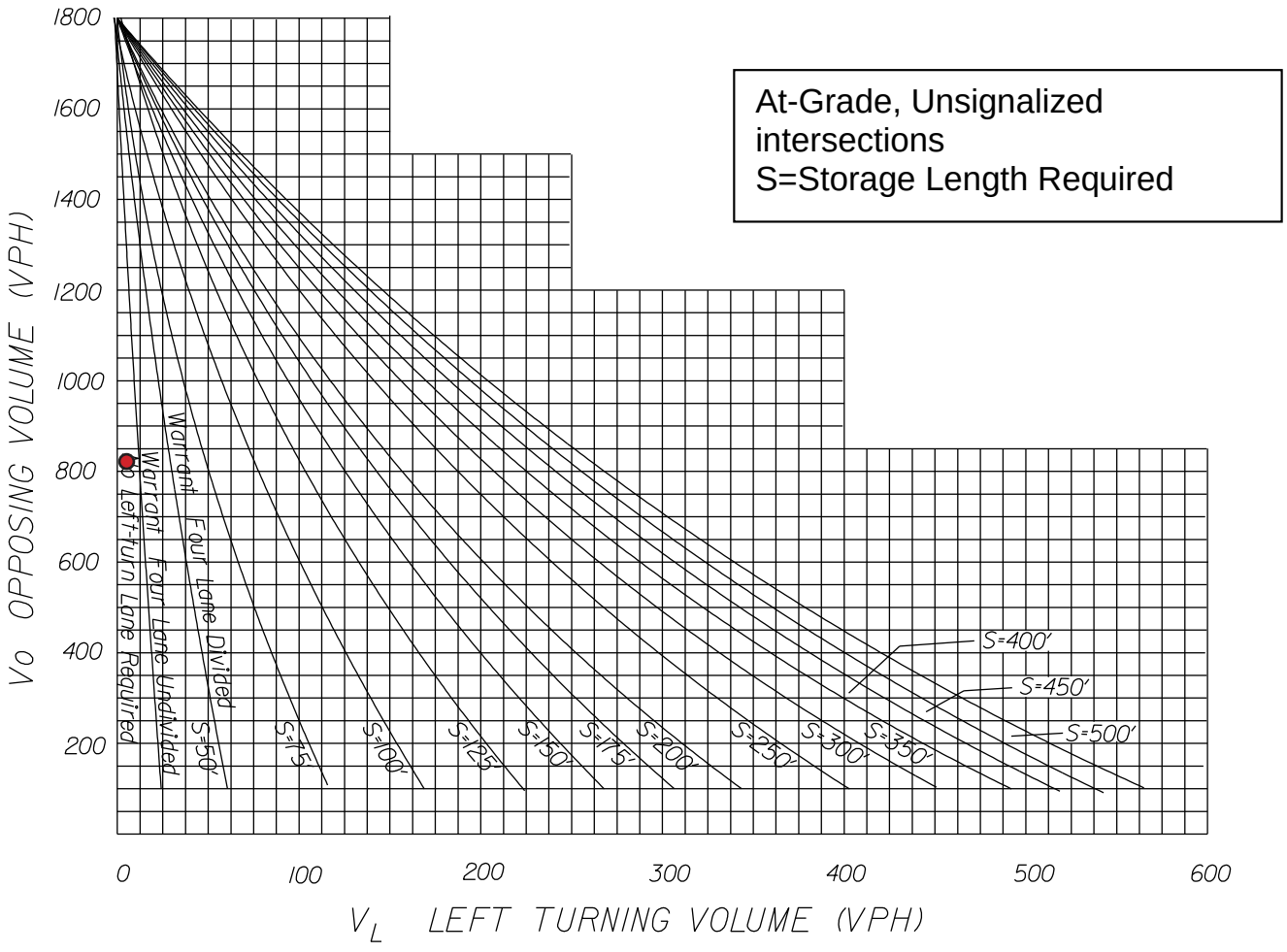
Warrant for Left-Turn Storage Lanes on Four-Lane Highway

Project: Graves Mill Corridor Study
Intersection: Graves Mill Road/Millside

Approach Direction: Graves Mill Road EB
Peak Hour: AM

Peak Hour Left Turns (V_L): 4 vph
Opposing Volume (V_O): 822 vph

Conclusion: No Left Turn Storage Lane Required



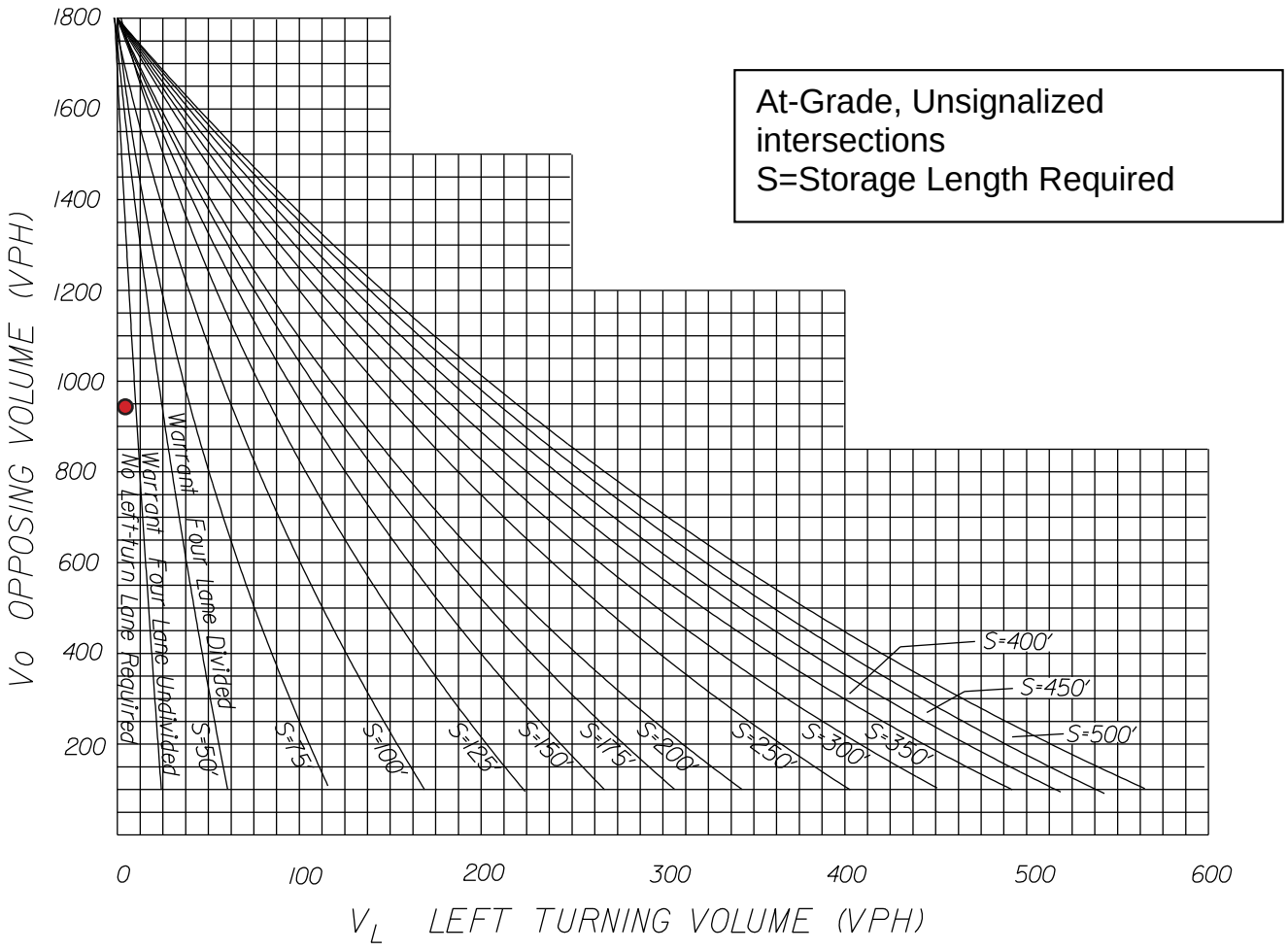
Warrant for Left-Turn Storage Lanes on Four-Lane Highway

