TIMMONS GROUP

Taylor Middle School – Addition

Traffic Impact Analysis

September 8, 2023

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Submitted to:
Town of Warrenton, Virginia

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Taylor Middle School – Addition
Traffic Impact Analysis

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1 EXECUTIVE SUMMARY

This report presents the findings of the revised traffic impact analysis (TIA) prepared for the proposed expansion of Taylor Middle School in the Town of Warrenton, Virginia. The original TIA was submitted in September 2023 and the Town issued comments in November 2023. This revised TIA has been prepared to address those comments.

1.1 PROJECT OVERVIEW

The site is generally located south of E Shirley Street, north of Alwington Boulevard, and east of Culpeper Street as shown in Figure 1-1 (all figures are located at the end of their respective chapter).

The existing site encompasses Taylor Middle School and James G. Brumfield Elementary School. The middle school currently accommodates 510 students. The proposed expansion of the middle school will accommodate an increase of 340 students for a total of 850 students.

Access will be provided via three existing entrances on E Shirley Avenue and one new entrance via a connecting road to the existing elementary school and out to Alwington Boulevard. A conceptual plan is shown on Figure 1-2.

For the purposes of this analysis, the expansion was assumed to be complete and occupied by 2026.

When complete, the expansion will generate an increase of 145 AM peak hour trips (84 in and 61 out), 101 School PM peak hour trips (40 in and 61 out), 42 PM peak hour trips (30 in ands 12 out) and 714 average daily trips.

Based on the trips generated by the site and the rezoning application, a traffic study is required by the Town of Warrenton, but a VDOT Chapter 527 TIA is not required.

The purpose of this analysis is to determine the impact of the proposed expansion of the middle school on the surrounding roadway network. The scope of this study was developed in conjunction with the Town of Warrenton and the Virginia Department of Transportation (VDOT). A copy of the scoping documents is included in Appendix A.

1.2 STUDY LIMITS

As agreed, upon in the scoping documents, the study limits include the following seven (7) existing intersections:

1. Shirley Avenue/Culpeper Street (signalized);
2. E Shirley Avenue/Site Entrance #1 (unsignalized);
3. E Shirley Avenue/Site Entrance #2 (signalized);
4. E Shirley Avenue/Site Entrance #3 (unsignalized);
5. E Shirley Avenue/Route 15 (roundabout);
6. E Shirley Avenue/Alwington Boulevard (signalized); and
7. Alwington Boulevard/Elementary School Entrance (unsignalized).

It is noted that the Shirley Avenue/Culpeper Street signal is maintained by the Town while the E Shirley Avenue/Alwington Boulevard signal is maintained by VDOT.

In accordance with the scoping agreement, analyses were completed for the following scenarios:

1. 2023 Existing Traffic Conditions;
2. 2026 Background Traffic Conditions (without proposed expansion of the site);
3. 2026 Future Traffic Conditions (with proposed expansion of the site);
4. 2032 Background Traffic Conditions (without proposed expansion of the site); and
5. 2032 Future Traffic Conditions (with proposed expansion of the site).

The analysis examines the AM peak hour (when the school peak coincides with the commuter peak), the school PM peak hour, and the commuter PM peak hour. It is noted the commuter PM peak hour is referred to as the "PM peak hour" and the school PM peak hour is referred to as the "School PM peak hour" in this analysis.

The following steps were taken to determine the potential traffic impacts associated with this project:

1. Data Collection – Existing AM (6-9 AM) and PM (2-6 PM) peak hour traffic counts were collected at the existing study intersections on May 16 and May 18, 2023.

2. Traffic Growth – As agreed upon in the scoping document, a 1% annual growth rate was applied to existing traffic volumes to account for development outside the study area.

3. Other Developments – The traffic from the approved Arrington Development was accounted for in the 2032 scenarios only.

4. Trip Generation – Traffic generated by the proposed development was estimated using the existing traffic counts at the school driveways (peak hours) and the 11th edition of the Institute of Transportation Engineers' *Trip Generation Manual* (average daily traffic).

5. Traffic Distributions – The distribution of trips generated by the proposed developed was based on the existing traffic volumes, the nature of the use, and local knowledge.

6. Site Traffic Projections – Future traffic volumes were determined by combining the 2026 and 2032 background traffic volumes with proposed new trips generated by the site to create the 2026 and 2032 total traffic volumes used in the analysis.

7. Traffic Capacity Analysis – Level of service calculations for existing, background, and future conditions were performed using SYNCHRO Version 11 with SimTraffic for signalized and unsignalized intersections and SIDRA version 9 for the roundabout.

8. Queuing Analysis – The 95th percentile queue lengths (Synchro) and maximum queues (SimTraffic) were reviewed at the intersections listed above.

9. Turn Lane Warrant Analysis – The need for turn lanes at the site entrances on E Shirley Avenue will be analyzed under 2026 and 2032 future traffic conditions.

10. Access Management Review – An evaluation of the access management spacing standards for the site entrances on E Shirley Avenue will be conducted for the reconfigured site entrances.

1.3 PRINCIPAL FINDINGS

Based on the analysis contained herein, the following principal findings are offered:

Under 2023 existing conditions:

1. The East Shirley/Culpeper Street intersection currently operates an overall LOS C in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns.

2. The school entrances along East Shirley Avenue operate at LOS C or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Route 15 (Falmouth Street) operates at LOS A in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C or better in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Under 2026 background conditions, all intersections experience similar levels of service, delay, and queueing as under existing conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns.

2. The school entrances along East Shirley Avenue operate at LOS C or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Route 15 (Falmouth Street) operates at LOS A in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Under 2026 total future conditions, with buildout of the proposed development, all intersections experience similar levels of service compared to 2026 background conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns.

2. The school entrances along East Shirley Avenue operate at LOS C or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Route 15 (Falmouth Street) operates at LOS A in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

6. The expansion of the middle school will have minimal impact on the external surrounding roadway network and no improvements are required at the study intersections.
    a. The expansion will provide a link between the elementary school and the middle school during school pick up and drop off times only. During all other times, the connection between the schools will be gated.

Under 2032 background conditions, all intersections experience similar levels of service, delay, and queueing as under 2026 background conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C or D in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns with the exception of the eastbound left approach which will operate at LOS E in both PM peaks.
    a. It is noted that the traffic signal is running under "free" operations and is likely giving more time to the mainline through movements which results in the LOS E. The delays are less than the overall cycle length of the intersection indicating that the average traffic waits at most one cycle length to traverse the intersection.

2. The school entrances along East Shirley Avenue operate at LOS D or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Route 15 (Falmouth Street) operates at LOS A or B in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Under 2032 total future conditions, with buildout of the proposed development, all intersections experience similar levels of service compared to 2026 background conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C or D in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns with the exception of the eastbound left approach which will operate at LOS E in both PM peaks.
    a. It is noted that the traffic signal is running under "free" operations and is likely giving more time to the mainline through movements which results in the LOS E. The delays are less than the overall cycle length of the intersection indicating that the average traffic waits at most one cycle length to traverse the intersection.

2. The school entrances along East Shirley Avenue operate at LOS D or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Route 15 (Falmouth Street) operates at LOS A or B in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

6. The expansion of the middle school will have minimal impact on the external surrounding roadway network and no improvements are required at the study intersections.
    a. The expansion will provide a link between the elementary school and the middle school during school pick up and drop off times only. During all other times, the connection between the schools will be gated.

1.4 RECOMMENDATIONS

The expansion of the middle school will have minimal to no impact on the surrounding roadway network and no improvements are required at the study intersections.

The expansion will provide a link between the elementary school and the middle school during school pick up and drop off times only. During all other times, the connection between the schools will be gated.

The traffic control at internal intersections to the school site was not reviewed as part of this study and will the specifics (signage, pavement markings, etc.) will be designed at the time of site plan approval.

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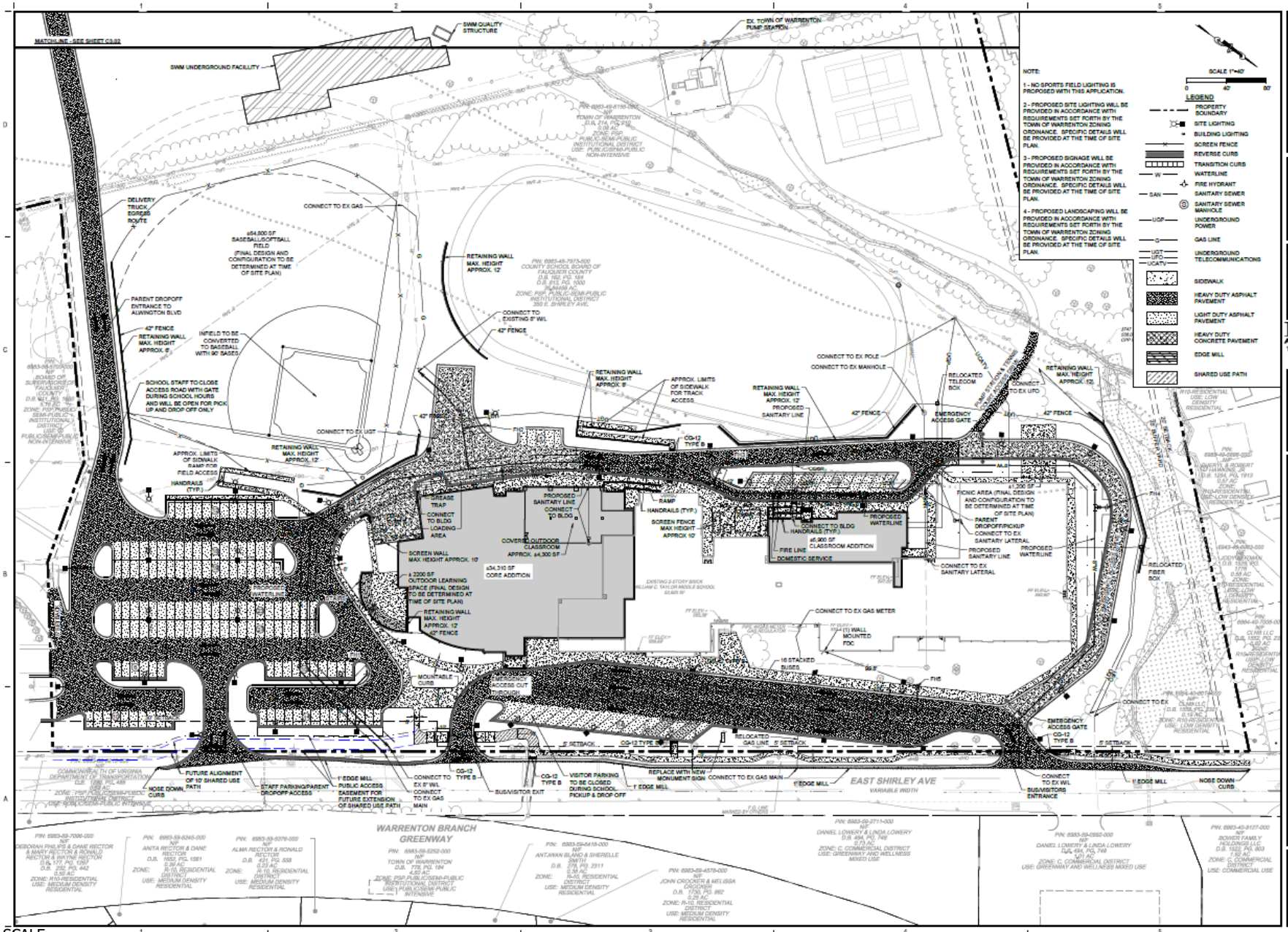
Site Location and Study Intersections
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure
1-1



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Site Layout
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure
1-2

2 BACKGROUND INFORMATION

2.1 DESCRIPTION OF ON-SITE DEVELOPMENT

The site is generally located south of E Shirley Street, north of Alwington Boulevard, and east of Culpeper Street as shown in Figure 1-1 (all figures are located at the end of their respective chapter).

The existing site encompasses Taylor Middle School and James G. Brumfield Elementary School. The middle school currently accommodates 510 students. The proposed expansion of the middle school will accommodate an increase of 340 students for a total of 850 students. Access will be provided via three existing entrances on E Shirley Avenue and one new entrance via a connecting road to the existing elementary school and out to Alwington Boulevard. A conceptual plan is shown on Figure 1-2.

For the purposes of this analysis, the expansion was assumed to be complete and occupied by 2026.

When complete, the expansion will generate an increase of 145 AM peak hour trips (84 in and 61 out), 101 School PM peak hour trips (40 in and 61 out), 42 PM peak hour trips (30 in ands 12 out) and 714 average daily trips.

Based on the trips generated by the site and the rezoning application, a traffic study is required by the Town of Warrenton, but a VDOT Chapter 527 TIA is not required.

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2.2 STUDY LIMITS

As agreed, upon in the scoping documents, the study limits include the following seven (7) existing intersections:

1. Shirley Avenue/Culpeper Street (signalized);
2. E Shirley Avenue/Site Entrance #1 (unsignalized);
3. E Shirley Avenue/Site Entrance #2 (signalized);
4. E Shirley Avenue/Site Entrance #3 (unsignalized);
5. E Shirley Avenue/Route 15 (roundabout);
6. E Shirley Avenue/Alwington Boulevard (signalized); and
7. Alwington Boulevard/Elementary School Entrance (unsignalized).

2.3 EXISTING ROADWAY NETWORK

E Shirley Avenue (Route 17) is a two-lane, undivided, minor arterial with a posted speed limit of 40 mph from Culpeper Street to Route 15 and 25 mph from Route 15 to Alwington Boulevard. The 2021 VDOT traffic data shows that Route 17 carries approximately 15,000 vehicles per day between Culpeper Street and Route 15. The 2021 Virginia Roads traffic data shows that Route 17 carries approximately 9,7000 vehicles per day between the Town of Warrenton Line and the James Madison Highway/Bus US 15 interchange.

An existing school zone speed limit of 25 mph is present on E Shirley Avenue approximately 255 ft west of school entrance #1 and approximately 650 ft east of school entrance #3. It was assumed that the school zone speed limit was active in this area during the AM and school PM peak hour of this analysis.

Falmouth Street (Route 15) is a two-lane, undivided, minor arterial with a posted speed limit of 25 mph within the site vicinity. The 2021 VDOT traffic data shows that Route 15 carries approximately 4,300 vehicles per day between Route 17 and Mockingbird Lane.

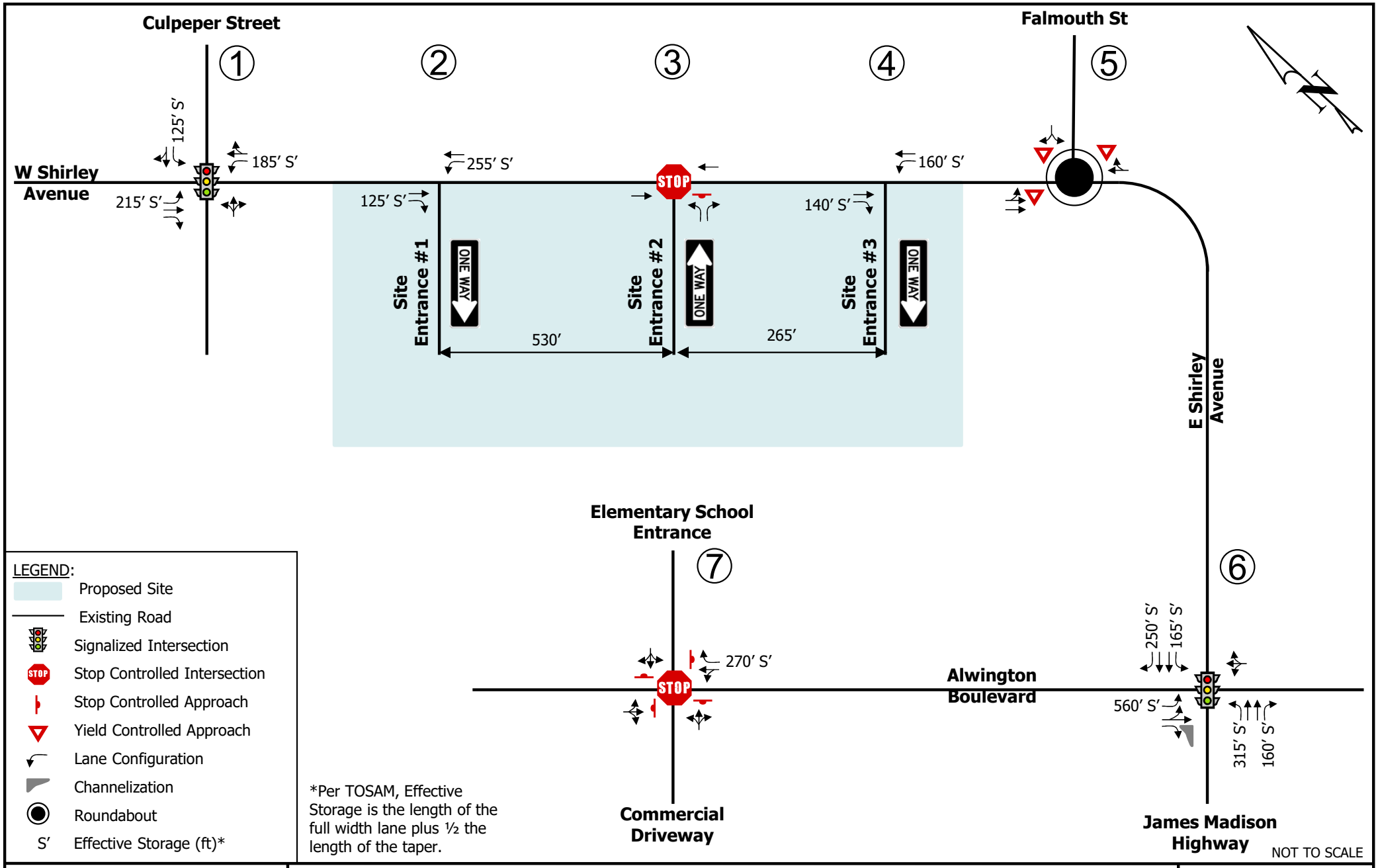
Culpeper Street is a two-lane, undivided, major collector to the west and a minor arterial to the east of E Shirley Avenue, with a posted speed limit of 25 mph within the site vicinity. The 2021 VDOT traffic data shows that Culpeper Street carries approximately 3,300 vehicles per day between Shirley Avenue and Hotel Street.

Alwington Boulevard is a four-lane, divided, local road with a posted speed limit of 35 mph. No VDOT traffic data available for Alwington Boulevard. The 2016 Virginia Roads traffic data shows that Alwington Boulevard carries approximately 7,000 vehicles per day.

The existing lane use and traffic control at the study intersections is shown on Figure 2-1.

2.4 FUTURE IMPROVEMENTS

There are no improvements at the study intersections that will occur within the timeframe analyzed in the study except the realignment of the Alwington Boulevard/Elementary School Entrance/Commercial Driveway intersection. This improvement is a realignment only and will not impact the capacity of the intersection.



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Existing Roadway Geometry and Stop Control
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 2-1

3 2023 EXISTING CONDITIONS

3.1 EXISTING TRAFFIC VOLUMES

Directional turning movement counts (TMCs) were collected during the AM (6:00-9:00) and PM (2:00-6:00) peak traffic hours. The counts were conducted on May 16, 2023, at intersections 2 through 7 and on May 18, 2023, at intersection 1 on a typical weekday when public schools were in session. The TMCs included heavy vehicles by movement and pedestrian/bicycles counts, where applicable. A copy of the count data is included in Appendix B.

The peak hours analyzed in this report align with the highest traffic volumes of the roadway network. The morning peak hour (7:15-8:15 AM), school PM peak hour (2:15-3:15 PM), and commuter PM peak hour (4:30-5:30 PM) were determined by the highest hour of total traffic on the study area road network. The 2023 existing bus peak hour volumes are shown on Figure 3-1 and the 2023 existing vehicle (no-bus) peak hour volumes are shown on Figure 3-2. Figures 3-1 and 3-2 were added together to yield the 2023 total existing peak hour volumes as shown on Figure 3-3.

Existing signal timings for the Shirley Avenue/Culpeper Street intersection was provided by the Town of Warrenton and the E Shirley Avenue/Alwington Boulevard intersection was provided by VDOT. A copy of the signal timings included in Appendix C.