Project: Graves Mill Corridor Study
Intersection: Graves Mill Road/Millside

Approach Direction: Graves Mill Road EB
Peak Hour: PM

Peak Hour Left Turns (V_L): 3 vph
Opposing Volume (V_O): 949 vph

Conclusion: No Left Turn Storage Lane Required



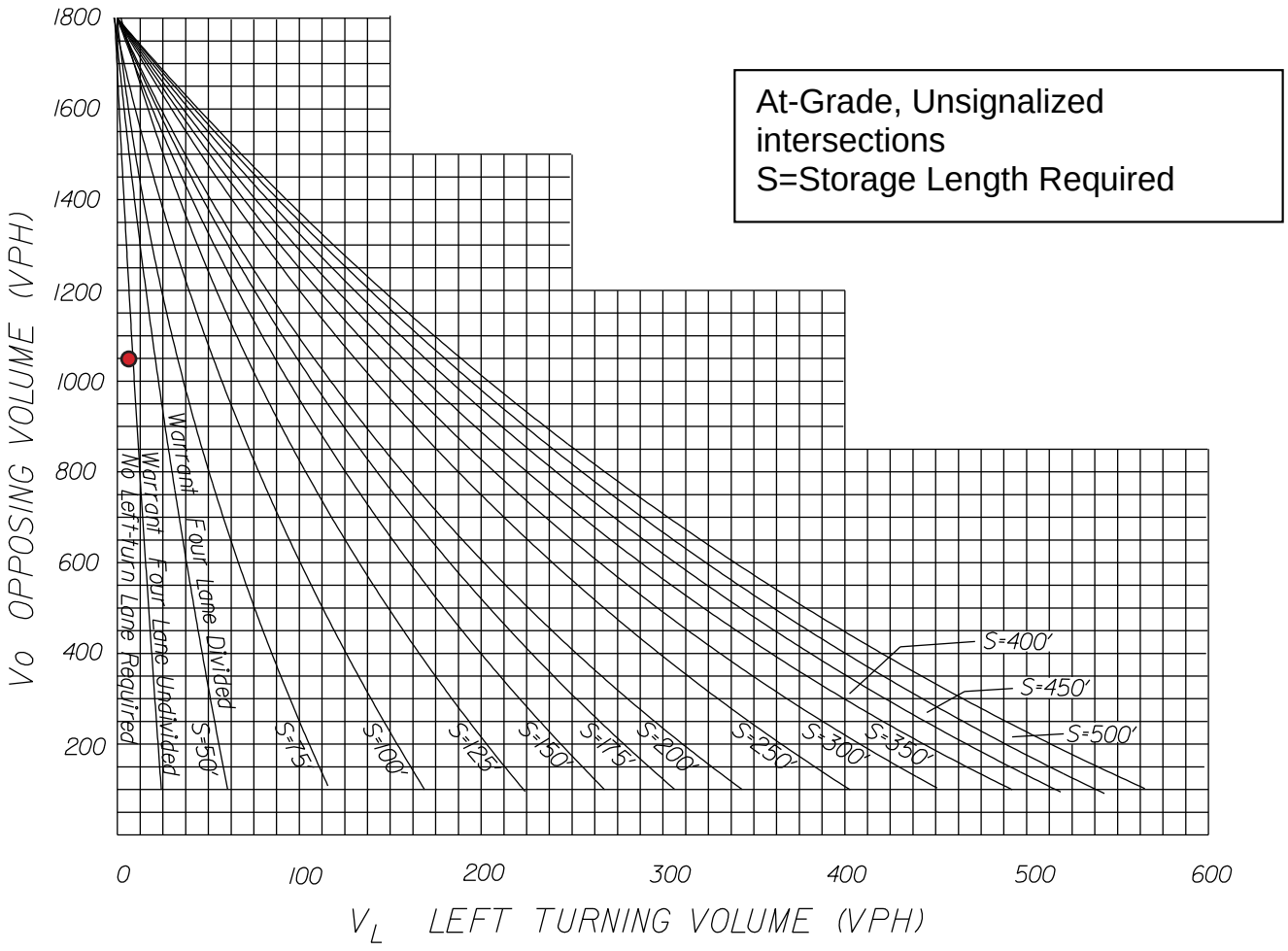
Warrant for Left-Turn Storage Lanes on Four-Lane Highway

Project: Graves Mill Corridor Study
Intersection: Graves Mill Road/Millside

Approach Direction: Graves Mill Road WB
Peak Hour: AM

Peak Hour Left Turns (V_L): 6 vph
Opposing Volume (V_O): 1050 vph

Conclusion: No Left Turn Storage Lane Required



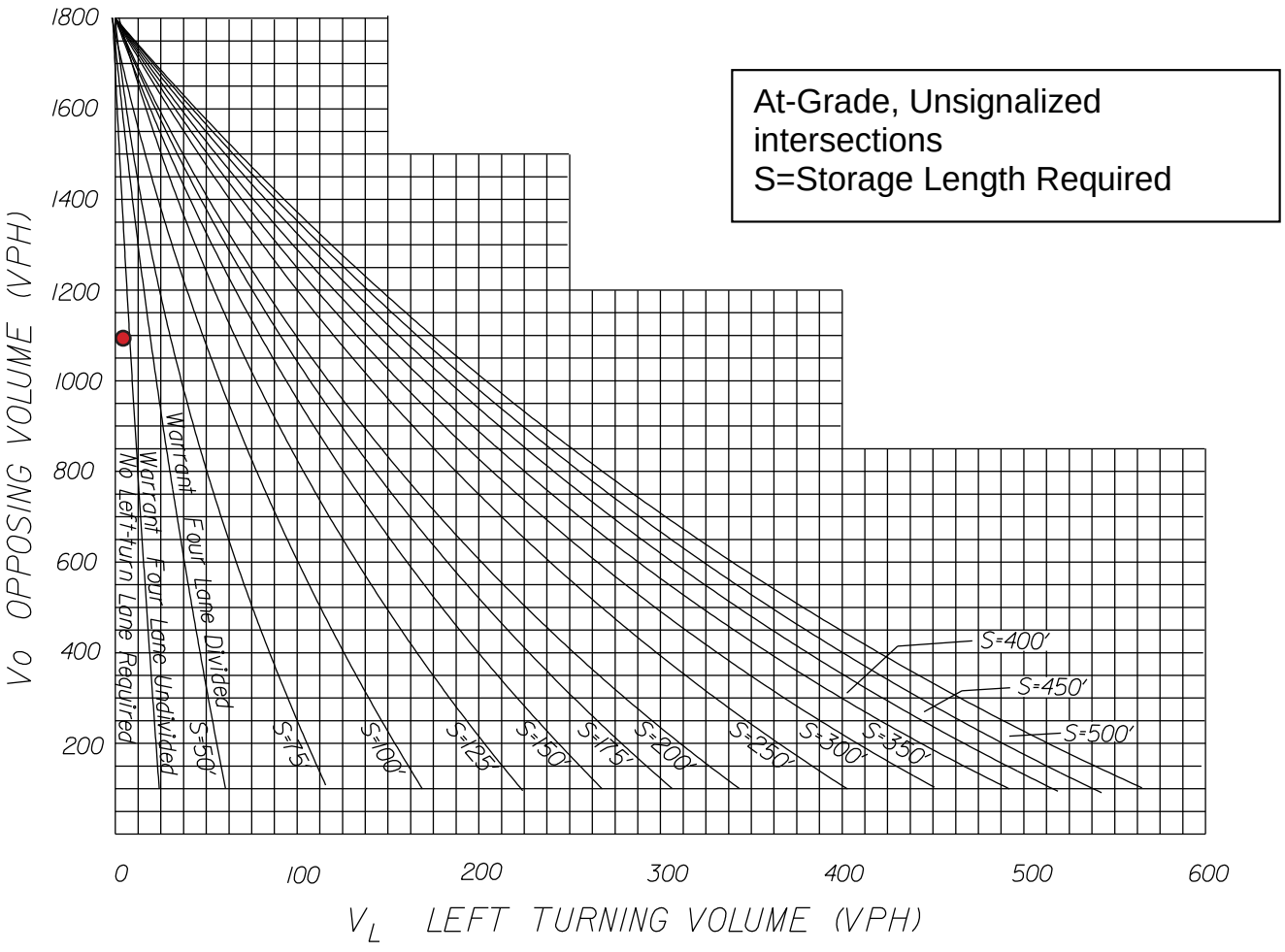
Warrant for Left-Turn Storage Lanes on Four-Lane Highway

Project: Graves Mill Corridor Study
Intersection: Graves Mill Road/Millside

Approach Direction: Graves Mill Road WB
Peak Hour: PM

Peak Hour Left Turns (V_L): 4 vph
Opposing Volume (V_O): 1092 vph

Conclusion: No Left Turn Storage Lane Required



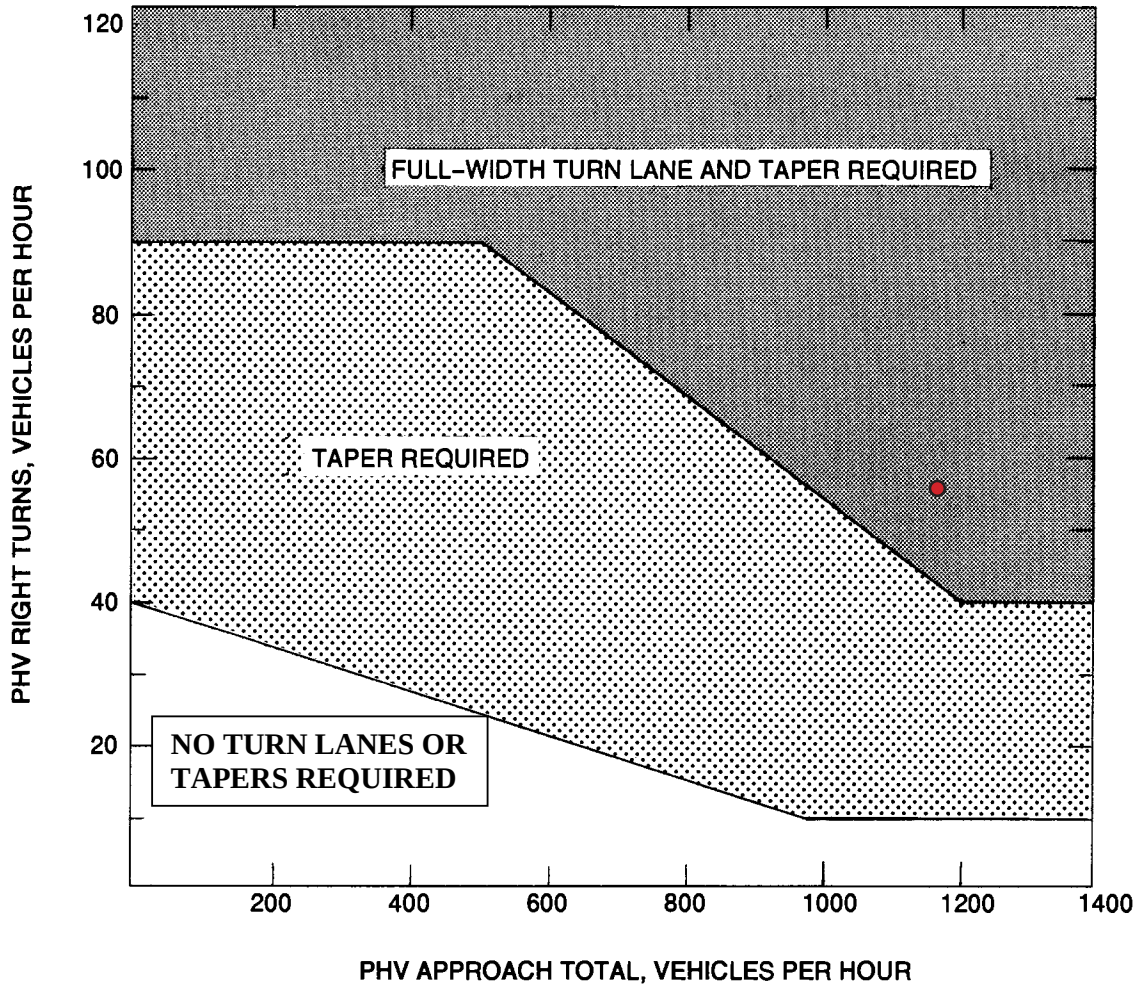
Warrant for Right-Turn Storage Lanes on Four-Lane Highway