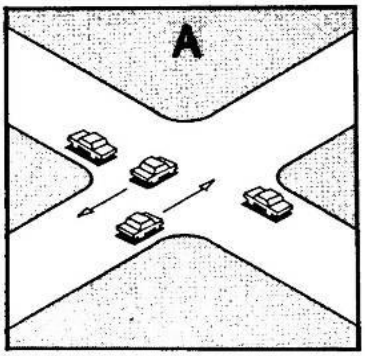
It is noted that both signals operate under "free" operations and are not coordinated with any other traffic signals.

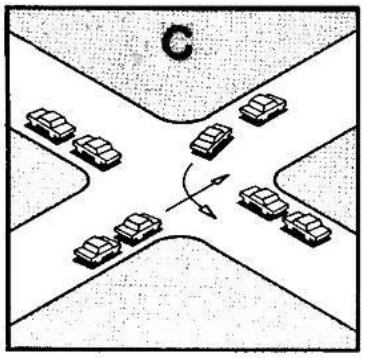
3.2 CAPACITY ANALYSIS

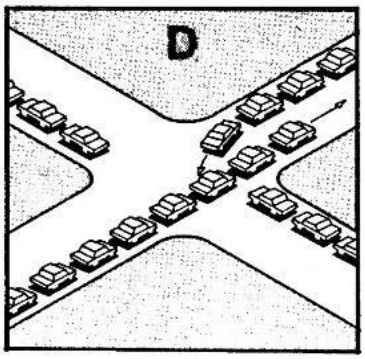
Capacity analysis allows traffic engineers to determine the impacts of traffic on the surrounding roadway network. The Transportation Research Board's (TRB) *Highway Capacity Manual* (HCM) methodologies govern how the capacity analyses are conducted and how the results are interpreted. There are six letter grades of Levels of Service (LOS) from A to F, with LOS A representing the best operating conditions and LOS F the worst operating conditions. Table 3-1 shows in detail how each of these levels of service are interpreted.

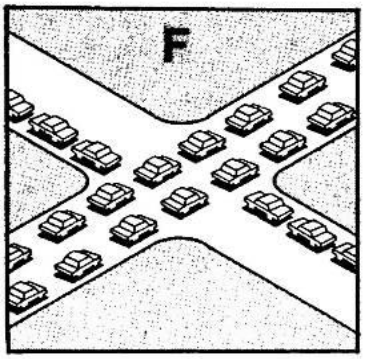
Table 3-1: Level of Service Definitions

Level of Service	Roadway Segments or Controlled Access Highways	Intersections
A	Free flow, low traffic density.	No vehicle waits longer than one signal indication.
B	Delay is not unreasonable, stable traffic flow.	On a rare occasion motorists wait through more than one signal indication.
C	Stable condition, movements somewhat restricted due to higher volumes, but not objectionable for motorists.	Intermittently drivers wait through more than one signal indication, and occasionally backups may develop behind left turning vehicles, traffic flow still stable and acceptable.
D	Movements more restricted, queues and delays may occur during short peaks, but lower demands occur often enough to permit clearing, thus preventing excessive backups.	Delays at intersections may become extensive with some, especially left-turning vehicles waiting two or more signal indications, but enough cycles with lower demand occur to permit periodic clearance, thus preventing excessive backups.
E	Actual capacity of the roadway invloves delay to all motorists due to congestion.	Very long queues may create lengthly delays, especially for left-turning vehicles.
F	Forced flow with demand volumes greater than capacity resulting in complete congestion. Volumes drop to zero in extreme cases.	Backups from locations downstream restrict or prevent movement of vehicles out of approach creating a storage ares during part or all of an hour.









SOURCE: *"A Policy on Design of Design of Urban Highways and Arterial Streets"* - AASHTO, 1973 based upon material published in *"Highway Capacity Manual"*, National Academy of Sciences, 1965.

For signalized and unsignalized intersections, level of service is defined in terms of **delay**, a measure of driver discomfort, frustration, fuel consumption and lost travel time. Table 3-2 summarizes the delay associated with each LOS category:

Table 3-2: Signalized and Unsignalized Intersection Level of Service Criteria

Signalized Intersections		Unsignalized Intersections	
Level of Service	Control Delay per Vehicle (sec/veh)	Level of Service	Average Control Delay (sec/veh)
A	≤ 10	A	0 to 10
B	> 10 to ≤ 20	B	> 10 to ≤ 15
C	> 20 to ≤ 35	C	> 15 to ≤ 25
D	> 35 to ≤ 55	D	> 25 to ≤ 35
E	> 55 to ≤ 80	E	> 35 to ≤ 50
F	> 80	F	> 50

Source: Exhibit 16-2 and Exhibit 17-2 from TRB's "Highway Capacity Manual 2000"

Capacity analyses were performed to assess existing (2023), background (2026 and 2032), and future (2026 and 2032) operational conditions. The signalized and unsignalized intersections were analyzed using SYNCHRO Version 11 and the roundabout was analyzed using SIDRA Version 9.0. All intersections were analyzed based on HCM 2000 methodologies except the all-way stop-control intersection (Alwington Boulevard/Elementary School Entrance/Commercial Entrance) which was based on HCM 6th edition. All analysis uses the with the following assumptions:

- Level terrain;
- 12-foot lane widths;
- Existing peak hour factor as determined by the traffic counts (by intersection) for existing scenario;
- The higher of the existing peak hour factor as determined by traffic counts (by intersection) or a peak hour factor of 0.92 for the background and total future scenarios;
- Grades as obtained through Google Earth;
- Turning movements into or out of the school will have a peak hour factor of 0.50;
- Heavy vehicle percentage as determined by the traffic counts (by movement); and
- Traffic signals timing data provided by the Town of Warrenton and VDOT.

Queuing analyses were conducted using both the HCM 2000 Edition methodology (as calculated by SYNCHRO/SIDRA) and SimTraffic simulations. The Synchro 95th percentile queue is the maximum back of queue for a particular lane within a lane group considering 95th percentile traffic volumes. The SimTraffic maximum queues are the average maximum queues after 10 runs of 60 minutes each.

Note that it is possible for the 95th percentile queue to be higher than the SimTraffic maximum queue due to the method in which each software calculates its respective value. The 95th percentile queue is based on an HCM formula while the SimTraffic maximum queue varies based on simulation results.

The signals operate under "free" operations and therefore all splits were optimized in each analysis scenario.

Additionally, the roundabout was modeled in Synchro for simulation purposes only, but all roundabout analysis results were obtained from SIDRA.

3.3 EXISTING CONDITIONS CAPACITY ANALYSIS RESULTS

Table 3-3 summarizes the 2023 existing intersection LOS, delay, 95th percentile queue lengths (Synchro), and maximum queue lengths (SimTraffic) based on the 2023 existing intersection geometry (Figure 2-1), peak hour traffic volumes shown on Figure 3-3 and the existing signal timings as provided by the Town of Warrenton and VDOT. The corresponding SYNCHRO and SimTraffic reports are included in Appendix D.

Note that the intersection numbers shown on the LOS, delay, and queue length summary tables correspond with the intersection numbers used in the SYNCHRO models and report figures.

As shown in Table 3-3, under 2023 existing conditions:

1. The East Shirley/Culpeper Street intersection currently operates an overall LOS C in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns.

2. The school entrances along East Shirley Avenue operate at LOS C or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Route 15 (Falmouth Street) operates at LOS A in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C or better in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Table 3-3: 2023 Existing Traffic
Intersection Level of Service and Delay Summary

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				SCHOOL PM PEAK HOUR				COMMUTER PM PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[(2)] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[(2)] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[(2)] (ft)
1. Shirley Avenue (E-W) at	EB Left	215	43.2	D	45	115	52.9	D	61	149	45.5	D	56	200
Culpeper Street (N-S)	EB Thru		22.7	C	260	253	26.6	C	438	357	30.8	C	#474	374
Signalized	EB Right		17.6	B	0	66	17.1	B	11	73	20.5	C	46	98
	EB Approach		*23.3*	*C*	--	--	*26.8*	*C*	--	--	*29.3*	*C*	--	--
	WB Left	185	38.8	D	47	140	41.4	D	61	173	40.1	D	50	150
	WB Thru/Right		23.8	C	#424	362	22.1	C	437	400	25.9	C	#475	347
	WB Approach		*24.8*	*C*	--	--	*23.5*	*C*	--	--	*26.8*	*C*	--	--
	NB Left/Thru/Right		42.3	D	207	231	44.5	D	199	218	42.3	D	178	190
	NB Approach		*42.3*	*D*	--	--	*44.5*	*D*	--	--	*42.3*	*D*	--	--
	SB Left	125	39.0	D	29	55	40.6	D	43	78	35.8	D	48	105
	SB Thru/Right		40.6	D	55	85	43.6	D	89	118	40.5	D	139	179
	SB Approach		*40.2*	*D*	--	--	*42.9*	*D*	--	--	*39.6*	*D*	--	--
	Overall		**28.4**	**C**	**--**	**--**	**29.1**	**C**	**--**	**--**	**31.2**	**C**	**--**	**--**
2. E Shirley Avenue (E-W) at	EB Thru		†	†	0	4	†	†	0	--	†	†	0	--
Site Entrance #1 (N-S)	EB Right	125	†	†	0	6	†	†	0	2	†	†	0	--
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	255	8.3	A	4	56	8.5	A	1	31	8.5	A	1	20
	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*0.8*	*A*	--	--	*0.2*	*A*	--	--	*0.1*	*A*	--	--
3. E Shirley Avenue (E-W) at	EB Thru		†	†	0	2	†	†	0	2	†	†	0	--
Site Entrance #2 (N-S)	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
Unsignalized	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	NB Left		17.8	C	12	74	23.3	C	16	82	19.5	C	5	42
	NB Right		10.7	B	7	75	13.1	B	10	84	11.6	B	0	27
	NB Approach		*13.9*	*B*	--	--	*17.3*	*C*	--	--	*18.3*	*C*	--	--
4. E Shirley Avenue (E-W) at	EB Thru		†	†	0	--	†	†	0	--	†	†	0	--
Site Entrance #3 (N-S)	EB Right	140	†	†	0	2	†	†	0	5	†	†	0	5
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	160	8.0	A	2	38	8.7	A	1	37	8.7	A	2	42
	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*0.4*	*A*	--	--	*0.3*	*A*	--	--	*0.4*	*A*	--	--
5. E Shirley Avenue (E-W) at	*EB Approach*		*1.8*	*A*	*21*	--	*1.9*	*A*	*30*	--	*1.9*	*A*	*30*	--
Falmouth Street (N)	*WB Approach*		*10.5*	*B*	*120*	--	*9.2*	*A*	*100*	--	*12.7*	*B*	*176*	--
Roundabout*	*SB Approach*		*8.7*	*A*	*34*	--	*7.0*	*A*	*31*	--	*7.8*	*A*	*37*	--
	Overall		**7.2**	**A**	**--**	**--**	**5.7**	**A**	**--**	**--**	**7.7**	**A**	**--**	**--**
6. E Shirley Avenue/ (N-S)	EB Left	560	34.1	C	63	126	36.7	D	123	154	38.6	D	128	159
James Madison Highway at	EB Left/Thru		34.1	C	63	87	36.9	D	130	120	38.6	D	129	114
Alwington Boulevard (E-W)	EB Right[(3)]		0.1	A	0	14	0.2	A	0	47	0.2	A	0	54
Signalized	*EB Approach*		*21.2*	*C*	--	--	*22.1*	*C*	--	--	*21.8*	*C*	--	--
	WB Left/Thru/Right		33.0	C	0	52	34.9	C	26	63	37.1	D	0	52
	WB Approach		*33.0*	*C*	--	--	*34.9*	*C*	--	--	*37.1*	*D*	--	--
	NB Left	315	17.6	B	99	165	18.1	B	95	142	18.5	B	102	168
	NB Thru		18.4	B	143	192	18.0	B	83	139	18.2	B	92	157
	NB Right	160	15.8	B	0	19	16.8	B	0	44	16.7	B	0	31
	NB Approach		*18.1*	*B*	--	--	*18.0*	*B*	--	--	*18.3*	*B*	--	--
	SB Left	165	15.2	B	11	49	16.2	B	17	57	16.0	B	15	67
	SB Thru		24.1	C	71	103	25.6	C	129	162	26.9	C	138	161
	SB Right	250	16.9	B	15	87	15.5	B	9	85	15.3	B	0	82
	SB Approach		*20.6*	*C*	--	--	*22.5*	*C*	--	--	*24.4*	*C*	--	--
	Overall		**19.4**	**B**	**--**	**--**	**21.2**	**C**	**--**	**--**	**21.7**	**C**	**--**	**--**
7. Alwington Boulevard (E-W) a	EB Left/Thru/Right		7.3	A	0	8	7.4	A	0	20	7.3	A	3	8
Elementary School Entrance	*EB Approach*		*7.3*	*A*	--	--	*7.4*	*A*	--	--	*7.3*	*A*	--	--
Commercial Entrance (N-S)	WB Left/Thru		8.7	A	10	76	8.8	A	3	63	8.9	A	3	64
Unsignalized**	WB Right	270	7.1	A	10	64	6.9	A	5	57	6.7	A	3	55
	WB Approach		*7.8*	*A*	--	--	*7.4*	*A*	--	--	*7.8*	*A*	--	--
	NB Left/Thru/Right		6.9	A	3	86	6.6	A	3	60	6.6	A	3	54
	NB Approach		*6.9*	*A*	--	--	*6.6*	*A*	--	--	*6.6*	*A*	--	--
	SB Left/Thru/Right		7.8	A	3	52	7.4	A	0	29	7.4	A	3	29
	NB Approach		*7.8*	*A*	--	--	*7.4*	*A*	--	--	*7.4*	*A*	--	--

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

[2] SimTraffic Queues are average maximum queues after 10 runs of 60 minutes each.

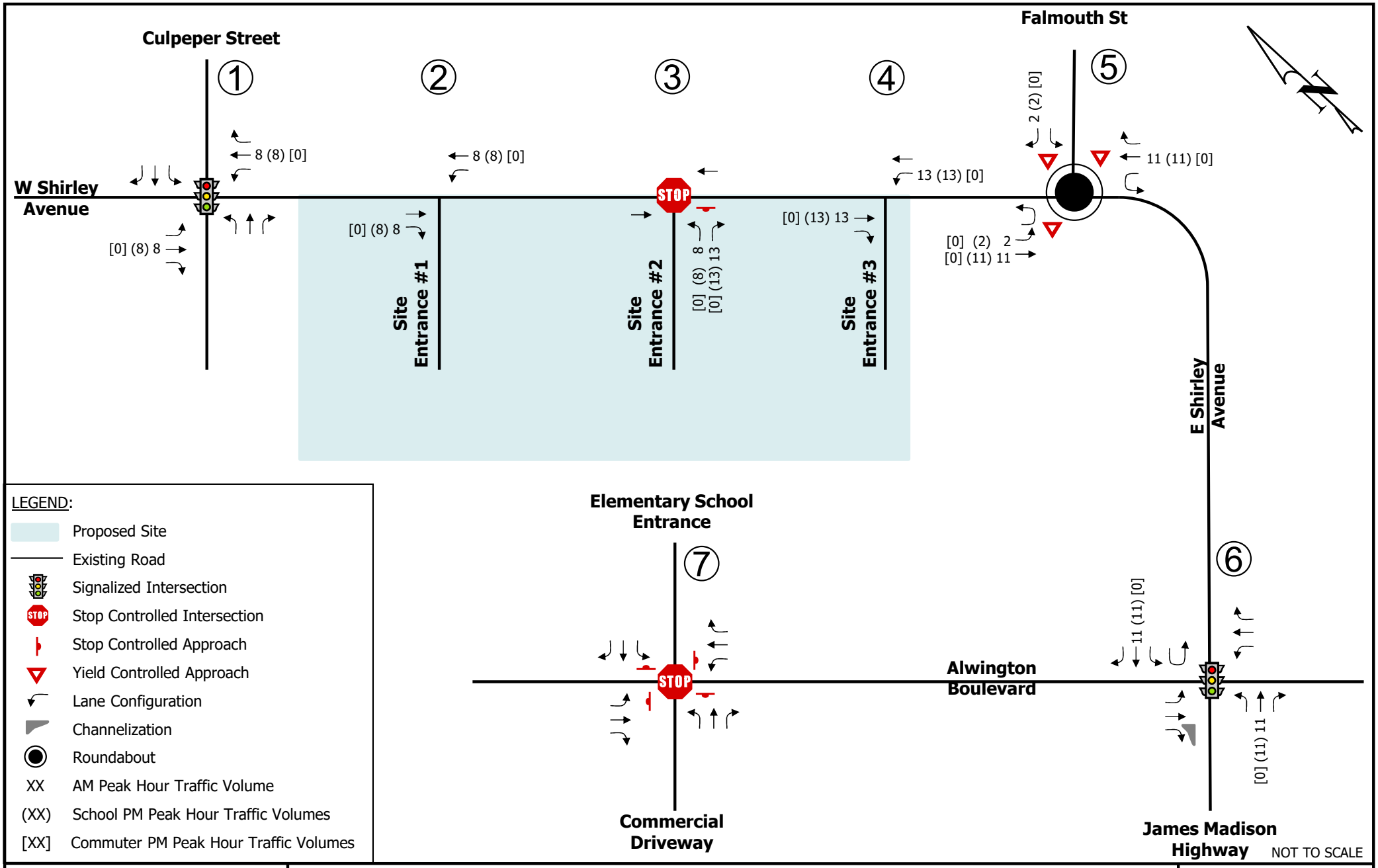
[3] *Channelized right turn not controlled by the signal.*

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

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

* Note: SIDRA was used to analyze the roundabout at intersection 5.

** Note: HCM 6th Edition was used to analyze the all way stop controlled intersection at intersection 7.



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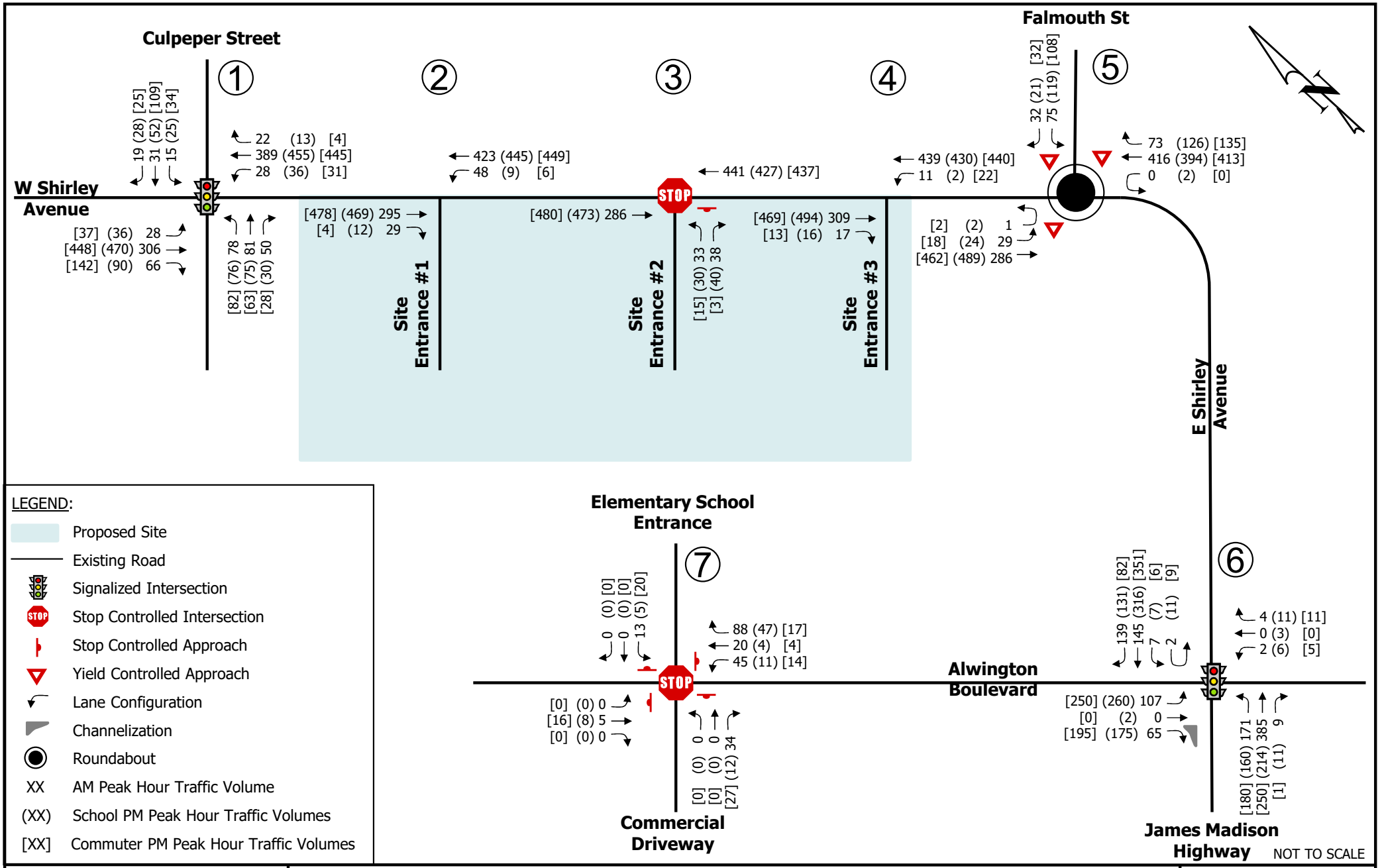
2023 Existing Bus Peak Hour Volumes
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure
3-1



LEGEND:

- Proposed Site
- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Controlled Approach
- Yield Controlled Approach
- Lane Configuration
- Channelization
- Roundabout
- XX AM Peak Hour Traffic Volume
- (XX) School PM Peak Hour Traffic Volumes
- [XX] Commuter PM Peak Hour Traffic Volumes

NOT TO SCALE

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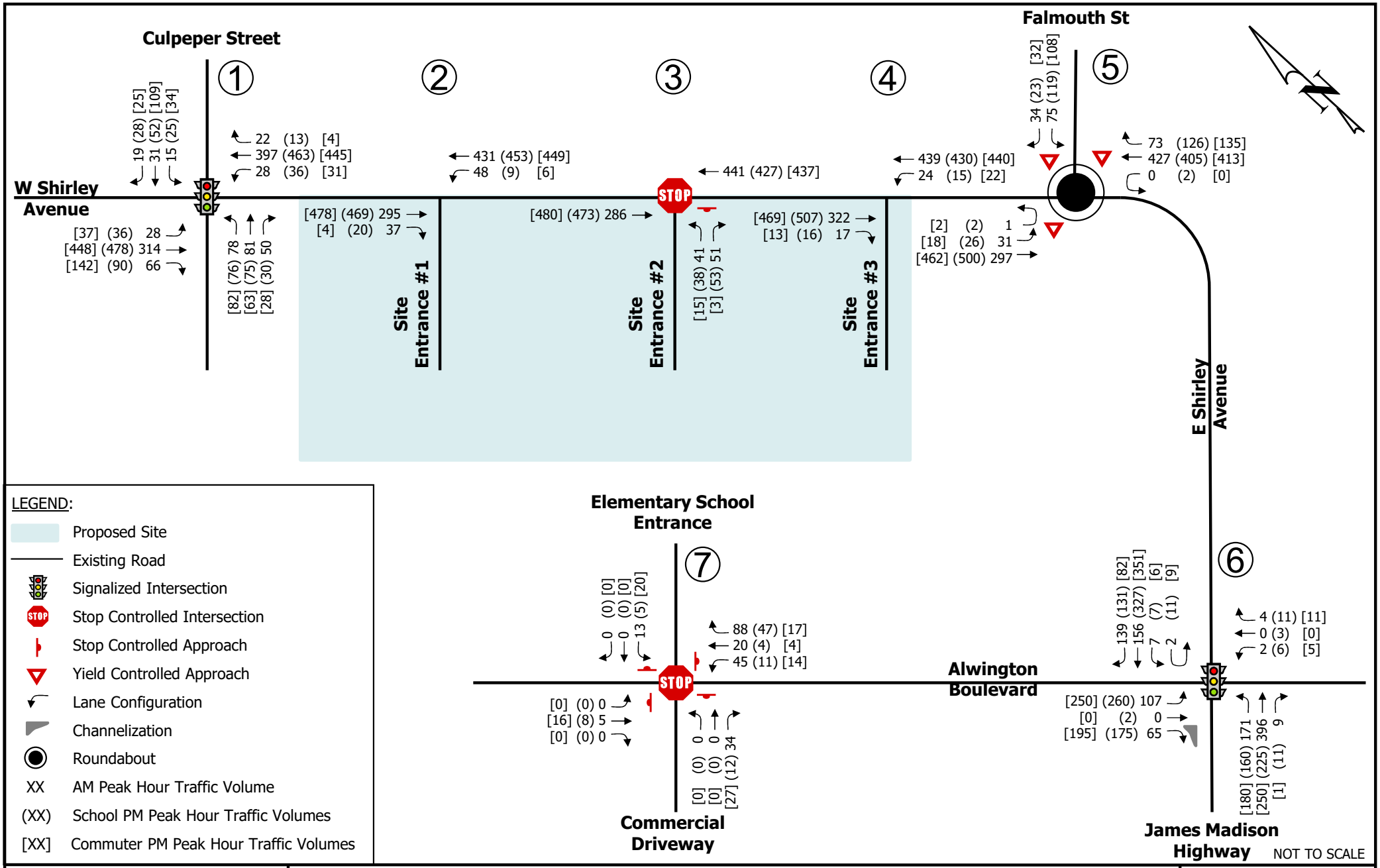
2023 Existing Vehicles (Non-Bus) Peak Hour Volumes
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure
3-2



LEGEND:

- Proposed Site
- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Controlled Approach
- Yield Controlled Approach
- Lane Configuration
- Channelization
- Roundabout
- XX AM Peak Hour Traffic Volume
- (XX) School PM Peak Hour Traffic Volumes
- [XX] Commuter PM Peak Hour Traffic Volumes

NOT TO SCALE

TIMMONS GROUP
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2023 Total Existing Peak Hour Volumes
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 3-3

4 2026 BACKGROUND CONDITIONS

The background 2026 volumes were analyzed assuming existing intersection geometry in conjunction with projected background traffic volumes, which consists of general traffic growth in the area.

4.1 GENERAL TRAFFIC GROWTH

The background volumes were based on a 1.0% annual growth rate and applied to all movements except the turns into and out of the existing school entrances. The growth rate was compounded annually for the three-year period from 2023 to 2026 and was applied to all movements at the study intersections. The resulting 2026 vehicle background (existing + growth) volumes are shown on Figure 4-1.

4.2 BACKGROUND 2026 CAPACITY ANALYSIS RESULTS

Table 4-1 summarizes the 2026 background intersection LOS, delay, 95th percentile queue lengths (Synchro), and maximum queue lengths (SimTraffic) based on the intersection geometry (Figure 2-1), 2026 background peak hour traffic volumes shown on Figure 4-1 and the existing signal timings as provided by the Town of Warrenton and VDOT. The corresponding SYNCHRO and SimTraffic reports are included in Appendix E.

Note that the intersection numbers shown on the LOS, delay, and queue length summary tables correspond with the intersection numbers used in the SYNCHRO models and report figures.

As shown in Table 4-1, under 2026 background conditions, all intersections experience similar levels of service, delay, and queueing as under existing conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns.

2. The school entrances along East Shirley Avenue operate at LOS C or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Route 15 (Falmouth Street) operates at LOS A in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Table 4-1: 2026 Background Conditions
Intersection Level of Service and Delay Summary

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				SCHOOL PM PEAK HOUR				COMMUTER PM PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[2] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[2] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[2] (ft)
1. Shirley Avenue (E-W) at Culpeper Street (N-S) Signalized	EB Left	215	46.4	D	50	105	54.0	D	62	186	52.0	D	63	213
	EB Thru		21.9	C	267	264	27.5	C	452	410	29.0	C	423	342
	EB Right		17.3	B	0	67	17.3	B	12	69	19.8	B	43	79
	EB Approach		*22.9*	*C*	--	--	*27.5*	*C*	--	--	*28.2*	*C*	--	--
	WB Left	185	40.2	D	50	149	41.8	D	61	183	43.1	D	56	173
	WB Thru/Right		22.0	C	380	331	2.7	A	449	401	24.4	C	420	362
	WB Approach		*23.2*	*C*	--	--	*24.0*	*C*	--	--	*25.6*	*C*	--	--
	NB Left/Thru/Right		44.0	D	220	222	45.0	D	204	227	45.4	D	195	206
	NB Approach		*44.0*	*D*	--	--	*45.0*	*D*	--	--	*45.4*	*D*	--	--
	SB Left	125	40.3	D	30	53	40.8	D	44	84	37.5	D	53	124
	SB Thru/Right		42.0	D	59	90	44.0	D	92	130	42.9	D	153	198
	SB Approach		*41.6*	*D*	--	--	*43.3*	*D*	--	--	*41.8*	*D*	--	--
	Overall		**28.0**	**C**	**--**	**--**	**29.7**	**C**	**--**	**--**	**31.0**	**C**	**--**	**--**
2. E Shirley Avenue (E-W) at Site Entrance #1 (N-S) Unsignalized	EB Thru		†	†	0	5	†	†	0	--	†	†	0	--
	EB Right	125	†	†	0	9	†	†	0	--	†	†	0	--
	EB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	255	8.6	A	7	75	8.6	A	1	33	8.5	A	1	24
	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*1.4*	*A*	--	--	*0.3*	*A*	--	--	*0.2*	*A*	--	--
3. E Shirley Avenue (E-W) at Site Entrance #2 (N-S) Unsignalized	EB Thru		†	†	0	2	†	†	0	10	†	†	0	--
	EB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	NB Left		19.6	C	24	83	25.0	C	30	83	20.5	C	10	38
	NB Right		11.1	B	13	74	13.7	B	19	88	11.7	B	1	27
	NB Approach		*14.9*	*B*	--	--	*18.4*	*C*	--	--	*19.0*	*C*	--	--
4. E Shirley Avenue (E-W) at Site Entrance #3 (N-S) Unsignalized	EB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	EB Right	140	†	†	0	4	†	†	0	--	†	†	0	--
	EB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	160	8.2	A	3	43	8.8	A	2	33	8.8	A	4	53
	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*0.7*	*A*	--	--	*0.5*	*A*	--	--	*0.7*	*A*	--	--
5. E Shirley Avenue (E-W) at Falmouth Street (N) Roundabout*	*EB Approach*		*1.8*	*A*	*21*	--	*2.0*	*A*	*31*	--	*1.9*	*A*	*31*	--
	WB Approach		*10.9*	*B*	*128*	--	*9.5*	*A*	*107*	--	*13.4*	*B*	*190*	--
	SB Approach		*8.9*	*A*	*36*	--	*7.2*	*A*	*32*	--	*8.1*	*A*	*39*	--
	Overall		**7.5**	**A**	**--**	**--**	**5.9**	**A**	**--**	**--**	**8.0**	**A**	**--**	**--**
6. E Shirley Avenue/ (N-S) James Madison Highway at Alwington Boulevard (E-W) Signalized	EB Left	560	34.0	C	64	124	37.0	D	132	146	38.5	D	130	152
	EB Left/Thru		34.0	C	64	87	37.3	D	133	116	38.5	D	130	113
	EB Right[3]		0.1	A	0	10	0.2	A	0	61	0.2	A	0	46
	EB Approach		*21.2*	*C*	--	--	*22.3*	*C*	--	--	*21.7*	*C*	--	--
	WB Left/Thru/Right		32.6	C	0	57	35.2	D	27	68	34.9	C	0	50
	WB Approach		*32.6*	*C*	--	--	*35.2*	*D*	--	--	*34.9*	*C*	--	--
	NB Left	315	17.4	B	99	162	18.3	B	99	135	18.1	B	106	169
	NB Thru		18.3	B	143	194	18.1	B	87	134	17.7	B	93	164
	NB Right	160	15.8	B	0	19	16.9	B	0	39	16.3	B	0	27
	NB Approach		*18.0*	*B*	--	--	*18.2*	*B*	--	--	*17.9*	*B*	--	--
	SB Left	165	15.1	B	11	43	16.3	B	18	40	15.8	B	15	59
	SB Thru		23.7	C	70	119	25.9	C	135	162	25.8	C	141	159
	SB Right	250	16.7	B	15	93	15.5	B	9	84	15.4	B	0	79
	SB Approach		*20.3*	*C*	--	--	*22.6*	*C*	--	--	*23.6*	*C*	--	--
	Overall		**19.3**	**B**	**--**	**--**	**21.4**	**C**	**--**	**--**	**21.3**	**C**	**--**	**--**
7. Alwington Boulevard (E-W) at Elementary School Entrance/ Commercial Entrance (N-S) Unsignalized**	EB Left/Thru/Right		7.3	A	0	10	7.4	A	0	22	7.2	A	3	8
	EB Approach		*7.3*	*A*	--	--	*7.4*	*A*	--	--	*7.2*	*A*	--	--
	WB Left/Thru		8.7	A	10	82	8.7	A	3	66	8.9	A	3	69
	WB Right	270	7.1	A	10	72	6.8	A	5	64	6.7	A	3	56
	WB Approach		*7.8*	*A*	--	--	*7.3*	*A*	--	--	*7.8*	*A*	--	--
	NB Left/Thru/Right		6.9	A	3	89	6.5	A	0	59	6.6	A	3	58
	NB Approach		*6.9*	*A*	--	--	*6.5*	*A*	--	--	*6.6*	*A*	--	--
	SB Left/Thru/Right		7.8	A	3	48	7.3	A	0	29	7.4	A	3	29
	NB Approach		*7.8*	*A*	--	--	*7.3*	*A*	--	--	*7.4*	*A*	--	--

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

[2] SimTraffic Queues are average maximum queues after 10 runs of 60 minutes each.

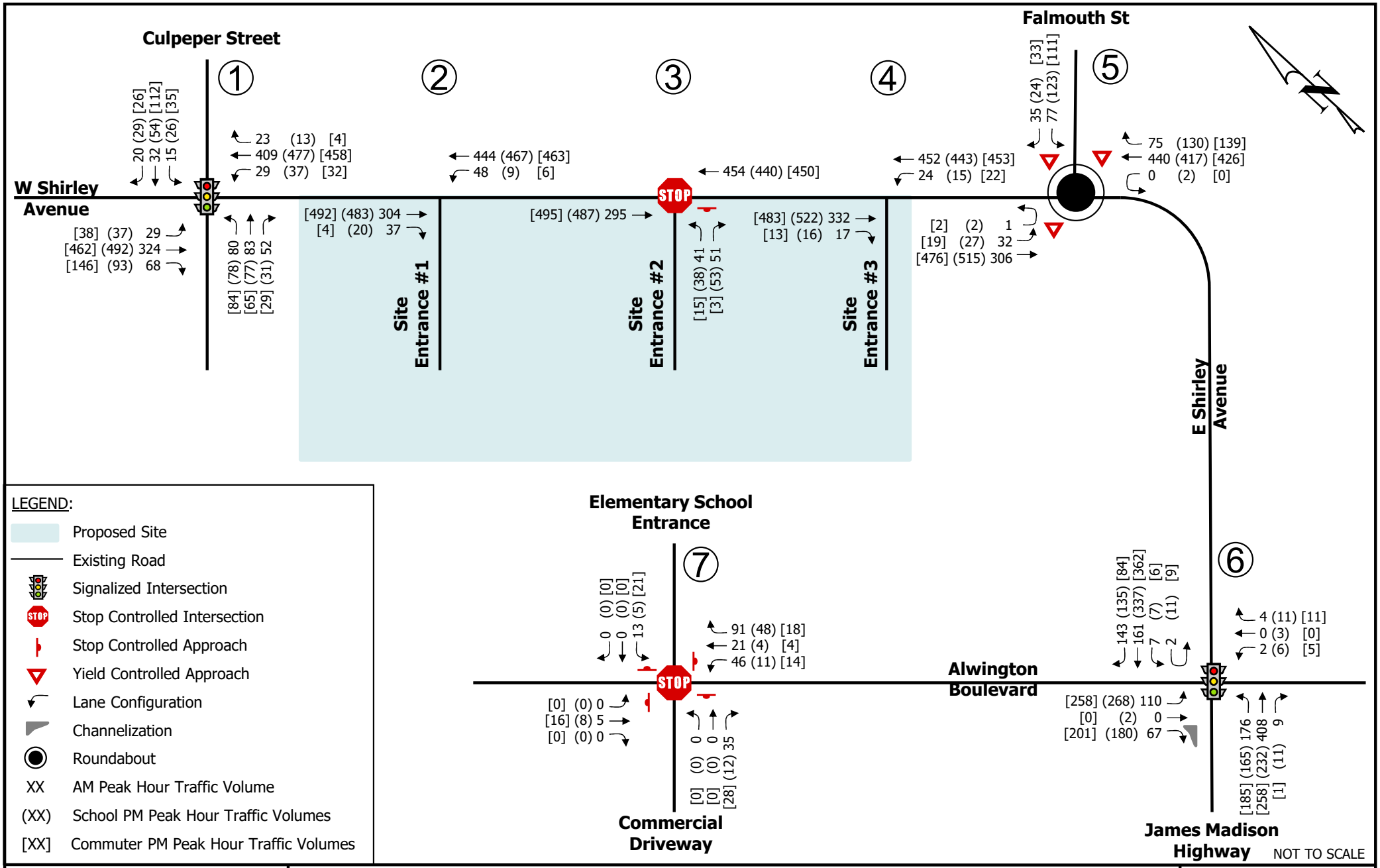
[3] *Channelized right turn not controlled by the signal.*

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

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

* Note: SIDRA was used to analyze the roundabout at intersection 5.

** Note: HCM 6th Edition was used to analyze the all way stop controlled intersection at intersection 7.



LEGEND:

- Proposed Site
- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Controlled Approach
- Yield Controlled Approach
- Lane Configuration
- Channelization
- Roundabout
- XX AM Peak Hour Traffic Volume
- (XX) School PM Peak Hour Traffic Volumes
- [XX] Commuter PM Peak Hour Traffic Volumes

NOT TO SCALE

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2026 Total Background Peak Hour Volumes
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure
4-1

5 TRIP GENERATION

For purposes of this analysis, the proposed expansion of the middle school will accommodate an increase of 340 students and anticipated to occur by 2026.

Access to the site will be provided via three existing entrances into the site from E Shirley Avenue and one new alternate access from Alwington Boulevard. A site layout is shown on Figure 1-2.

With the expansion, the access to the site will be reworked as shown in Figure 5-1. The two western entrances on East Shirley Avenue will be a bus loop only and the eastern entrance will serve all other vehicles. The new entrance off of Alwington Boulevard will service passenger vehicles.

It is anticipated that passenger vehicle traffic from the south on East Shirley Avenue will use the entrance off Alwington Boulevard while all other traffic will use the entrances on East Shirley Avenue.

5.1 ACCESS MANAGEMENT REVIEW

As noted above, the expanded Middle School will utilize the existing three entrances points along E Shirley Avenue under a reworked access scenario. No new access points are proposed on E Shirley Avenue.

As shown on Figure 2-1, the western access point (bus entrance only) is located approximately 530 feet from the middle entrance (bus out only). The middle entrance is spaces approximately 265 feet from the eastern entrance (vehicle in and out).

In accordance with VDOT's Road Design Manual, Appendix F, Table 2-2, on a roadway like E Shirley Avenue (minor arterial with a posted 40 mph speed limit), a Type 3 (full access) entrance requires 470 feet of spacing to other signalized or full access intersections. A Type 4 (partial access) requires 250 feet of spacing from all other intersections.

Since the eastern and middle entrance are Type 4 (partial access), 250 feet of spacing is required between each of the entrances.

The spacing between each entrance exceeds 250 feet and therefore all access management standards are met at the entrances.

5.2 REROUTED TRAFFIC

As noted above, with the expansion, the site driveways will be changed as shown in Figure 5-1. As a result, the existing traffic entering and exiting the school will be rerouted to the new entrances as shown on Figure 5-2 (bus trips) and Figure 5-3 (vehicle trips).