Project: Graves Mill Corridor Study
Intersection: Graves Mill Road/Millrace Drive

Approach Direction: Graves Mill Road EB
Peak Hour: AM

Peak Hour Volume Right Turns: 56 vph
Peak Hour Volume Approach Total: 1180 vph

Conclusion: Full-width Turn Lane and Taper Required



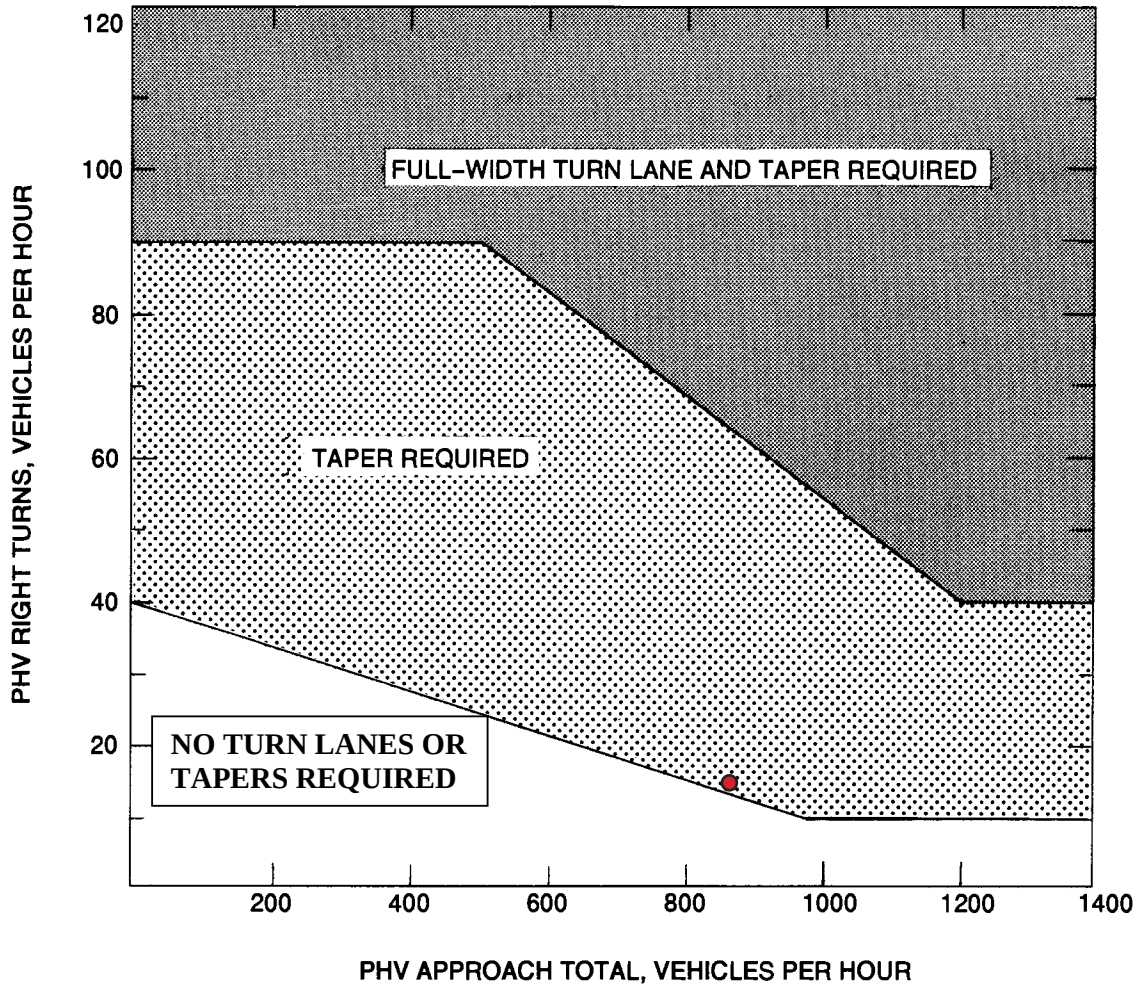
Warrant for Right-Turn Storage Lanes on Four-Lane Highway

Project: Graves Mill Corridor Study
Intersection: Graves Mill Road/Millrace Drive