5.3 SITE TRIP GENERATION

The peak hour site-generated traffic volumes shown in Table 5-1 were estimated using existing driveway counts at the school pro-rated for the expansion in students. The average daily traffic was estimated using the 11th Edition of the Institute of Transportation Engineers' (ITE) *Trip Generation Manual* .

Table 5-1: Trip Generation Summary

Land Use	Size	Units	Land Use Code	School AM Peak Hour (1) In	School AM Peak Hour (1) Out	School AM Peak Hour (1) Total	School PM Peak (1) In	School PM Peak (1) Out	School PM Peak (1) Total	Commuter PM Peak Hour (1) In	Commuter PM Peak Hour (1) Out	Commuter PM Peak Hour (1) Total	Average Daily Trips (2)
Existing Capacity													
Middle School	510	Students	522	126	92	218	60	91	151	45	18	63	1071
New Capacity													
Middle School	850	Students	522	210	153	363	100	152	252	75	30	105	1785
Increase	340	Students		84	61	145	40	61	101	30	12	42	714

Note: (1) Peak hour counts based on existing driveway counts conducted for the site for the existing school capacity. New capacity trips pro-rated based on the existing counts and the percent increase in students.

(2) Average Daily Trips based on the Institute of Transportation Engineers Trip Generation, 11th Edition. Assumes General Urban/Suburban land use category.

As shown in Table 5-1, the overall expansion will generate an increase of 145 AM peak hour trips (84 in and 61 out), 101 School PM peak hour trips (40 in and 61 out), 42 PM peak hour trips (30 in ands 12 out) and 714 average daily trips.

5.4 External Trip Distributions

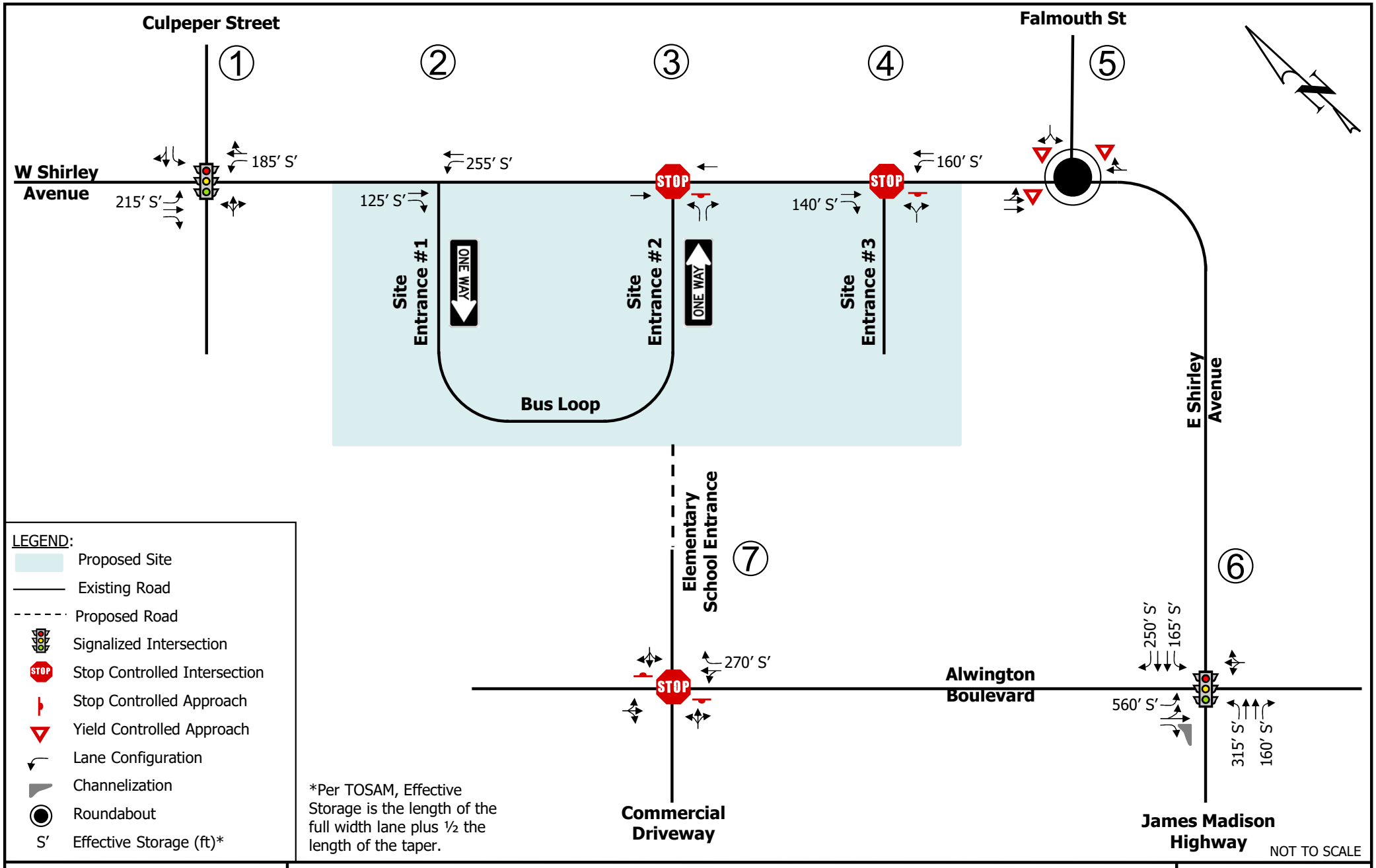
The distribution of trips generated by the proposed developed was based on other traffic studies in the area, the existing traffic volumes, the nature of the use, the school attendance map and local knowledge.

The following directional distributions were assumed for the site:

- 40% from the west on East Shirley Avenue;
- 10% from the north on Falmouth Street; and
- 50% from the south on East Shirley Avenue.

5.5 Traffic Assignment

The trip distribution percentages for the new traffic generated by the site were applied to the site driveways as shown in Figure 5-4 (bus trips) and Figure 5-5 (vehicle trips). The distributions were then applied to the new trips shown in Table 5-1 and the resulting new external trips are shown in Figure 5-6 (bus trips) and Figure 5-7 (vehicle trips).



TIMMONS GROUP
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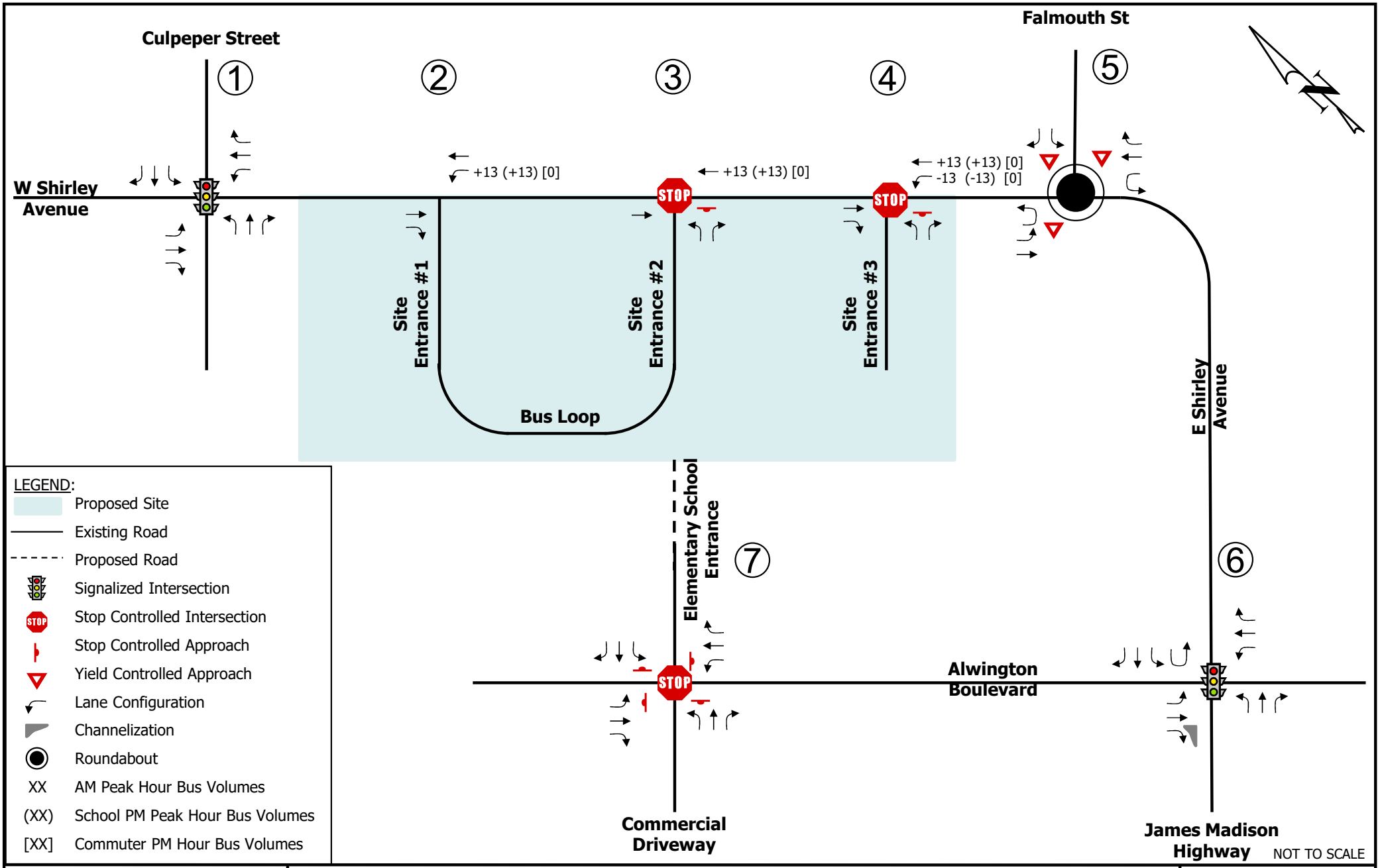
Future Geometry and Stop Control
Taylor Middle School – Addition
Town of Warrenton, Virginia

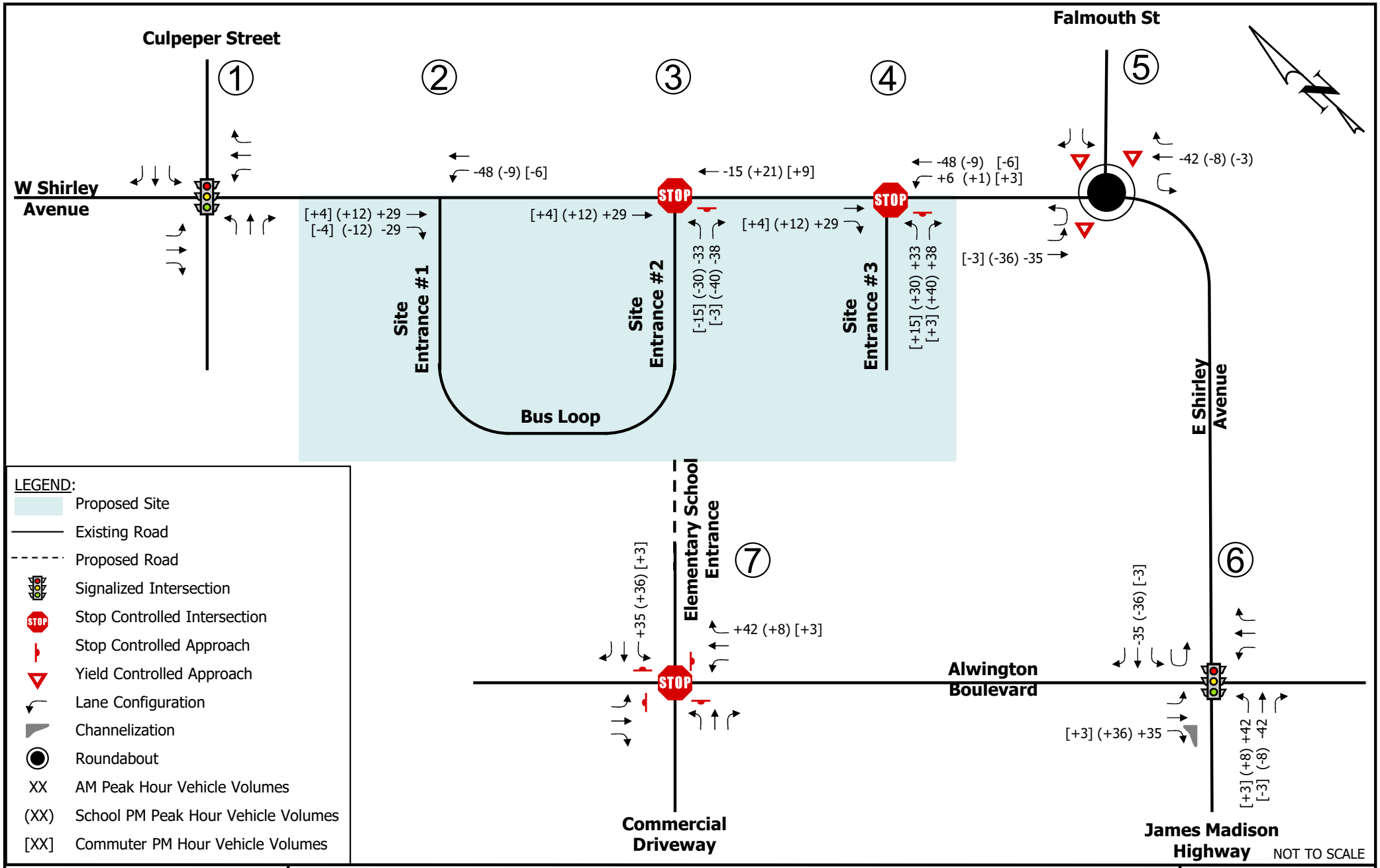
Figure
5-1



TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Rerouted Existing Buses
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure
5-2



LEGEND:

- Proposed Site
- Existing Road
- Proposed Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Controlled Approach
- Yield Controlled Approach
- Lane Configuration
- Channelization
- Roundabout
- XX AM Peak Hour Vehicle Volumes
- (XX) School PM Peak Hour Vehicle Volumes
- [XX] Commuter PM Hour Vehicle Volumes

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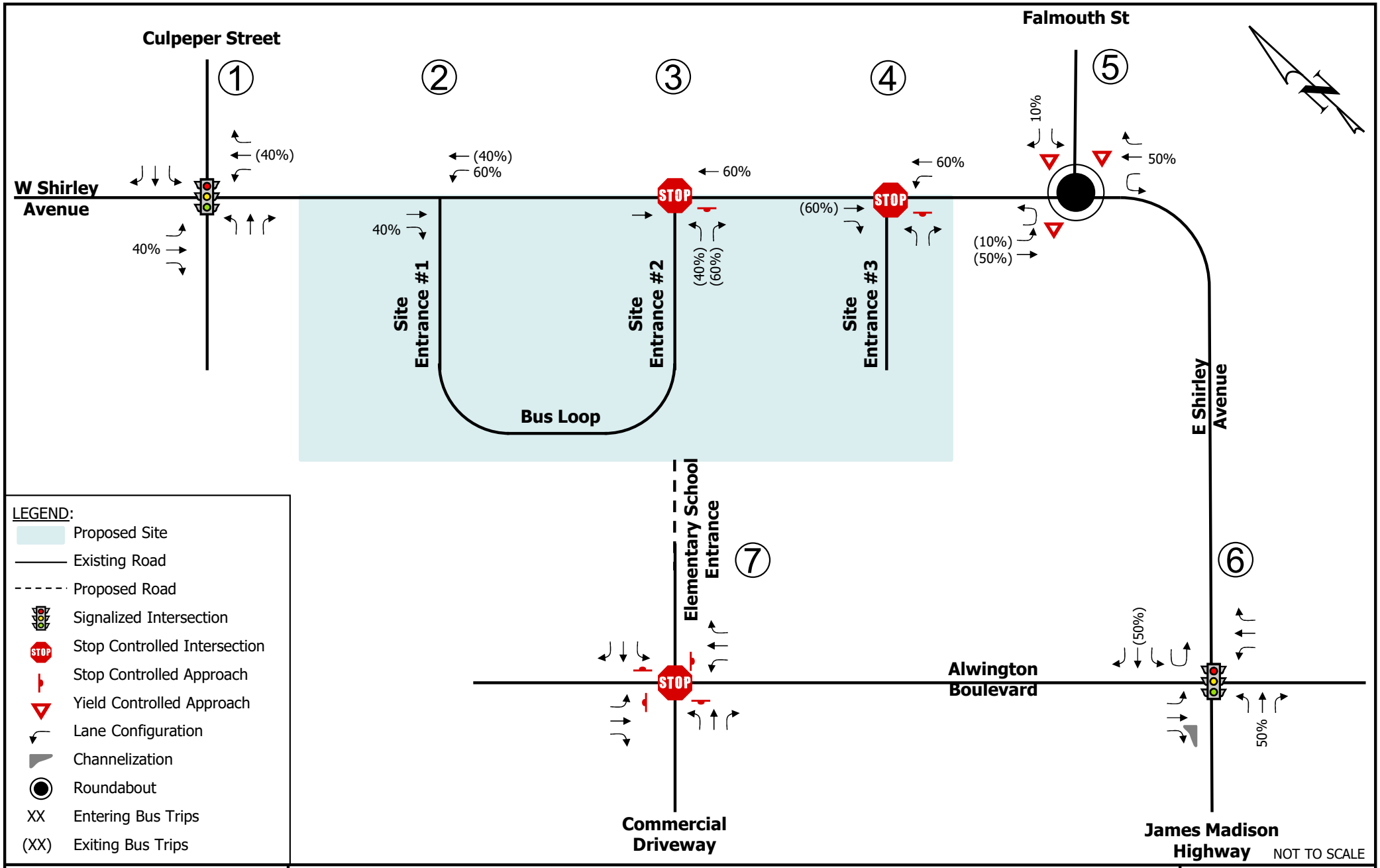
Rerouted Existing Vehicles (Non-Bus)
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 5-3



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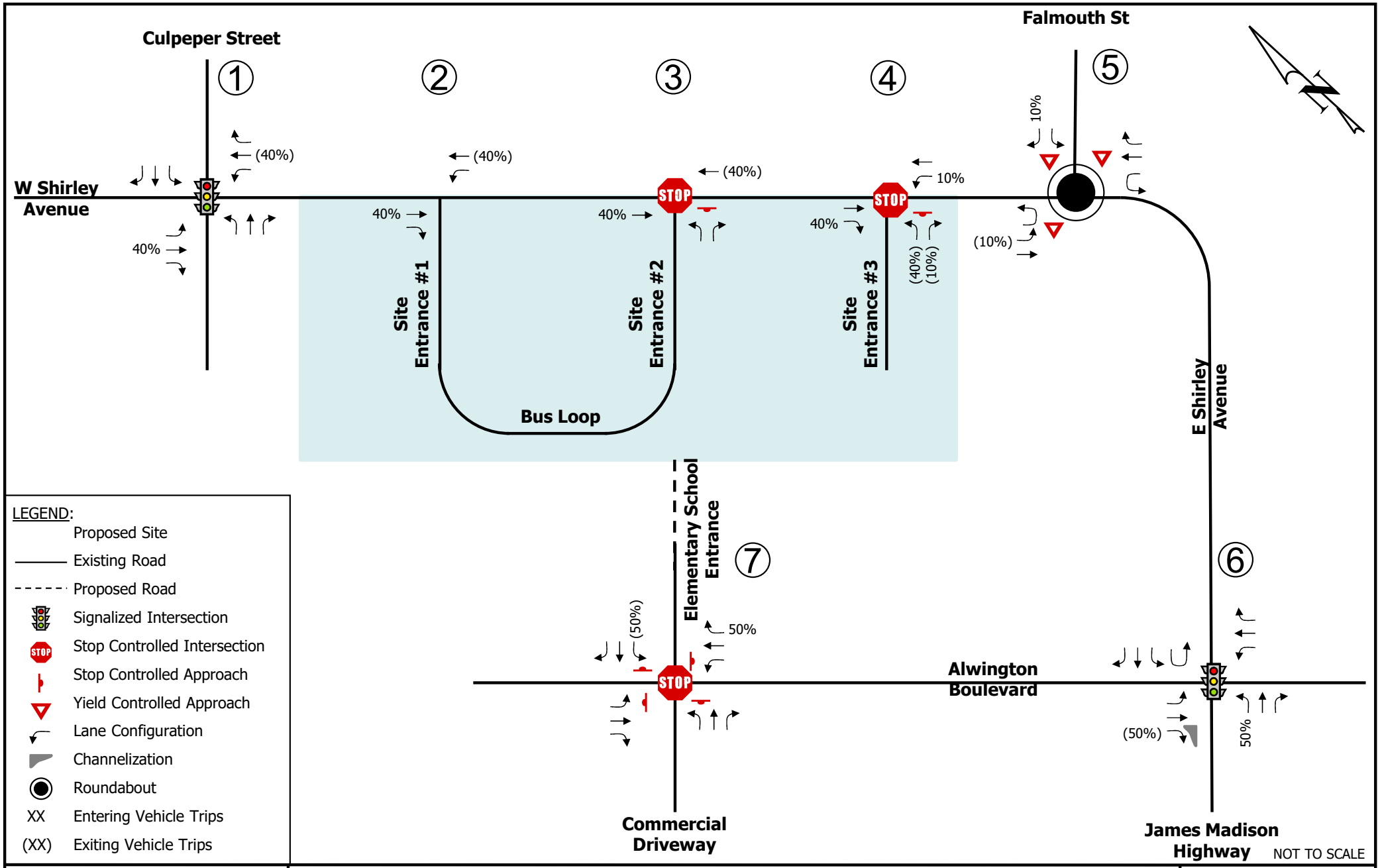
Additional Bus Trip Distributions
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure
5-4



TIMMONS GROUP
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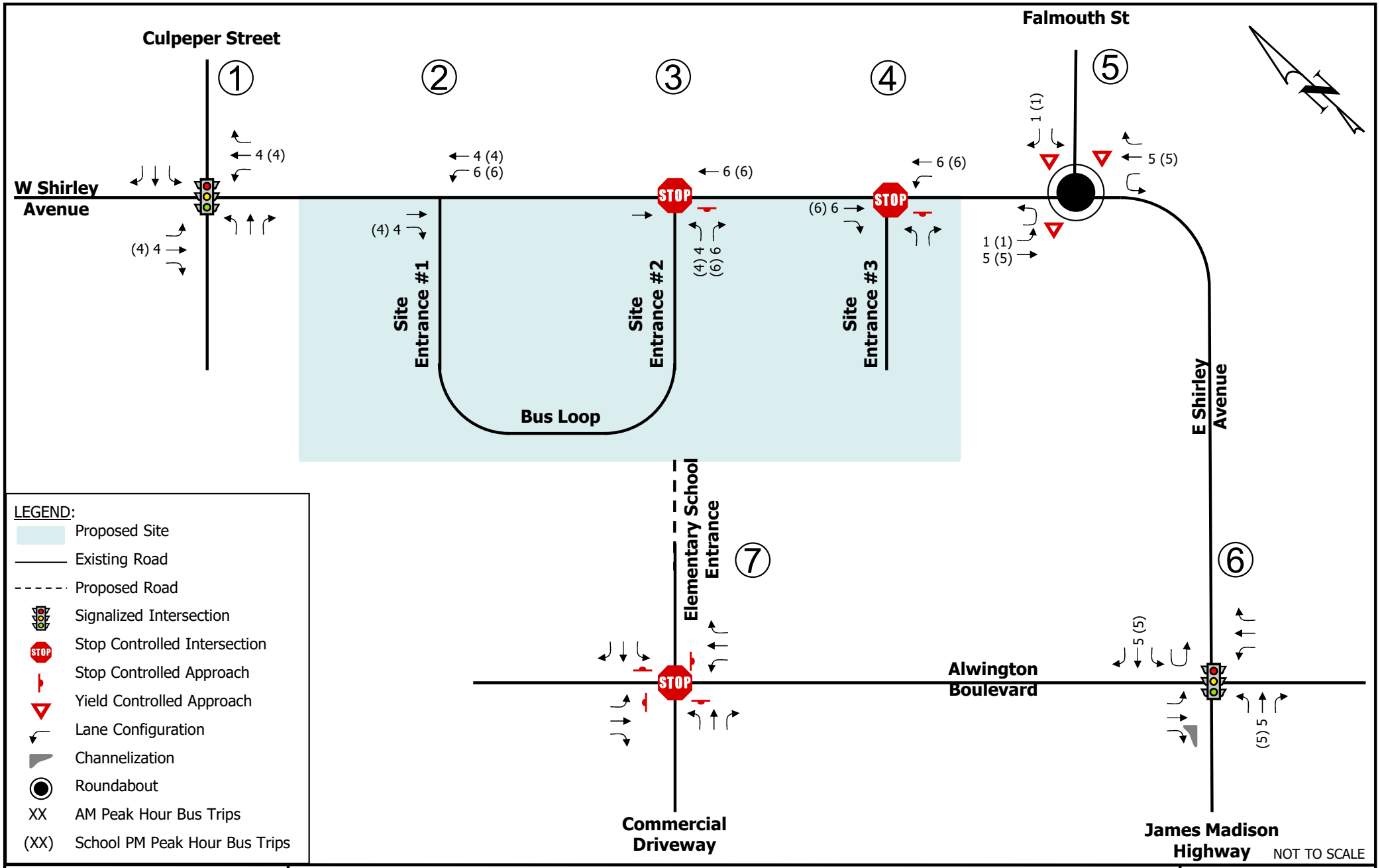
Additional Vehicle (Non-Bus) Trip Distributions
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure
5-5



TIMMONS GROUP
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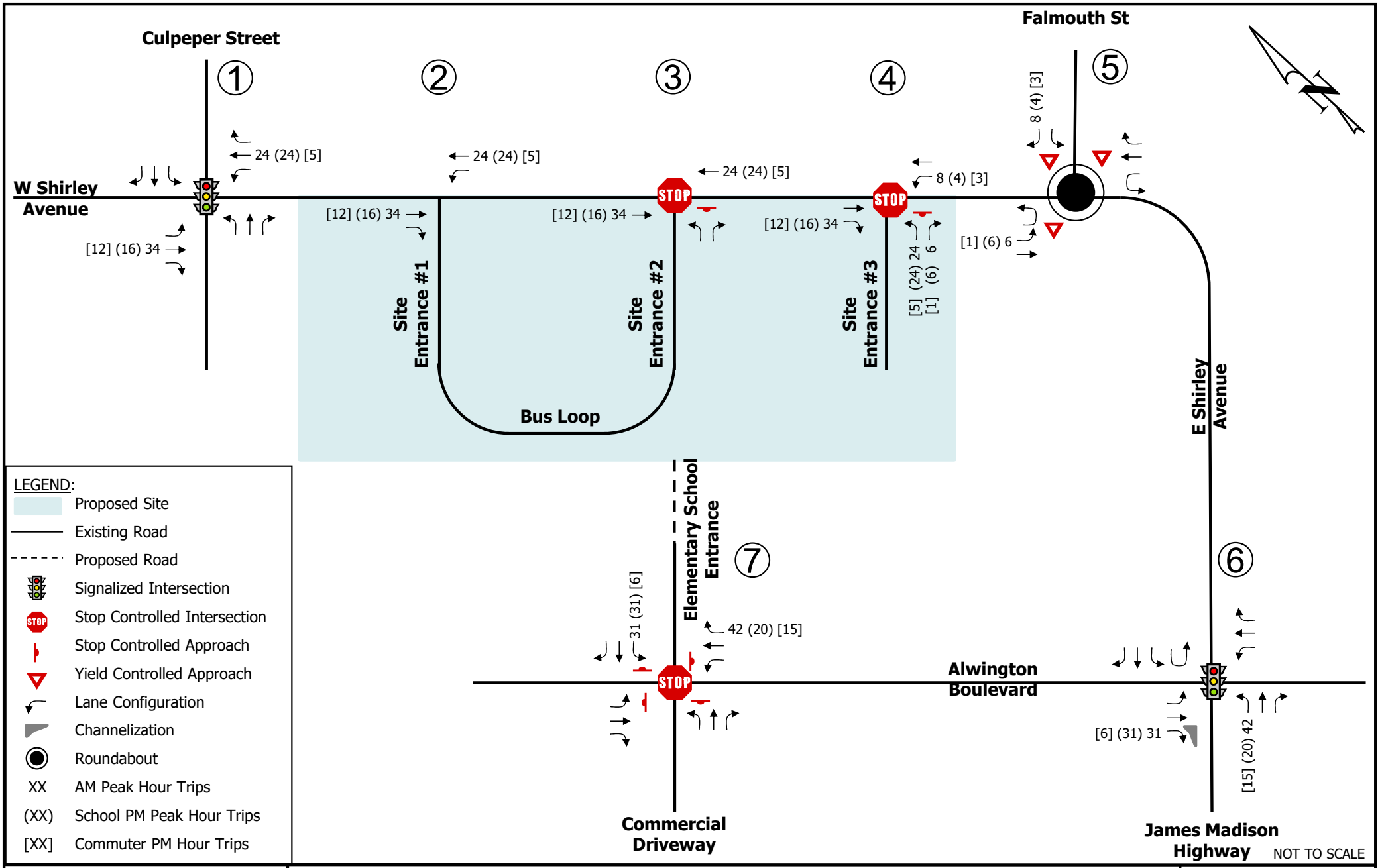
Site Generated Additional Bus Trips
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure
5-6



TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Site Generated Additional Vehicle (Non-Bus) Trips
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure
5-7

6 2026 TOTAL FUTURE CONDITIONS

To complete the analysis of 2026 total conditions (with the proposed development), the estimated site trips were added to the background 2026 traffic volumes. The projected volumes were then used to complete the capacity analysis.

6.1 TOTAL FUTURE TRAFFIC VOLUMES

The rerouted existing trips shown on Figures 5-2 and 5-3 and site generated trips shown on Figures 5-6 and 5-7 were added to the 2026 background traffic volumes (Figure 4-1) to yield the 2026 total future traffic volumes shown in Figure 6-1.

6.2 2026 FUTURE CONDITIONS ANALYSIS RESULTS

Table 6-1 summarizes the 2026 future intersection LOS, delay, 95th percentile queue lengths (Synchro), and maximum queue lengths (SimTraffic) based on the future intersection geometry (Figure 5-1), 2026 future peak hour traffic volumes shown on Figure 6-1 and the existing signal timings as provided by the Town of Warrenton and VDOT. The corresponding SYNCHRO and SimTraffic reports are included in Appendix F.

Note that the intersection numbers shown on the LOS, delay, and queue length summary tables correspond with the intersection numbers used in the SYNCHRO models and report figures.

As shown in Table 6-1, under 2026 future conditions, all intersections experience similar levels of service, delay, and queueing as under 2026 background conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns.

2. The school entrances along East Shirley Avenue operate at LOS C or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Route 15 (Falmouth Street) operates at LOS A in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

6. The expansion of the middle school will have minimal impact on the external surrounding roadway network and no improvements are required at the study intersections.

    a. The expansion will provide a link between the elementary school and the middle school during school pick up and drop off times only. During all other times, the connection between the schools will be gated.

Table 6-1: 2026 Total Future Conditions
Intersection Level of Service and Delay Summary

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				SCHOOL PM PEAK HOUR				COMMUTER PM PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[2] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[2] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[2] (ft)
1. Shirley Avenue (E-W) at	EB Left	215	47.0	D	50	98	54.3	D	62	186	52.1	D	63	214
Culpeper Street (N-S)	EB Thru		22.6	C	297	280	28.5	C	#509	401	29.5	C	438	363
Signalized	EB Right		17.0	B	0	64	17.3	B	12	74	19.7	B	43	89
	EB Approach		*23.3*	*C*	--	--	*28.3*	*C*	--	--	*28.7*	*C*	--	--
	WB Left	185	40.7	D	50	172	42.1	D	61	161	43.2	D	56	164
	WB Thru/Right		22.6	C	406	378	23.8	C	#522	397	24.5	C	426	344
	WB Approach		*23.7*	*C*	--	--	*25.0*	*C*	--	--	*25.7*	*C*	--	--
	NB Left/Thru/Right		45.4	D	#239	212	45.6	D	204	225	45.7	D	195	215
	NB Approach		*45.4*	*D*	--	--	*45.6*	*D*	--	--	*45.7*	*D*	--	--
	SB Left	125	40.8	D	30	52	41.0	D	44	86	37.6	D	53	106
	SB Thru/Right		42.5	D	59	99	44.3	D	92	147	43.1	D	153	184
	SB Approach		*42.1*	*D*	--	--	*43.5*	*D*	--	--	*42.0*	*D*	--	--
	Overall		**28.4**	**C**	**--**	**--**	**30.3**	**C**	**--**	**--**	**31.2**	**C**	**--**	**--**
2. E Shirley Avenue (E-W) at	EB Thru		†	†	0	--	†	†	0	--	†	†	0	--
Site Entrance #1 (N-S)	EB Right	125	†	†	0	--	†	†	0	--	†	†	0	--
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	255	8.5	A	3	46	8.7	A	3	40	†	†	0	--
	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*0.6*	*A*	--	--	*0.6*	*A*	--	--	*†*	*†*	--	--
3. E Shirley Avenue (E-W) at	EB Thru		†	†	0	--	†	†	0	--	†	†	0	--
Site Entrance #2 (N-S)	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
Unsignalized	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	NB Left		18.7	C	7	66	23.2	C	9	54	†	†	0	--
	NB Right		11.1	B	5	72	12.8	B	6	69	†	†	0	--
	NB Approach		*14.0*	*B*	--	--	*16.8*	*C*	--	--	*†*	*†*	--	--
4. E Shirley Avenue (E-W) at	EB Thru		†	†	0	--	†	†	0	0	†	†	0	3
Site Entrance #3 (N-S)	EB Right	140	†	†	0	27	†	†	0	4	†	†	0	4
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	160	8.6	A	4	40	8.9	A	1	31	9.0	A	5	60
	WB Thru		†	†	0	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Approach		*0.9*	*A*	--	--	*0.2*	*A*	--	--	*0.9*	*A*	--	--
	NB Left-Right		17.4	C	27	79	22.4	C	37	91	21.9	C	9	46
	NB Approach		*17.4*	*C*	--	--	*22.4*	*C*	--	--	*21.9*	*C*	--	--
5. E Shirley Avenue (E-W) at	*EB Approach*		*1.8*	*A*	*20*	--	*1.9*	*A*	*30*	--	*1.9*	*A*	*30*	--
Falmouth Street (N)	*WB Approach*		*10.3*	*B*	*111*	--	*9.6*	*A*	*106*	--	*13.3*	*B*	*188*	--
Roundabout*	*SB Approach*		*8.7*	*A*	*37*	--	*7.3*	*A*	*34*	--	*8.2*	*A*	*40*	--
	Overall		**7.1**	**A**	**--**	**--**	**6.0**	**A**	**--**	**--**	**8.0**	**A**	**--**	**--**
6. E Shirley Avenue/ (N-S)	EB Left	560	35.6	D	68	144	37.0	D	130	165	36.7	D	125	157
James Madison Highway at	EB Left/Thru		35.6	D	68	78	37.3	D	132	114	36.7	D	125	111
Alwington Boulevard (E-W)	EB Right[3]		0.2	A	0	22	0.3	A	0	52	0.2	A	0	46
Signalized	*EB Approach*		*16.2*	*B*	--	--	*19.5*	*B*	--	--	*20.3*	*C*	--	--
	WB Left/Thru/Right		34.1	C	0	61	35.2	D	26	70	34.8	C	0	53
	WB Approach		*34.1*	*C*	--	--	*35.2*	*D*	--	--	*34.8*	*C*	--	--
	NB Left	315	18.2	B	146	210	18.7	B	115	167	19.0	B	122	190
	NB Thru		17.4	B	129	198	18.1	B	86	128	18.1	B	95	139
	NB Right	160	15.3	B	0	23	16.9	B	0	43	16.7	B	0	32
	NB Approach		*17.7*	*B*	--	--	*18.4*	*B*	--	--	*18.5*	*B*	--	--
	SB Left	165	14.6	B	11	45	16.3	B	18	39	16.2	B	15	80
	SB Thru		25.1	C	63	102	25.9	C	123	160	25.8	C	140	166
	SB Right	250	18.1	B	0	114	15.8	B	9	81	15.1	B	1	72
	SB Approach		*21.2*	*C*	--	--	*22.6*	*C*	--	--	*23.5*	*C*	--	--
	Overall		**18.3**	**B**	**--**	**--**	**20.4**	**C**	**--**	**--**	**20.9**	**C**	**--**	**--**
7. Alwington Boulevard (E-W) at	EB Left/Thru/Right		7.6	A	0	8	7.6	A	0	23	7.3	A	3	11
Elementary School Entrance/	*EB Approach*		*7.6*	*A*	--	--	*7.6*	*A*	--	--	*7.3*	*A*	--	--
Commercial Entrance (N-S)	WB Left/Thru		9.0	A	10	76	8.9	A	3	64	8.9	A	3	64
Unsignalized**	WB Right	270	7.9	A	20	86	7.2	A	8	62	6.8	A	3	67
	WB Approach		*8.2*	*A*	--	--	*7.5*	*A*	--	--	*7.5*	*A*	--	--
	NB Left/Thru/Right		7.2	A	3	88	6.7	A	0	60	6.6	A	3	57
	NB Approach		*7.2*	*A*	--	--	*6.7*	*A*	--	--	*6.6*	*A*	--	--
	SB Left/Thru/Right		8.5	A	10	70	7.8	A	8	53	7.5	A	3	43
	NB Approach		*8.5*	*A*	--	--	*7.8*	*A*	--	--	*7.5*	*A*	--	--

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

[2] SimTraffic Queues are average maximum queues after 10 runs of 60 minutes each.

[3] *Channelized right turn not controlled by the signal.*

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

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

* Note: SIDRA was used to analyze the roundabout at intersection 5.

** Note: HCM 6th Edition was used to analyze the all way stop controlled intersection at intersection 7.

6.3 2026 TURN LANE WARRANT ANALYSIS

As shown in Figures 2-1 and 5-1, the following right and left turn lanes are present under existing conditions at the site entrances on E Shirley Avenue:

Western Site Entrance (Bus Ingress Only)

Eastbound right turn lane with 125 feet of storage

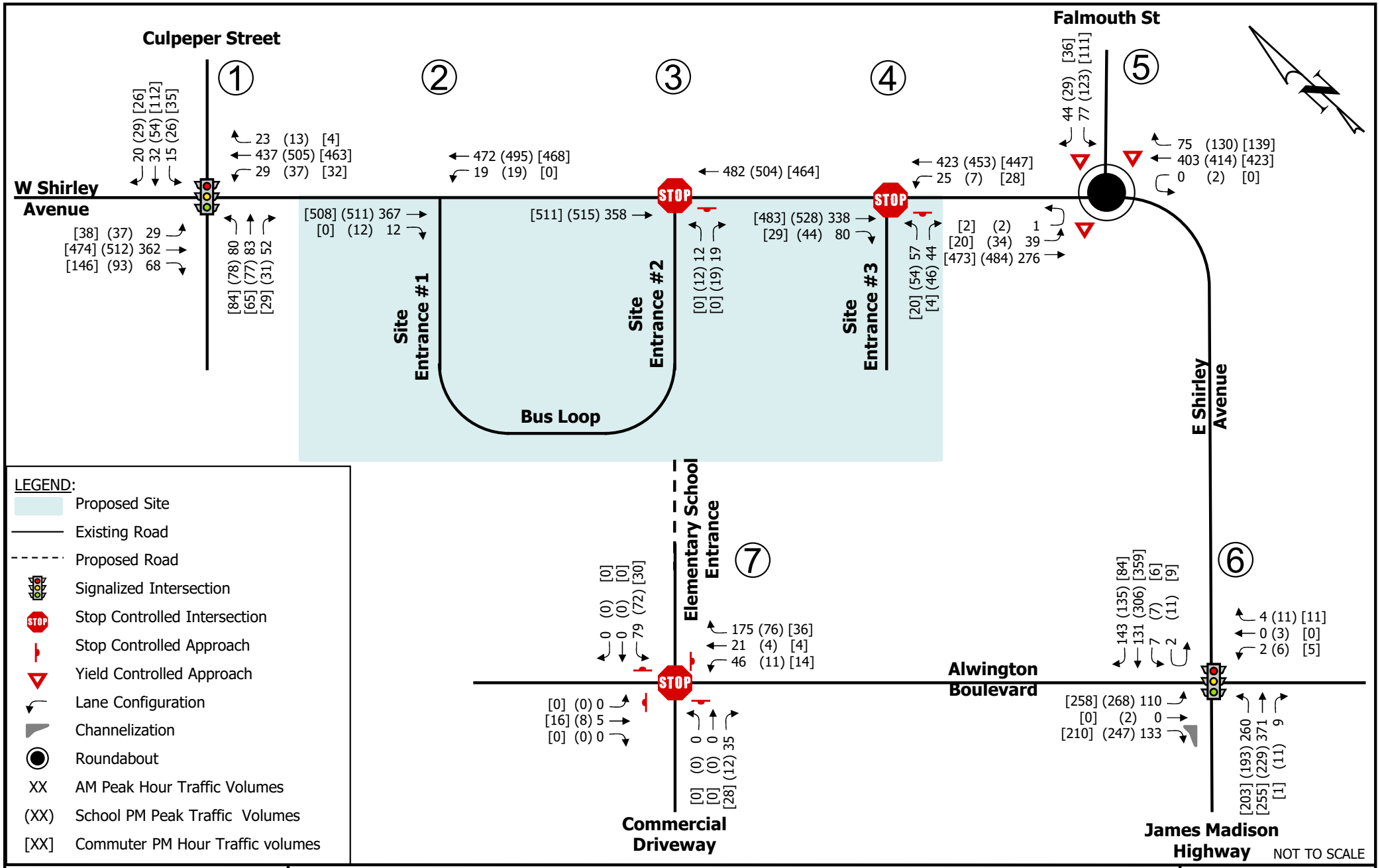
Westbound left turn lane with 255 feet of storage

Eastern Site Entrance (Vehicle Ingress and Egress)

Eastbound right turn lane with 140 feet of storage

Westbound left turn lane with 160 feet of storage

As shown in Table 6-1, under 2026 future conditions, the 95th percentile and maximum queues at the site entrances will be contained within the existing available storage. No additional storage is required.