Approach Direction: Graves Mill Road EB
Peak Hour: PM

Peak Hour Volume Right Turns: 14 vph
Peak Hour Volume Approach Total: 860 vph

Conclusion: Taper Required



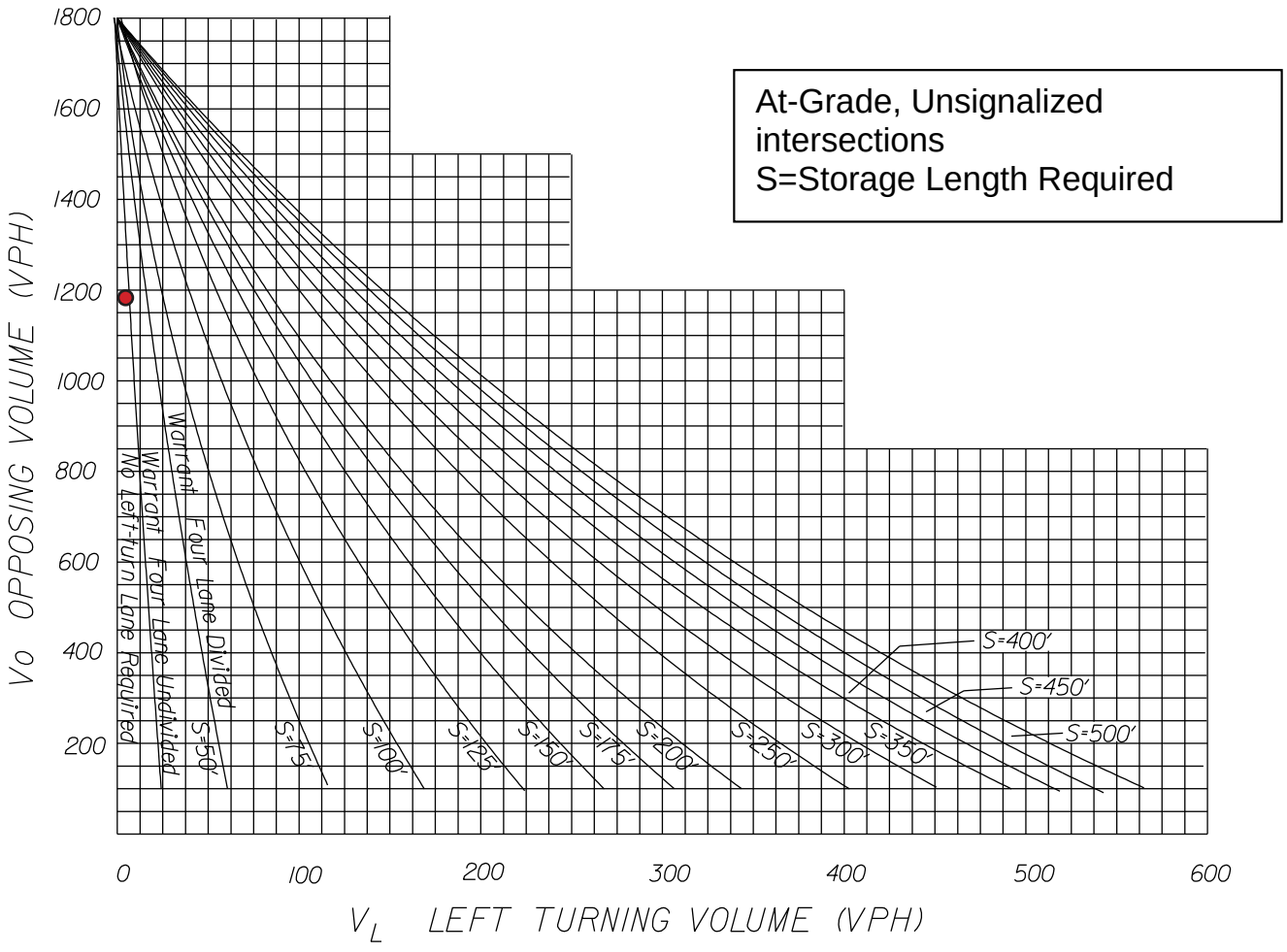
Warrant for Left-Turn Storage Lanes on Four-Lane Highway

Project: Graves Mill Corridor Study (2040 No Build Scenario)
Intersection: Graves Mill Road/Millside

Approach Direction: Graves Mill Road EB
Peak Hour: AM

Peak Hour Left Turns (V_L): 5 vph
Opposing Volume (V_O): 1186 vph

Conclusion: No Left Turn Storage Lane Required



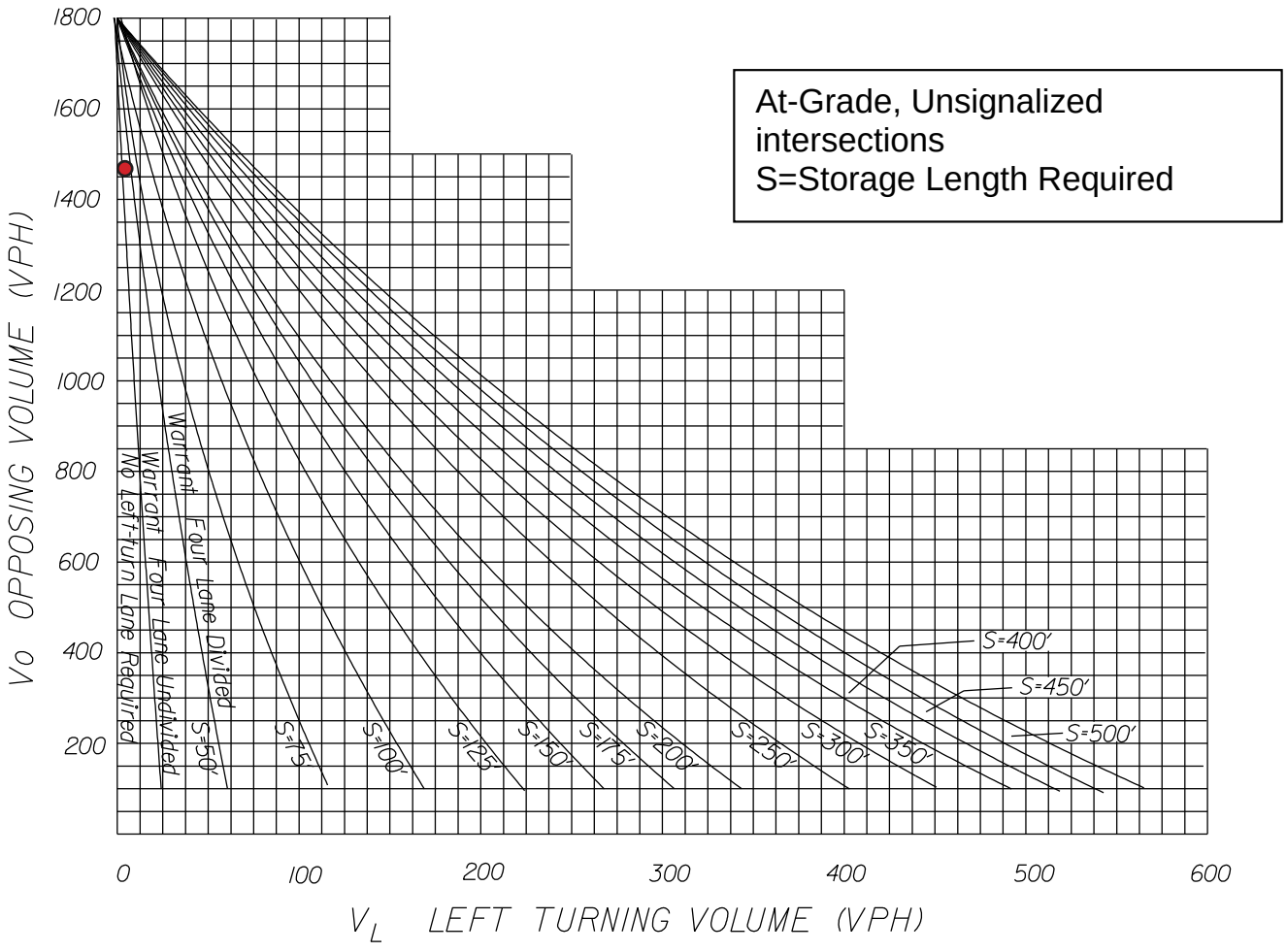
Warrant for Left-Turn Storage Lanes on Four-Lane Highway

Project: Graves Mill Corridor Study (2040 No Build Scenario)
Intersection: Graves Mill Road/Millside