LEGEND:

- Proposed Site
- Existing Road
- Proposed Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Controlled Approach
- Yield Controlled Approach
- Lane Configuration
- Channelization
- Roundabout
- XX — AM Peak Hour Traffic Volumes
- (XX) — School PM Peak Traffic Volumes
- [XX] — Commuter PM Hour Traffic volumes

NOT TO SCALE

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2026 Total Future Peak Hour Volumes
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 6-1

7 2032 BACKGROUND CONDITIONS

The background 2032 volumes were analyzed assuming existing intersection geometry in conjunction with projected background traffic volumes, which consists of general traffic growth and growth due to an approved and the neighboring Arrington development.

7.1 GENERAL TRAFFIC GROWTH

The background volumes were based on a 1.0% annual growth rate. The growth rate was compounded annually for the nine-year period from 2023 to 2032 and was applied to all movements at the study intersections. The resulting 2032 vehicle background (existing + growth) volumes are shown on Figure 7-1.

7.2 APPROVED BACKGROUND DEVELOPMENTS

Per coordination with the Town of Warrenton, the traffic associated with the approved Arrington Development was included in the 2032 background conditions analysis.

The generated site trips were included in the approved Arrington Development TIA were extracted and applied to the study area intersections and are shown on Figure 7-2. Note that the study area for the Arrington Development TIA is south of the study area for this report. As a result, the distributions were assigned to the study area road network according to existing travel patterns, the nature of the use, the 2023 existing traffic volumes, and local knowledge.

7.3 2032 TOTAL BACKGROUND

The Arrington development trips shown on Figure 7-2 were added to the existing + growth traffic shown on Figure 7-1 to yield the total 2032 background traffic forecasts which are shown on Figure 7-3.

7.4 BACKGROUND 2032 CAPACITY ANALYSIS RESULTS

Table 7-1 summarizes the 2032 background intersection LOS, delay, 95th percentile queue lengths (Synchro), and maximum queue lengths (SimTraffic) based on the existing intersection geometry (Figure 2-1), 2032 background peak hour traffic volumes shown on Figure 7-3 and the existing signal timings as provided by the Town of Warrenton and VDOT.

The corresponding SYNCHRO and SimTraffic reports are included in Appendix G. Note that the intersection numbers shown on the LOS, delay, and queue length summary tables correspond with the intersection numbers used in the SYNCHRO models and report figures.

As shown in Table 7-1, under 2032 background conditions, all intersections experience similar levels of service, delay, and queueing as under 2026 background conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C or D in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns with the exception of the eastbound left approach which will operate at LOS E in both PM peaks.
    a. It is noted that the traffic signal is running under "free" operations and is likely giving more time to the mainline through movements which results in the LOS E. The delays are less than the overall cycle length of the intersection indicating that the average traffic waits at most one cycle length to traverse the intersection.

2. The school entrances along East Shirley Avenue operate at LOS D or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Route 15 (Falmouth Street) operates at LOS A or B in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Table 7-1: 2032 Background Conditions
Intersection Level of Service and Delay Summary

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				SCHOOL PM PEAK HOUR				COMMUTER PM PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[2] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[2] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[2] (ft)
1. Shirley Avenue (E-W) at	EB Left	215	48.9	D	53	172	58.6	E	64	204	56.5	E	67	214
Culpeper Street (N-S)	EB Thru		22.5	C	296	326	32.0	C	#601	486	36.4	D	#613	504
Signalized	EB Right		17.1	B	0	58	17.3	B	15	76	19.9	B	49	80
	EB Approach		*23.4*	*C*	--	--	*31.4*	*C*	--	--	*34.1*	*C*	--	--
	WB Left	185	41.9	D	53	178	43.9	D	64	184	45.5	D	58	184
	WB Thru/Right		24.6	C	#507	434	25.8	C	#597	479	27.5	C	#561	417
	WB Approach		*25.6*	*C*	--	--	*26.9*	*C*	--	--	*28.5*	*C*	--	--
	NB Left/Thru/Right		49.3	D	#264	230	48.4	D	#228	235	49.7	D	209	210
	NB Approach		*49.3*	*D*	--	--	*48.4*	*D*	--	--	*49.7*	*D*	--	--
	SB Left	125	41.8	D	31	56	42.5	D	45	87	39.2	D	55	116
	SB Thru/Right		43.6	D	62	109	46.2	D	97	144	46.1	D	163	186
	SB Approach		*43.2*	*D*	--	--	*45.3*	*D*	--	--	*44.7*	*D*	--	--
	Overall		**30.0**	**C**	**--**	**--**	**32.8**	**C**	**--**	**--**	**35.1**	**D**	**--**	**--**
2. E Shirley Avenue (E-W) at	EB Thru		†	†	0	8	†	†	0	--	†	†	0	--
Site Entrance #1 (N-S)	EB Right	125	†	†	0	13	†	†	0	--	†	†	0	2
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	255	8.8	A	8	65	8.8	A	1	34	8.9	A	1	21
	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*1.2*	*A*	--	--	*0.3*	*A*	--	--	*0.2*	*A*	--	--
3. E Shirley Avenue (E-W) at	EB Thru		†	†	0	--	†	†	0	5	†	†	0	--
Site Entrance #2 (N-S)	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
Unsignalized	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	NB Left		24.1	C	31	96	32.4	D	40	77	26.6	D	13	46
	NB Right		11.6	B	14	73	14.9	B	22	102	12.8	B	1	32
	NB Approach		*17.2*	*C*	--	--	*22.2*	*C*	--	--	*24.3*	*C*	--	--
4. E Shirley Avenue (E-W) at	EB Thru		†	†	0	--	†	†	0	--	†	†	0	--
Site Entrance #3 (N-S)	EB Right	140	†	†	0	6	†	†	0	--	†	†	0	--
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	160	8.3	A	3	35	9.0	A	3	40	9.3	A	4	54
	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*0.6*	*A*	--	--	*0.5*	*A*	--	--	*0.7*	*A*	--	--
5. E Shirley Avenue (E-W) at	*EB Approach*		*1.9*	*A*	*25*	--	*2.1*	*A*	*37*	--	*2.2*	*A*	*40*	--
Falmouth Street (N)	*WB Approach*		*14.6*	*B*	*209*	--	*11.3*	*B*	*149*	--	*18.6*	*B*	*330*	--
Roundabout*	*SB Approach*		*11.0*	*B*	*49*	--	*8.3*	*A*	*42*	--	*10.6*	*B*	*60*	--
	Overall		**9.9**	**A**	**--**	**--**	**6.9**	**A**	**--**	**--**	**10.7**	**B**	**--**	**--**
6. E Shirley Avenue/ (N-S)	EB Left	560	35.3	D	88	156	38.2	D	151	178	40.4	D	154	188
James Madison Highway at	EB Left/Thru		35.6	D	88	110	38.6	D	153	130	40.5	D	155	144
Alwington Boulevard (E-W)	EB Right[3]		0.1	A	0	11	0.2	A	0	77	0.2	A	0	60
Signalized	*EB Approach*		*23.8*	*C*	--	--	*23.8*	*C*	--	--	*23.8*	*C*	--	--
	WB Left/Thru/Right		33.7	C	0	53	35.6	D	29	70	36.2	D	0	56
	WB Approach		*33.7*	*C*	--	--	*35.6*	*D*	--	--	*36.2*	*D*	--	--
	NB Left	315	18.0	B	110	176	19.0	B	105	176	19.3	B	119	193
	NB Thru		19.2	B	172	219	19.7	B	99	159	19.5	B	111	160
	NB Right	160	16.1	B	0	20	18.1	B	0	43	17.6	B	0	17
	NB Approach		*18.8*	*B*	--	--	*19.4*	*B*	--	--	*19.4*	*B*	--	--
	SB Left	165	15.5	B	12	45	16.7	B	19	68	16.4	B	17	107
	SB Thru		24.8	C	82	115	26.9	C	150	186	27.9	C	174	205
	SB Right	250	16.8	B	20	116	15.5	B	16	96	15.7	B	12	112
	SB Approach		*20.8*	*C*	--	--	*23.2*	*C*	--	--	*24.6*	*C*	--	--
	Overall		**20.4**	**C**	**--**	**--**	**22.4**	**C**	**--**	**--**	**22.9**	**C**	**--**	**--**
7. Alwington Boulevard (E-W) at	EB Left/Thru/Right		7.6	A	5	23	7.6	A	5	47	7.6	A	5	24
Elementary School Entrance/	*EB Approach*		*7.6*	*A*	--	--	*7.6*	*A*	--	--	*7.6*	*A*	--	--
Commercial Entrance (N-S)	WB Left/Thru		8.9	A	13	69	8.8	A	8	72	9.4	A	13	79
Unsignalized**	WB Right	270	7.2	A	10	68	6.9	A	5	58	6.8	A	3	59
	WB Approach		*8.0*	*A*	--	--	*7.8*	*A*	--	--	*8.9*	*A*	--	--
	NB Left/Thru/Right		7.1	A	3	85	6.7	A	0	60	6.9	A	3	58
	NB Approach		*7.1*	*A*	--	--	*6.7*	*A*	--	--	*6.9*	*A*	--	--
	SB Left/Thru/Right		8.0	A	3	54	7.5	A	0	31	7.7	A	3	33
	NB Approach		*8.0*	*A*	--	--	*7.5*	*A*	--	--	*7.7*	*A*	--	--

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

[2] SimTraffic Queues are average maximum queues after 10 runs of 60 minutes each.

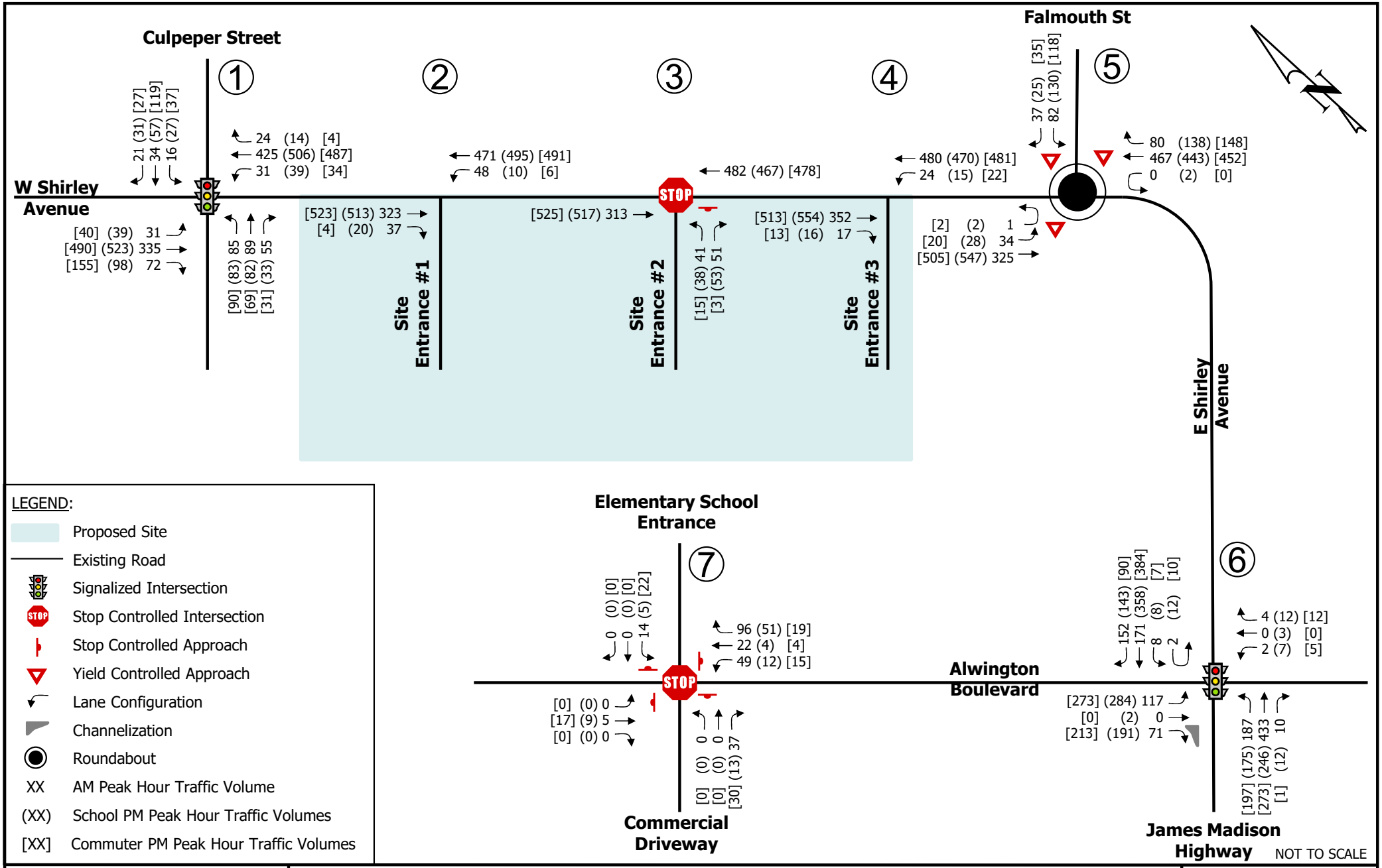
[3] *Channelized right turn not controlled by the signal.*

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

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

* Note: SIDRA was used to analyze the roundabout at intersection 5.

** Note: HCM 6th Edition was used to analyze the all way stop controlled intersection at intersection 7.



LEGEND:

- Proposed Site
- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Controlled Approach
- Yield Controlled Approach
- Lane Configuration
- Channelization
- Roundabout
- XX AM Peak Hour Traffic Volume
- (XX) School PM Peak Hour Traffic Volumes
- [XX] Commuter PM Peak Hour Traffic Volumes

NOT TO SCALE

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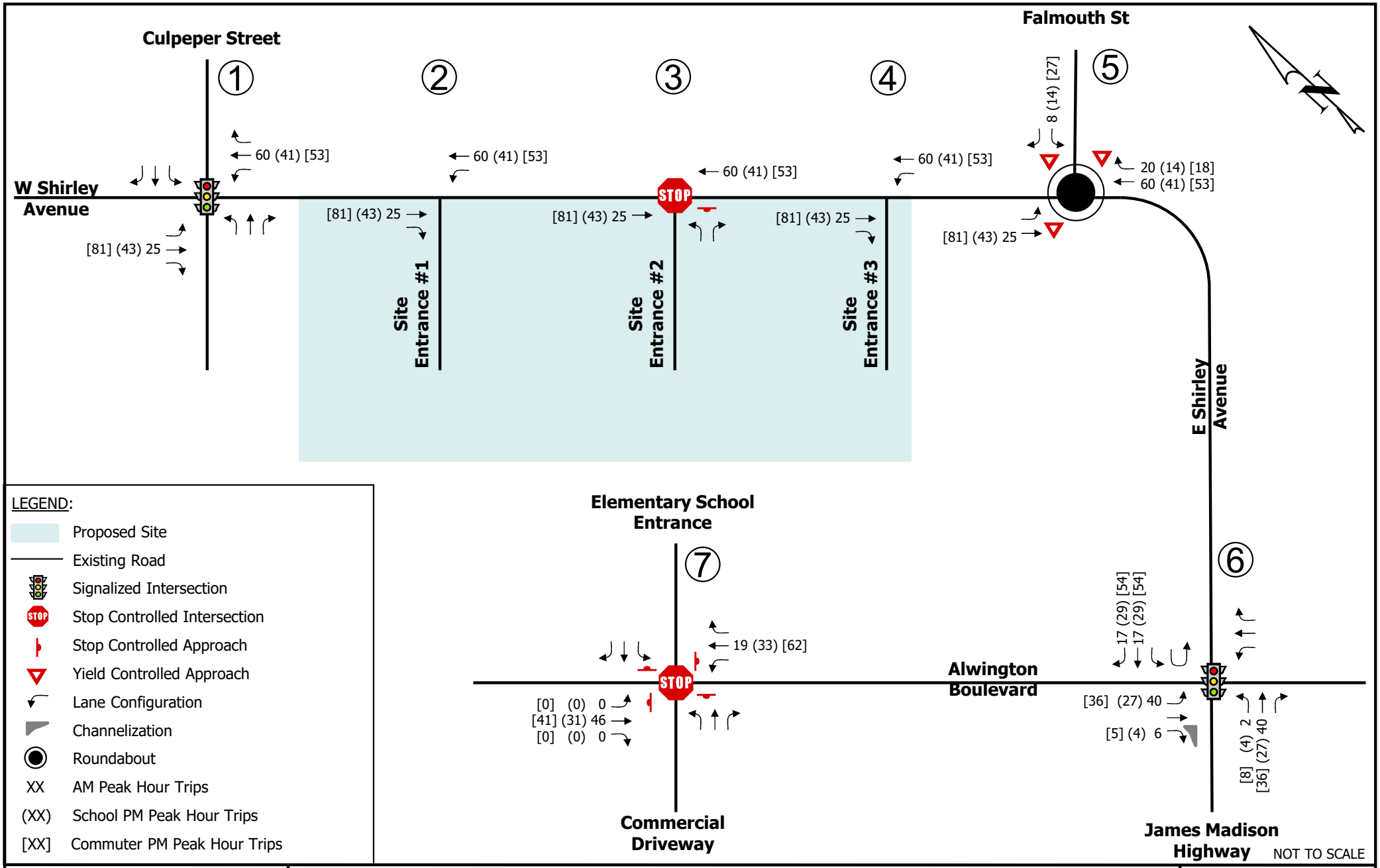
2032 Existing + Growth Peak Hour Volumes
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 7-1