Approach Direction: Graves Mill Road EB
Peak Hour: PM

Peak Hour Left Turns (V_L): 4 vph
Opposing Volume (V_O): 1469 vph

Conclusion: 50' Left Turn Storage Lane Required



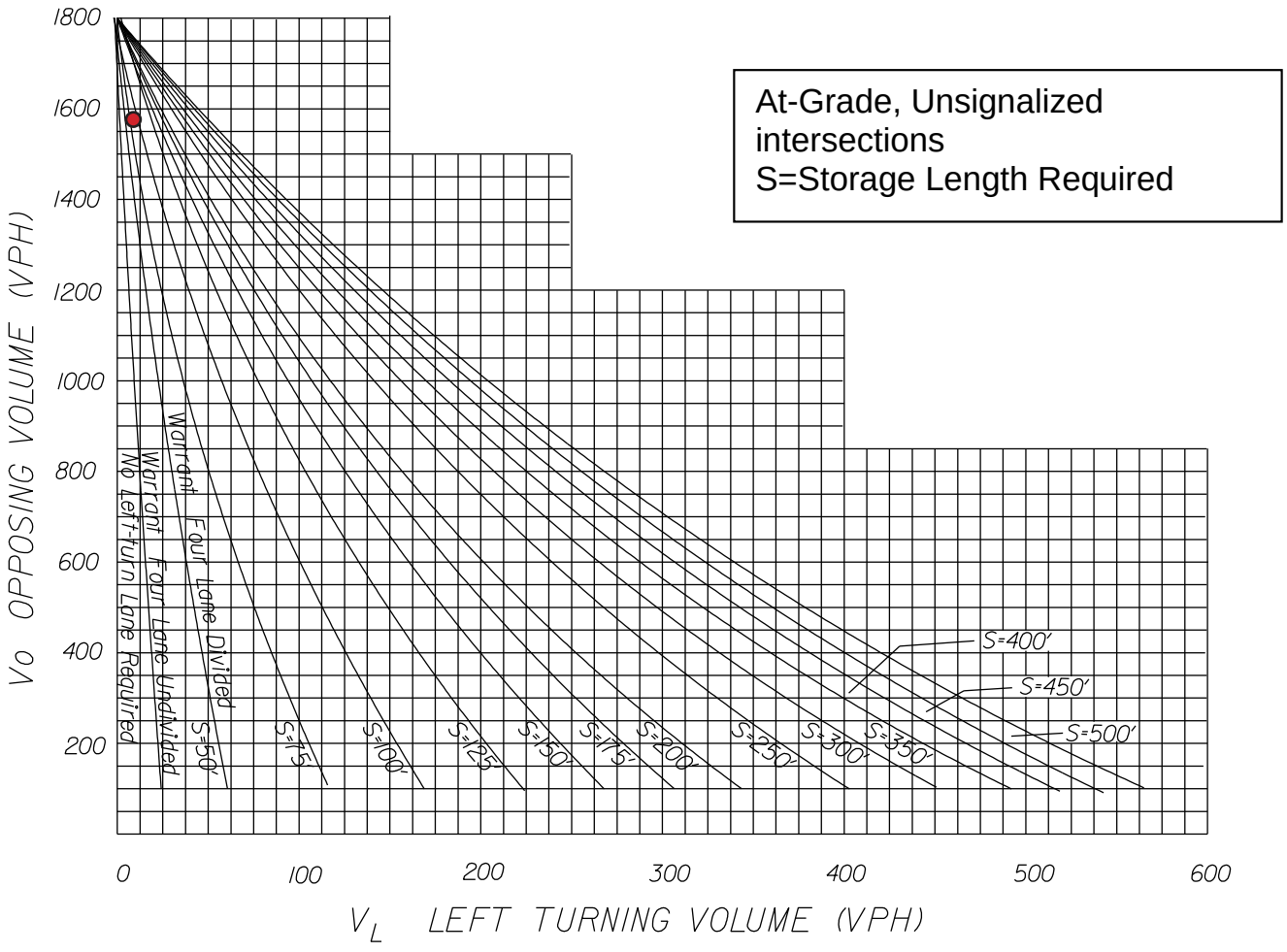
Warrant for Left-Turn Storage Lanes on Four-Lane Highway

Project: Graves Mill Corridor Study (2040 No Build Scenario)
Intersection: Graves Mill Road/Millside

Approach Direction: Graves Mill Road WB
Peak Hour: AM

Peak Hour Left Turns (V_L): 8 vph
Opposing Volume (V_O): 1574 vph

Conclusion: 100' Left Turn Storage Lane Required



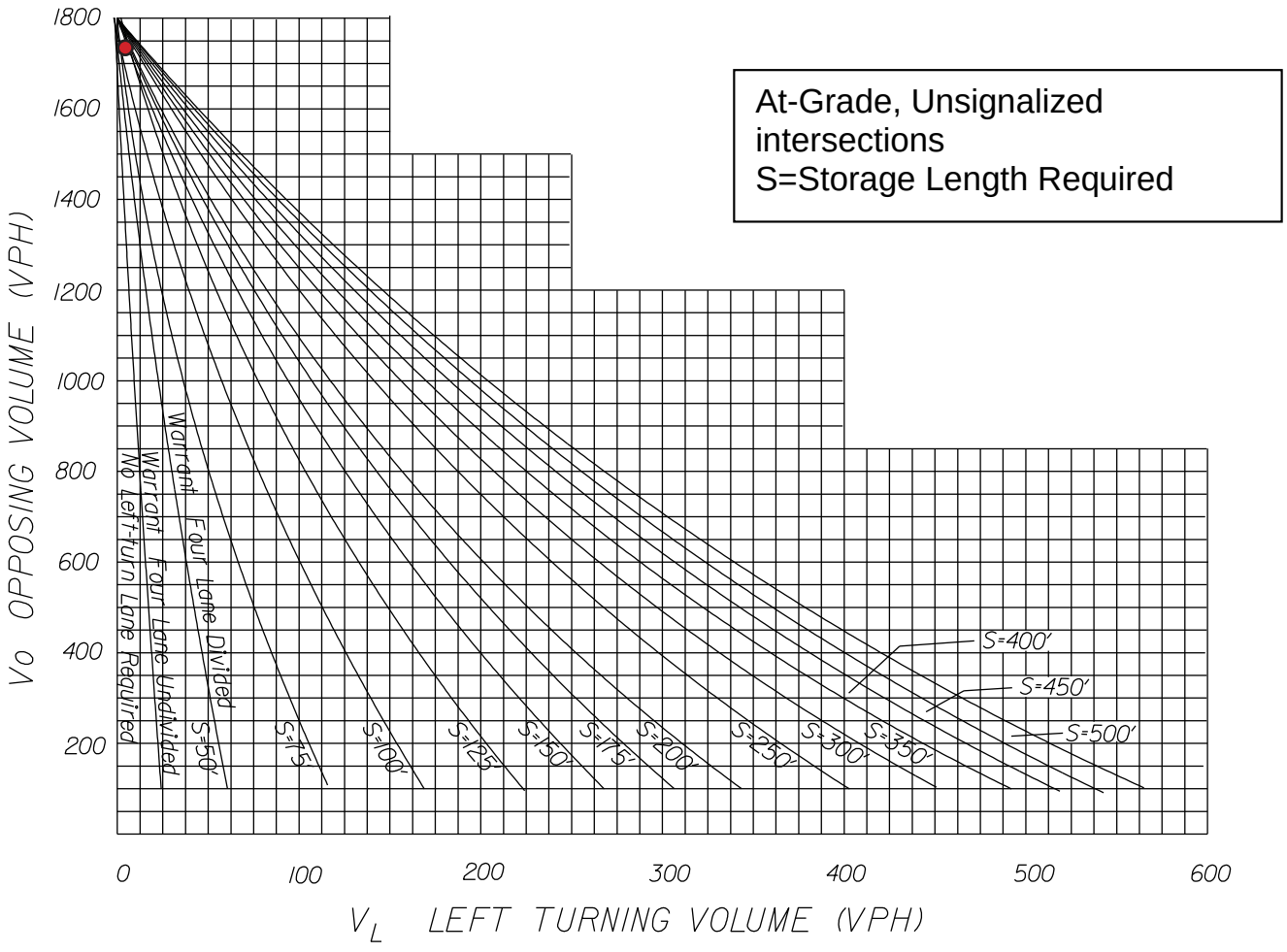
Warrant for Left-Turn Storage Lanes on Four-Lane Highway