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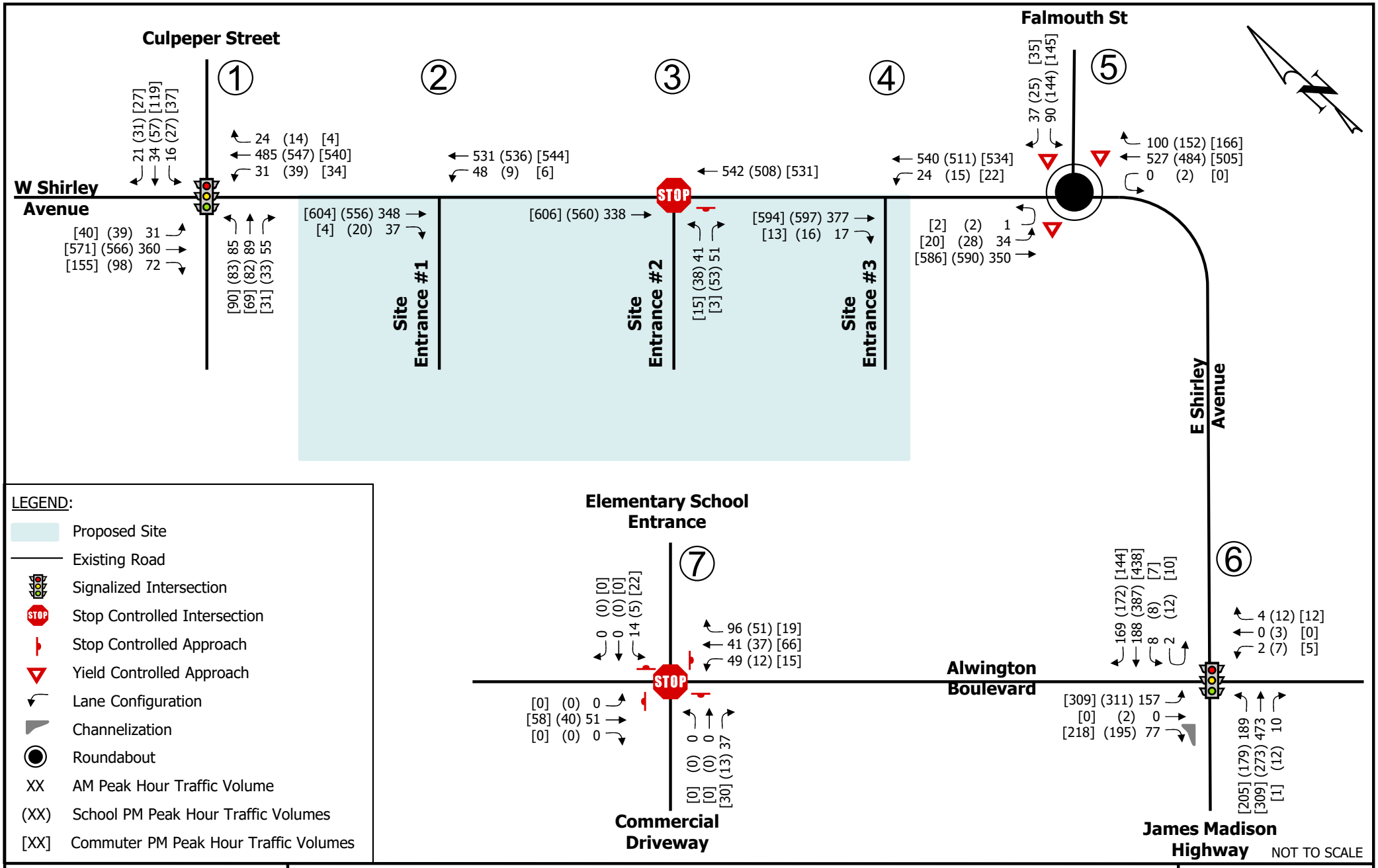
Arrington Development Trips
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure
7-2



LEGEND:

- Proposed Site
- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Controlled Approach
- Yield Controlled Approach
- Lane Configuration
- Channelization
- Roundabout
- XX AM Peak Hour Traffic Volume
- (XX) School PM Peak Hour Traffic Volumes
- [XX] Commuter PM Peak Hour Traffic Volumes

NOT TO SCALE

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2032 Total Background Peak Hour Volumes
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 7-3

8 2032 TOTAL FUTURE CONDITIONS

To complete the analysis of 2032 total conditions (with the proposed expansion), the estimated site trips were added to the background 2032 traffic volumes. The projected volumes were then used to complete the capacity analysis.

8.1 2032 TOTAL FUTURE TRAFFIC VOLUMES

The rerouted existing trips shown on Figure 5-2 and Figure 5-3 and The site generated trips shown on Figures 5-6 and 5-7 were added to the 2032 total background traffic volumes (Figure 7-3) to yield the 2032 total future traffic volumes shown in Figure 8-1.

8.2 2032 FUTURE CONDITIONS ANALYSIS RESULTS

Table 8-1 summarizes the 2032 future intersection LOS, delay, 95th percentile queue lengths (Synchro), and maximum queue lengths (SimTraffic) based on the future intersection geometry (Figure 5-1), 2032 future peak hour traffic volumes shown on Figure 8-1 and the existing signal timings as provided by the Town of Warrenton and VDOT. The corresponding SYNCHRO and SimTraffic reports are included in Appendix H.

Note that the intersection numbers shown on the LOS, delay, and queue length summary tables correspond with the intersection numbers used in the SYNCHRO models and report figures.

As shown in Table 8-1, under 2032 future conditions, all intersections experience similar levels of service, delay, and queueing as under 2032 background conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C or D in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns with the exception of the eastbound left approach which will operate at LOS E in both PM peaks.
    a. It is noted that the traffic signal is running under "free" operations and is likely giving more time to the mainline through movements which results in the LOS E. The delays are less than the overall cycle length of the intersection indicating that the average traffic waits at most one cycle length to traverse the intersection.

2. The school entrances along East Shirley Avenue operate at LOS D or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Route 15 (Falmouth Street) operates at LOS A or B in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

6. The expansion of the middle school will have minimal impact on the external surrounding roadway network and no improvements are required at the study intersections.

a. The expansion will provide a link between the elementary school and the middle school during school pick up and drop off times only. During all other times, the connection between the schools will be gated.

2032 TURN LANE WARRANT ANALYSIS

As shown in Figures 2-1 and 5-1, the following right and left turn lanes are present under existing conditions at the site entrances on E Shirley Avenue:

Western Site Entrance (Bus Ingress Only)

Eastbound right turn lane with 125 feet of storage

Westbound left turn lane with 255 feet of storage

Eastern Site Entrance (Vehicle Ingress and Egress)

Eastbound right turn lane with 140 feet of storage

Westbound left turn lane with 160 feet of storage

As shown in Table 8-1, under 2032 future conditions, the 95th percentile and maximum queues at the site entrances will be contained within the existing available storage. No additional storage is required.

Table 8-1: 2032 Total Future Conditions
Intersection Level of Service and Delay Summary

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				SCHOOL PM PEAK HOUR				COMMUTER PM PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[(2)] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[(2)] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[(2)] (ft)
1. Shirley Avenue (E-W) at	EB Left	215	48.9	D	53	164	58.8	E	64	214	57.4	E	67	214
Culpeper Street (N-S)	EB Thru		23.8	C	335	325	33.8	C	#636	551	37.7	D	#634	548
Signalized	EB Right		17.1	B	0	61	17.3	B	15	77	20.0	B	51	111
	EB Approach		*24.4*	*C*	--	--	*32.9*	*C*	--	--	*35.2*	*D*	--	--
	WB Left	185	41.9	D	53	170	44.1	D	64	177	45.8	D	58	184
	WB Thru/Right		26.3	C	#555	444	27.3	C	#645	578	27.8	C	#569	467
	WB Approach		*27.2*	*C*	--	--	*28.3*	*C*	--	--	*28.8*	*C*	--	--
	NB Left/Thru/Right		49.3	D	#264	251	48.5	D	#228	248	49.8	D	209	246
	NB Approach		*49.3*	*D*	--	--	*48.5*	*D*	--	--	*49.8*	*D*	--	--
	SB Left	125	41.8	D	31	47	42.7	D	45	82	39.4	D	55	114
	SB Thru/Right		43.6	D	62	86	46.3	D	97	147	46.3	D	163	199
	SB Approach		*43.2*	*D*	--	--	*45.5*	*D*	--	--	*44.9*	*D*	--	--
	Overall		**30.7**	**C**	**--**	**--**	**33.9**	**C**	**--**	**--**	**35.7**	**D**	**--**	**--**
2. E Shirley Avenue (E-W) at	EB Thru		†	†	0	--	†	†	0	--	†	†	0	--
Site Entrance #1 (N-S)	EB Right	125	†	†	0	6	†	†	0	--	†	†	0	--
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	255	8.6	A	3	44	9.0	A	3	44	†	†	0	--
	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*0.5*	*A*	--	--	*0.5*	*A*	--	--	*†*	*†*	--	--
3. E Shirley Avenue (E-W) at	EB Thru		†	†	0	2	†	†	0	--	†	†	0	--
Site Entrance #2 (N-S)	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
Unsignalized	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	NB Left		22.1	C	8	64	24.5	C	10	50	†	†	0	--
	NB Right		11.5	B	5	68	13.7	B	7	65	†	†	0	--
	NB Approach		*15.6*	*C*	--	--	*17.9*	*C*	--	--	*†*	*†*	--	--
4. E Shirley Avenue (E-W) at	EB Thru		†	†	0	7	†	†	0	--	†	†	0	--
Site Entrance #3 (N-S)	EB Right	140	†	†	0	12	†	†	0	6	†	†	0	--
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	160	8.7	A	4	45	9.2	A	1	33	9.5	A	5	52
	WB Thru		†	†	0	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Approach		*0.7*	*A*	--	--	*0.2*	*A*	--	--	*0.8*	*A*	--	--
	NB Left-Right		20.6	C	33	82	28.2	D	49	100	28.5	D	12	50
	NB Approach		*20.6*	*C*	--	--	*28.2*	*D*	--	--	*28.5*	*D*	--	--
5. E Shirley Avenue (E-W) at	*EB Approach*		*1.8*	*A*	*24*	--	*2.1*	*A*	*35*	--	*2.2*	*A*	*40*	--
Falmouth Street (N)	*WB Approach*		*13.6*	*B*	*179*	--	*11.5*	*B*	*148*	--	*18.4*	*B*	*325*	--
Roundabout*	*SB Approach*		*10.6*	*B*	*50*	--	*8.4*	*A*	*43*	--	*10.7*	*B*	*61*	--
	Overall		**9.3**	**A**	**--**	**--**	**7.1**	**A**	**--**	**--**	**10.7**	**B**	**--**	**--**
6. E Shirley Avenue/ (N-S)	EB Left	560	37.3	D	90	175	38.1	D	151	173	41.3	D	155	161
James Madison Highway at	EB Left/Thru		37.4	D	91	129	38.5	D	153	141	41.4	D	156	124
Alwington Boulevard (E-W)	EB Right[(3)]		0.2	A	0	36	0.3	A	0	84	0.2	A	0	63
Signalized	*EB Approach*		*19.7*	*B*	--	--	*21.0*	*C*	--	--	*23.9*	*C*	--	--
	WB Left/Thru/Right		35.1	D	0	60	35.8	D	29	78	36.3	D	0	52
	WB Approach		*35.1*	*D*	--	--	*35.8*	*D*	--	--	*36.3*	*D*	--	--
	NB Left	315	19.3	B	160	219	19.4	B	120	196	19.6	B	128	185
	NB Thru		18.4	B	157	203	19.7	B	98	165	19.3	B	109	178
	NB Right	160	15.7	B	0	23	18.1	B	0	50	17.5	B	0	31
	NB Approach		*18.7*	*B*	--	--	*19.5*	*B*	--	--	*19.4*	*B*	--	--
	SB Left	165	15.1	B	12	65	16.7	B	19	56	16.2	B	17	68
	SB Thru		26.3	C	75	119	27.6	C	142	175	28.0	C	173	189
	SB Right	250	18.3	B	3	122	16.2	B	18	100	15.9	B	13	99
	SB Approach		*22.0*	*C*	--	--	*23.6*	*C*	--	--	*24.7*	*C*	--	--
	Overall		**19.8**	**B**	**--**	**--**	**21.6**	**C**	**--**	**--**	**22.9**	**C**	**--**	**--**
7. Alwington Boulevard (E-W) at	EB Left/Thru/Right		8.0	A	5	20	7.9	A	5	42	7.6	A	5	23
Elementary School Entrance/	*EB Approach*		*8.0*	*A*	--	--	*7.9*	*A*	--	--	*7.6*	*A*	--	--
Commercial Entrance (N-S)	WB Left/Thru		9.2	A	13	80	9.1	A	8	73	9.4	A	13	77
Unsignalized**	WB Right	270	8.1	A	23	79	7.2	A	8	72	6.9	A	3	66
	WB Approach		*8.5*	*A*	--	--	*7.9*	*A*	--	--	*8.6*	*A*	--	--
	NB Left/Thru/Right		7.4	A	3	74	6.9	A	0	64	7.0	A	3	61
	NB Approach		*7.4*	*A*	--	--	*6.9*	*A*	--	--	*7.0*	*A*	--	--
	SB Left/Thru/Right		8.8	A	10	65	8.0	A	8	59	7.8	A	3	41
	NB Approach		*8.8*	*A*	--	--	*8.0*	*A*	--	--	*7.8*	*A*	--	--

[1] Overall intersection LOS and delay reported for signalized intersections and roundabouts only.

[2] SimTraffic Queues are average maximum queues after 10 runs of 60 minutes each.

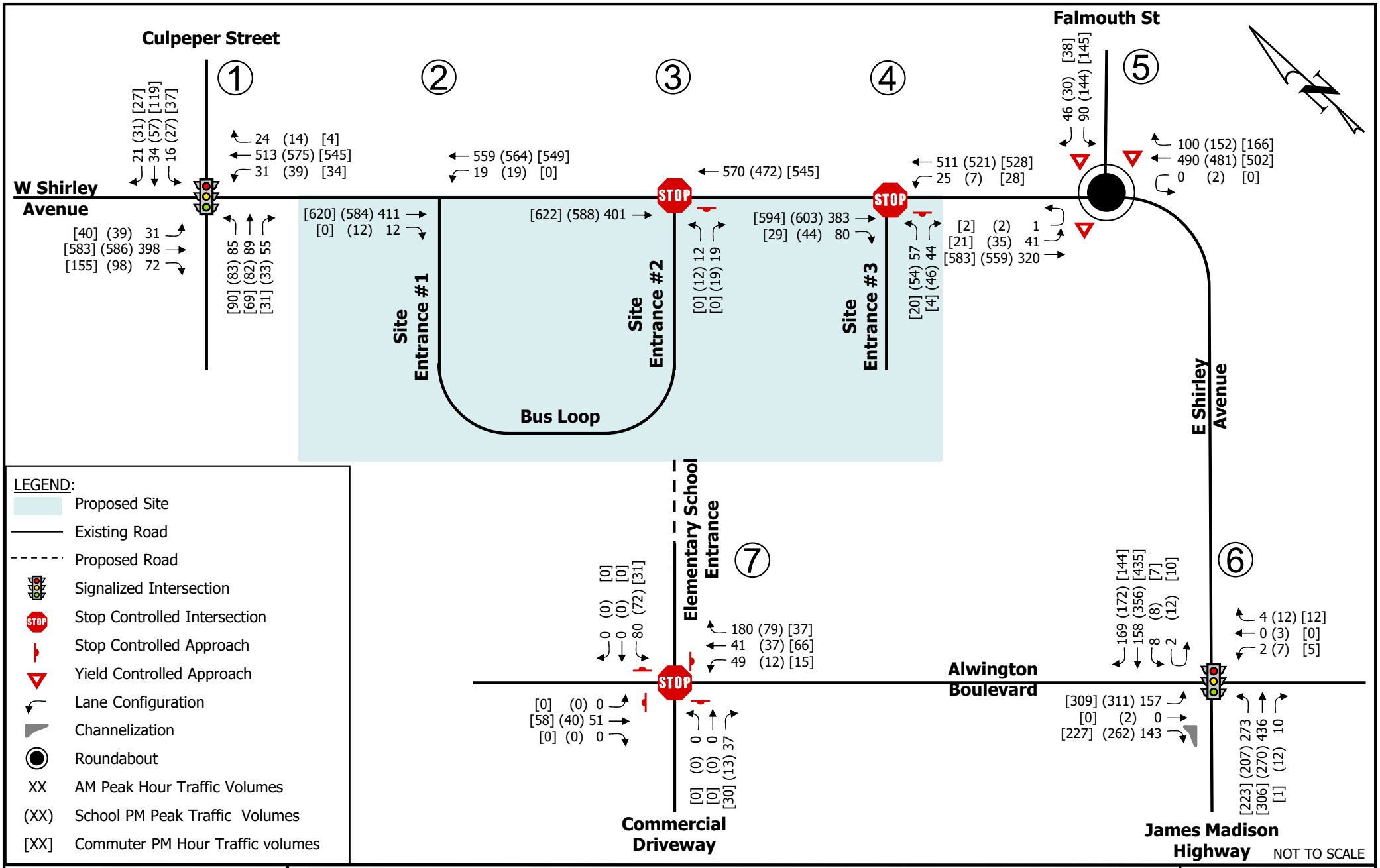
[3] Channelized right turn not controlled by the signal.

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

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

* Note: SIDRA was used to analyze the roundabout at intersection 5.

** Note: HCM 6th Edition was used to analyze the all way stop controlled intersection at intersection 7.



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2032 Total Future Peak Hour Volumes
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure
8-1

9 CONCLUSIONS

9.1 PRINCIPAL FINDINGS

Based on the analysis contained herein, the following principal findings are offered:

Under 2023 existing conditions:

1. The East Shirley/Culpeper Street intersection currently operates an overall LOS C in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns.

2. The school entrances along East Shirley Avenue operate at LOS C or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Route 15 (Falmouth Street) operates at LOS A in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C or better in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Under 2026 background conditions, all intersections experience similar levels of service, delay, and queueing as under existing conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns.

2. The school entrances along East Shirley Avenue operate at LOS C or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Route 15 (Falmouth Street) operates at LOS A in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Under 2026 total future conditions, with buildout of the proposed development, all intersections experience similar levels of service compared to 2026 background conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns.

2. The school entrances along East Shirley Avenue operate at LOS C or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Route 15 (Falmouth Street) operates at LOS A in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

6. The expansion of the middle school will have minimal impact on the external surrounding roadway network and no improvements are required at the study intersections.
    a. The expansion will provide a link between the elementary school and the middle school during school pick up and drop off times only. During all other times, the connection between the schools will be gated.

Under 2032 background conditions, all intersections experience similar levels of service, delay, and queueing as under 2026 background conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C or D in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns with the exception of the eastbound left approach which will operate at LOS E in both PM peaks.
    a. It is noted that the traffic signal is running under "free" operations and is likely giving more time to the mainline through movements which results in the LOS E. The delays are less than the overall cycle length of the intersection indicating that the average traffic waits at most one cycle length to traverse the intersection.

2. The school entrances along East Shirley Avenue operate at LOS D or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Route 15 (Falmouth Street) operates at LOS A or B in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Under 2032 total future conditions, with buildout of the proposed development, all intersections experience similar levels of service compared to 2026 background conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C or D in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns with the exception of the eastbound left approach which will operate at LOS E in both PM peaks.
    a. It is noted that the traffic signal is running under "free" operations and is likely giving more time to the mainline through movements which results in the LOS E. The delays are less than the overall cycle length of the intersection indicating that the average traffic waits at most one cycle length to traverse the intersection.

2. The school entrances along East Shirley Avenue operate at LOS D or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Route 15 (Falmouth Street) operates at LOS A or B in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

6. The expansion of the middle school will have minimal impact on the external surrounding roadway network and no improvements are required at the study intersections.
    a. The expansion will provide a link between the elementary school and the middle school during school pick up and drop off times only. During all other times, the connection between the schools will be gated.

9.2 RECOMMENDATIONS

The expansion of the middle school will have minimal to no impact on the surrounding roadway network and no improvements are required at the study intersections.

The expansion will provide a link between the elementary school and the middle school during school pick up and drop off times only. During all other times, the connection between the schools will be gated.

The traffic control at internal intersections to the school site was not reviewed as part of this study and will the specifics (signage, pavement markings, etc.) will be designed at the time of site plan approval.

Appendix A
Scoping Agreement

VDOT Virginia Department of Transportation

PRE-SCOPE OF WORK MEETING FORM

Information on the Project
Traffic Impact Analysis Base Assumptions

The applicant is responsible for entering the relevant information and submitting the form to VDOT and the locality no less than three (3) business days prior to the meeting. If a form is not received by this deadline, the scope of work meeting may be postponed.