Project: Graves Mill Corridor Study (2040 No Build Scenario)
Intersection: Graves Mill Road/Millside

Approach Direction: Graves Mill Road WB
Peak Hour: PM

Peak Hour Left Turns (V_L): 5 vph
Opposing Volume (V_O): 1744 vph

Conclusion: 125' Left Turn Storage Lane Required



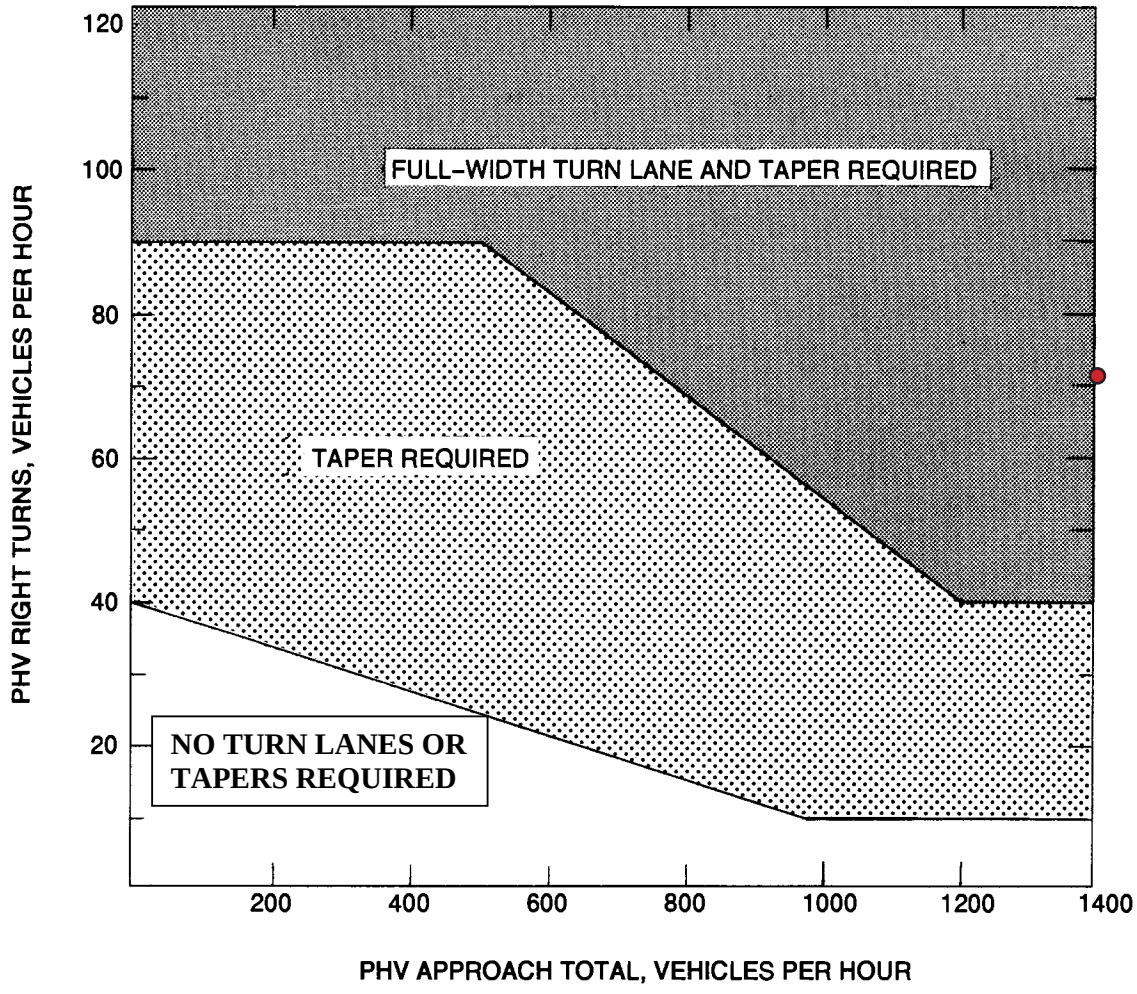
Warrant for Right-Turn Storage Lanes on Four-Lane Highway

Project: Graves Mill Corridor Study (2040 No Build Scenario)
Intersection: Graves Mill Road/Millrace Drive

Approach Direction: Graves Mill Road EB
Peak Hour: AM

Peak Hour Volume Right Turns: 72 vph
Peak Hour Volume Approach Total: 1741 vph

Conclusion: Full-width Turn Lane and Taper Required



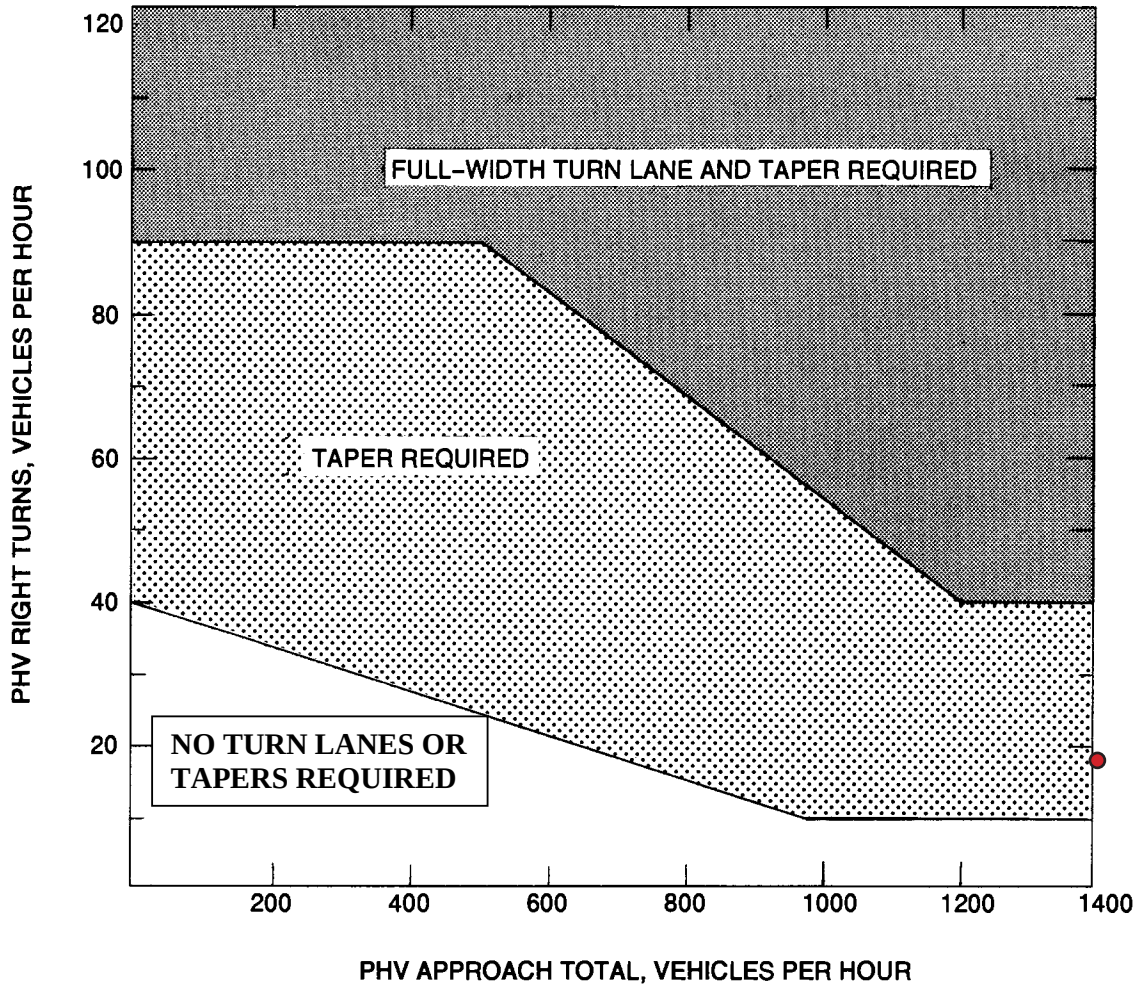
Warrant for Right-Turn Storage Lanes on Four-Lane Highway

Project: Graves Mill Corridor Study (2040 No Build Scenario)
Intersection: Graves Mill Road/Millrace Drive

Approach Direction: Graves Mill Road EB
Peak Hour: PM

Peak Hour Volume Right Turns: 18 vph
Peak Hour Volume Approach Total: 1445 vph

Conclusion: Taper Required



Appendix H

Detailed Cost Estimates

Project Cost Estimating System

SUMMARY PAGE

DISTRICT	LYNCHBURG		
PROJECT NUMBER	Graves Mill and Gristmill		
CONSTRUCTION END YEAR	FY2018	UPC	109702
AD YEAR	FY2018	RATE OF INFLATION TO AD	N/A
ESTIMATE YEAR	FY2018	INFLATION RATE DURING CN	N/A
Date of previous estimate	09/21/17		
PROJECT MANAGER / DESIGNER	Bill Wuensch		
Preliminary Engineering Estimate:	PCES		
Construction Estimate:	PCES		
Right-of-Way Estimate:	PCES		
Utilities Estimate:	PCES		
DATE	*6/8/2018*		

THE FOLLOWING DATA WILL BE PROVIDED UPON COMPLETION OF THE REMAINDER OF THE WORKBOOK, WHICH IS ACCESSED BY SELECTING THE CONST, RW, & UTIL TABS BELOW

Bridge PE ESTIMATE	*$0*
Bridge CN ESTIMATE	*$0*
Bridge RW ESTIMATE	*$0*
PRELIMINARY ENGINEERING ESTIMATE (excluding Bridge PE)	*$430,568*
CONSTRUCTION ESTIMATE (excluding Bridge CN)	*$2,289,807*
RIGHT-OF-WAY & UTILITIES ESTIMATE(excluding Bridge RW)	*$132,632*
TOTAL PROJECT ESTIMATE (excluding Bridge estimate)	*$2,853,007*

Revised 07/01/17

Estimate Class: Blank

Version 7.00

UPC: 109702

Project Cost Estimating System

SUMMARY PAGE

DISTRICT	LYNCHBURG		
PROJECT NUMBER	Graves Mill and 501		
CONSTRUCTION END YEAR	FY2018	UPC	
AD YEAR	FY2018	RATE OF INFLATION TO AD	N/A
ESTIMATE YEAR	FY2018	INFLATION RATE DURING CN	N/A
Date of previous estimate	09/21/17		
PROJECT MANAGER / DESIGNER	Bill Wuensch		
Preliminary Engineering Estimate:	PCES		
Construction Estimate:	PCES		
Right-of-Way Estimate:	PCES		
Utilities Estimate:	PCES		
DATE	*6/8/2018*		

THE FOLLOWING DATA WILL BE PROVIDED UPON COMPLETION OF THE REMAINDER OF THE WORKBOOK, WHICH IS ACCESSED BY SELECTING THE CONST, RW, & UTIL TABS BELOW

Bridge PE ESTIMATE	*$0*
Bridge CN ESTIMATE	*$0*
Bridge RW ESTIMATE	*$0*
PRELIMINARY ENGINEERING ESTIMATE (excluding Bridge PE)	*$697,821*
CONSTRUCTION ESTIMATE (excluding Bridge CN)	*$4,993,528*
RIGHT-OF-WAY & UTILITIES ESTIMATE(excluding Bridge RW)	*$473,149*
TOTAL PROJECT ESTIMATE (excluding Bridge estimate)	*$6,164,498*

Revised 07/01/17

Estimate Class: Blank

Version 7.00