Contact Information				
Consultant Name: Tele: E-mail:	Steve Schmidt 804.200.6502 steve.schmidt@timmons.com			
Developer/Owner Name: Tele: E-mail:				
Project Information				
Project Name:	Taylor Middle School Expansion	Locality/County:	Town of Warrenton	
Project Location: (Attach regional and site specific location map)	The site is generally located south of Buisness 17 (East Shirley Avenue) and north of Alwington Boulevard in the Town of Warrenton as shown in Figure 1.			
Submission Type	Comp Plan ☐	Rezoning ☐	SUP Site Plan ☒	Subd Plat ☐
Project Description: (Including details on the land use, acreage, phasing, access location, etc. Attach additional sheet if necessary)	The expansion of the existing Taylor Middle School will add a total of 69,000 sf of additional building area to increase the capacity of the school from 510 students to 850 students. Site improvements also include a dedicated loop for school buses, a separate loop for parent drop off, as well as parking lot improvements. Access to the site is proposed via the three (3) existing entrances to Taylor Middle School (on Business 17) and one new access via Alwington Boulevard via the James Brumfield Elementary School access road. See Figure 2 for the conceptual plan and Tables 1/2 for the trip generation table for traffic generated by the site. Table 1 shows the trip generation based on the existing driveway counts and Table 2 shows the trip generation based on ITE rates/equations. It is proposed to use the local counts (Table 1) as they represent actual operations at the school.			
Proposed Use(s): (Check all that apply; attach additional pages as necessary)	Residential ☐	Commercial ☐	Mixed Use ☐	Other ☒

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

	Residential Uses(s) Number of Units: ____ ITE LU Code(s): ____ ____ ____ **Commercial Use(s)** ITE LU Code(s): ____ ____ ____ Square Ft or Other Variable:		**Other Use(s)** ITE LU Code(s): 522 Independent Variable(s): Students	
Total Peak Hour Trip Projection:	Less than 100 ☐	100 – 499 ☒	500 – 999 ☐	1,000 or more ☐

Traffic Impact Analysis Assumptions

Study Period	Existing Year: 2023	Build-out Year: 2026	Design Year: 2032
Study Area Boundaries (Attach map)	North: Route 17	South: Alwington Boulevard	
	East: Alwington Boulevard	West: Cleveland Street	
External Factors That Could Affect Project (Planned road improvements, other nearby developments)	1. The traffic generated by the Arrington development will be included in all future analyses. 2. With the Arrington development, the elementary school entrances will be reconfigured. This will be assumed in all future analyses. 3. VDOT Pipeline Study on Route 17 - this will be discussed in the report but not analyzed in any scenario as the improvements are not funded.		
Consistency With Comprehensive Plan (Land use, transportation plan)	The site is currently a middle school and there is no change in land use		
Available Traffic Data (Historical, forecasts)	VDOT AADT Data, AM (6-9AM) and PM (2-6PM) counts conducted in May '23 prior to school letting out.		
Trip Distribution (Attach sketch)	Road Name: see Figure 3 and notes	Road Name:	
	Road Name:	Road Name:	
Annual Vehicle Trip Growth Rate:	1%	Peak Period for Study (check all that apply)	☒ AM ☒ PM ☐ SAT
		Peak Hour of the Generator	PM School Peak
Study Intersections and/or Road Segments (Attach additional sheets as necessary)	1.Culpeper St/Shirley Ave	6.Route 17 and Alwington Boulevard	
	2.Site Entrance 1 and Route 17	7.Alwington Boulevard and ES School Entrance	
	3.Site Entrance 2 and Route 17	8.	

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

	4.Site Entrance 3 and Route 17	9.
	5.Route 17 and Route 15	10.
Trip Adjustment Factors	Internal allowance: ☐ Yes ☒ No Reduction: _____% trips	Pass-by allowance: ☐ Yes ☒ No Reduction: _____% trips
Software Methodology	☒ Synchro ☐ HCS (v.2000/+) ☒ aaSIDRA ☐ CORSIM ☐ Other _____	
Traffic Signal Proposed or Affected (Analysis software to be used, progression speed, cycle length)	Existing Signals: Culpeper St/Shirley Ave and Route 17/Alwington Boulevard	
Improvement(s) Assumed or to be Considered	1. The traffic generated by the Arrington development will be included in all future analyses. 2. With the Arrington development, the elementary school entrances will be reconfigured. This will be assumed in all future analyses. 3. VDOT Pipeline Study on Route 17 - this will be discussed in the report but not analyzed in any scenario as the improvements are not funded.	
Background Traffic Studies Considered	TIA for the Arrington Development will be used to compare traffic counts, growth rates, etc.	
Plan Submission	☐ Master Development Plan (MDP) ☒ Generalized Development Plan (GDP) ☐ Preliminary/Sketch Plan ☐ Other Plan type (Final Site, Subd. Plan)	
Additional Issues to be Addressed	☒ Queuing analysis ☐ Actuation/Coordination ☐ Weaving analysis ☐ Merge analysis ☒ Bike/Ped Accommodations ☒ Intersection(s) ☐ TDM Measures ☒ Other Turn Lane Warrant Analysis	

NOTES on ASSUMPTIONS: See Tables 1/2 for the trip generation table for traffic generated by the site. Table 1 shows the trip generation based on the existing driveway counts and Table 2 shows the trip generation based on ITE rates/equations. It is proposed to use the local counts (Table 1) as they represent actual operations at the school and are generally in line with ITE rates/equations.

The overall site trip distributions are shown on Figure 3 and are based on the existing traffic counts at the school driveways and the County school attendance map for Taylor Middle School.

Turn lane warrant analyses will be completed for all site entrances

Study will include a review of Access Management Spacing Standards.

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

SIGNED: _____ DATE: 08/28/23

Applicant or Consultant

PRINT NAME: Steve Schmidt

Applicant or Consultant

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

SCOPE OF WORK MEETING CONCLUSIONS

ADDITIONS TO THE VDOT REQUIRED ELEMENTS, CHANGES TO THE METHODOLOGY OR STANDARD ASSUMPTIONS, AND SIGNATURE PAGE

Any additions to the VDOT Required Elements or changes to the Methodology or Standard Assumptions due to special circumstances that are approved by VDOT:

The applicant will contact VDOT and the locality prior to the preparation of the traffic impact analysis study in the event there are any substantial changes in the existing conditions that will affect the scope of the study.

AGREED: _____ DATE: 08/28/23
Applicant or Consultant

PRINT NAME: Steve Schmidt
Applicant or Consultant

SIGNED: _____ DATE: _____
VDOT Representative

PRINT NAME: _____
VDOT Representative

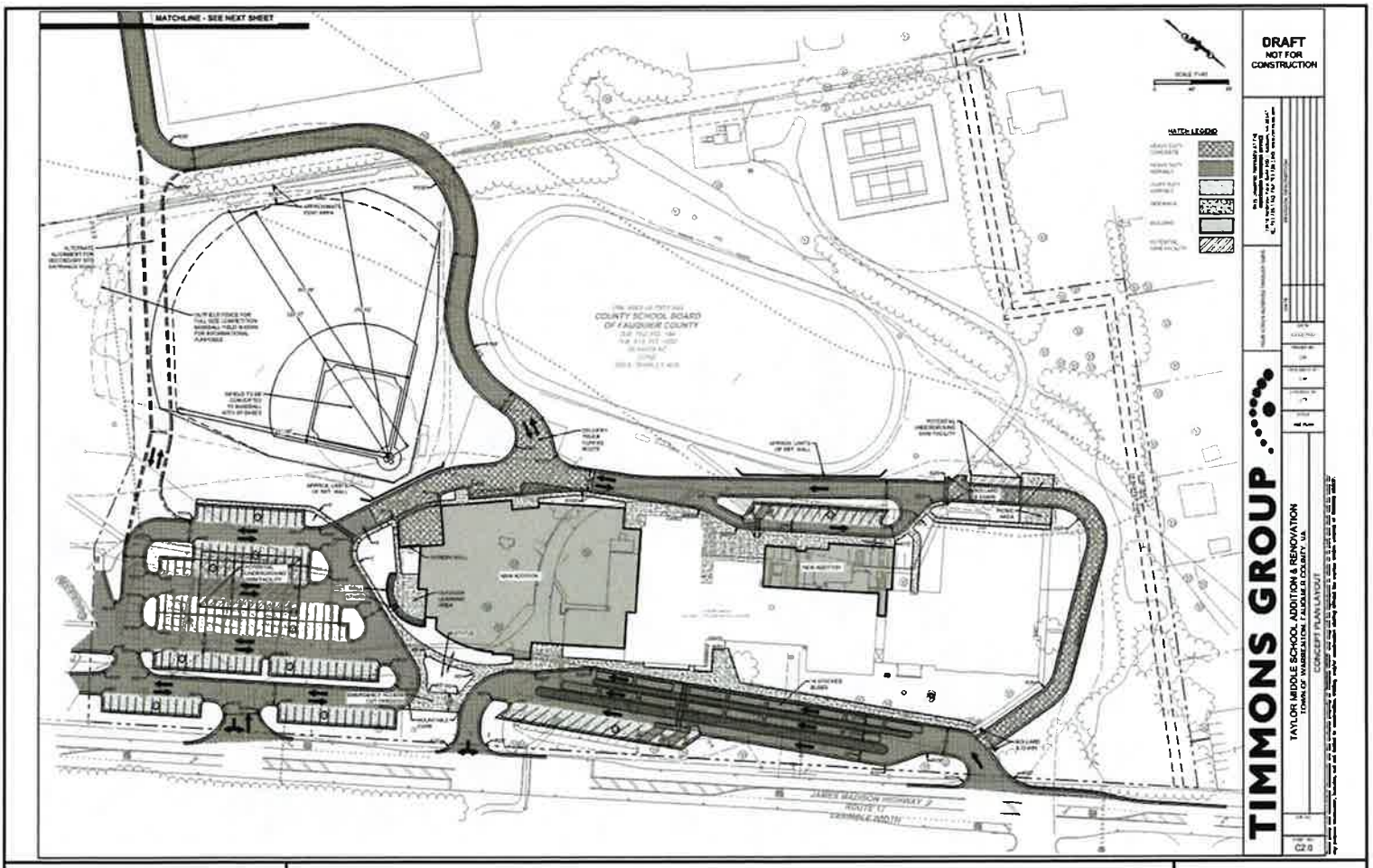
SIGNED: Denise Harris DATE: 8/29/23
Local Government Representative

PRINT NAME: Denise Harris
Local Government Representative

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Surrounding Roadway Network and Site Location
Taylor Middle School Addition
Town of Warrenton, Virginia

Figure
1



TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Conceptual Plan
Taylor Middle School Addition
Town of Warrenton, Virginia

Figure
2

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Proposed Overall Site Distributions
Taylor Middle School – Addition & Renovation
Town of Warrenton, Virginia

Figure
3

Table 1
Taylor Middle School Addition
Existing Counts as Basis For Trip Generation

Land Use	Size	Units	Land Use Code	School AM Peak Hour [1] In	Out	Total	School PM Peak [1] In	Out	Total	Commuter PM Peak Hour [1] In	Out	Total	Average Daily Trips [2]
Existing Capacity													
Middle School	510	Students	522	126	92	218	60	91	151	45	18	63	1071
New Capacity													
Middle School	850	Students	522	210	153	363	100	152	252	75	30	105	1785
Increase	340	Students		84	61	145	40	61	101	30	12	42	714

Note: (1) Peak hour counts based on existing driveway counts conducted for the site for the existing school capacity. New capacity trips pro-rated based on the existing counts and the percent increase in students.
(2) Average Daily Trips based on the Institute of Transportation Engineers Trip Generation, 11th Edition. Assumes General Urban/Suburban land use category.

Table 2
Taylor Middle School Addition
ITE Trip Generation as Basis for Trip Generation

Land Use	Size	Units	Land Use Code	School AM Peak Hour In	Out	Total	School PM Peak In	Out	Total	Commuter PM Peak Hour In	Out	Total	Average Daily Trips
Existing Capacity													
Middle School	510	Students	522	233	190	423	91	107	198	37	40	77	1071
New Capacity													
Middle School	850	Students	522	354	290	644	143	167	310	61	67	128	1785
Increase	340	Students		121	100	221	52	60	112	24	27	51	714

Note: (1) Based on the Institute of Transportation Engineers Trip Generation, 11th Edition. Assumes General Urban/Suburban land use category.

Appendix B
Traffic Count Data

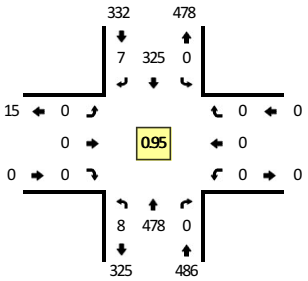
Type of peak hour being reported: Intersection Peak

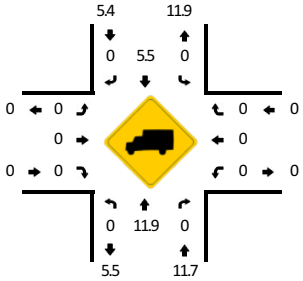
Method for determining peak hour: Total Entering Volume

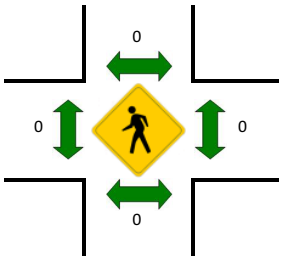
LOCATION: Rte 17 Bus -- Western Dwy
CITY/STATE: Warrenton, VA

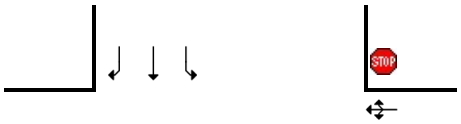
QC JOB #: 16218101
DATE: Tue, May 16 2023

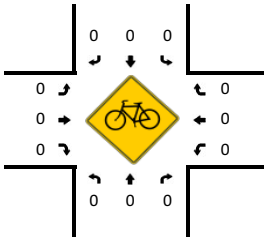
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

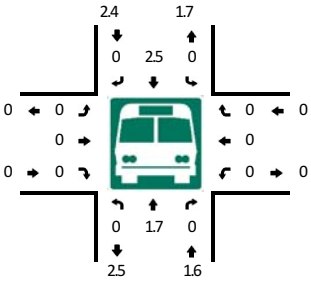


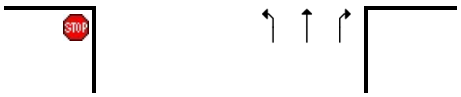


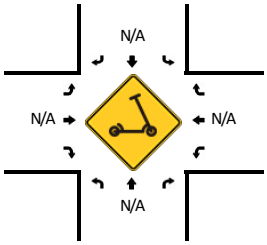












15-Min Count Period Beginning At	Rte 17 Bus (Northbound)				Rte 17 Bus (Southbound)				Western Dwy (Eastbound)				Western Dwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	25	0	0	0	26	1	0	0	0	0	0	0	0	0	0	52	
6:15 AM	0	28	0	0	0	28	0	0	0	0	0	0	0	0	0	0	56	
6:30 AM	2	51	0	0	0	35	1	0	0	0	0	0	0	0	0	0	89	
6:45 AM	7	65	0	0	0	63	7	0	0	0	0	0	0	0	0	0	142	339
7:00 AM	26	59	0	0	0	58	14	0	0	0	0	0	0	0	0	0	157	444
7:15 AM	32	109	0	0	0	58	24	0	0	0	0	0	0	0	0	0	223	611
7:30 AM	13	90	0	0	0	65	9	0	0	0	0	0	0	0	0	0	177	699
7:45 AM	1	125	0	0	0	74	3	0	0	0	0	0	0	0	0	0	203	760
8:00 AM	2	107	0	0	0	98	1	0	0	0	0	0	0	0	0	0	208	811
8:15 AM	3	128	0	0	0	84	1	0	0	0	0	0	0	0	0	0	216	804
8:30 AM	2	118	0	0	0	69	2	0	0	0	0	0	0	0	0	0	191	818
8:45 AM	1	102	0	0	0	83	2	0	0	0	0	0	0	0	0	0	188	803

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	512	0	0	0	336	4	0	0	0	0	0	0	0	0	0	864
Heavy Trucks	0	48	0		0	16	0		0	0	0		0	0	0		64
Buses	0	20	0		0	4	0		0	0	0		0	0	0		24
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:52 AM

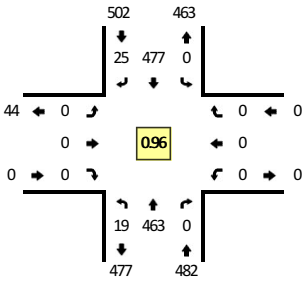
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

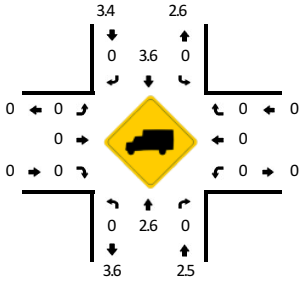
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

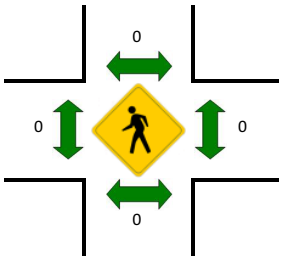
LOCATION: Rte 17 Bus -- Western Dwy
CITY/STATE: Warrenton, VA

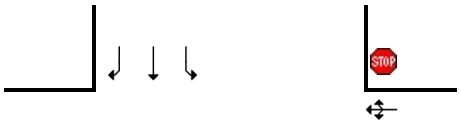
QC JOB #: 16218102
DATE: Tue, May 16 2023

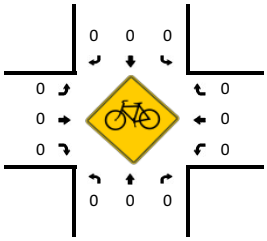
Peak-Hour: 2:00 PM -- 3:00 PM
Peak 15-Min: 2:15 PM -- 2:30 PM

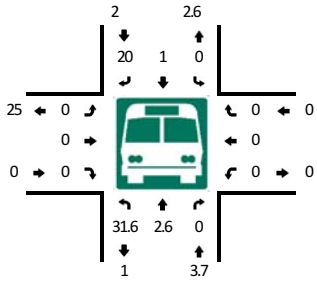


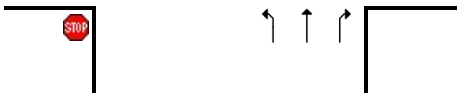


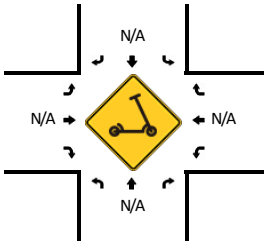












15-Min Count Period Beginning At	Rte 17 Bus (Northbound)				Rte 17 Bus (Southbound)				Western Dwy (Eastbound)				Western Dwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
2:00 PM	10	108	0	0	0	128	5	0	0	0	0	0	0	0	0	0	251	
2:15 PM	5	124	0	0	0	113	13	0	0	0	0	0	0	0	0	0	255	
2:30 PM	4	124	0	0	0	121	3	0	0	0	0	0	0	0	0	0	252	
2:45 PM	0	107	0	0	0	115	4	0	0	0	0	0	0	0	0	0	226	984
3:00 PM	0	98	0	0	0	120	0	0	0	0	0	0	0	0	0	0	218	951
3:15 PM	2	96	0	0	0	124	0	0	0	0	0	0	0	0	0	0	222	918
3:30 PM	2	150	0	0	0	131	0	0	0	0	0	0	0	0	0	0	283	949
3:45 PM	0	111	0	0	0	103	1	0	0	0	0	0	0	0	0	0	215	938
4:00 PM	1	101	0	0	0	120	2	0	0	0	0	0	0	0	0	0	224	944
4:15 PM	1	99	0	0	0	119	1	0	0	0	0	0	0	0	0	0	220	942
4:30 PM	3	118	0	0	0	144	0	0	0	0	0	0	0	0	0	0	265	924
4:45 PM	1	102	0	0	0	126	4	0	0	0	0	0	0	0	0	0	233	942
5:00 PM	1	105	0	0	0	95	0	0	0	0	0	0	0	0	0	0	201	919
5:15 PM	1	124	0	0	0	113	0	0	0	0	0	0	0	0	0	0	238	937
5:30 PM	0	107	0	0	0	106	1	0	0	0	0	0	0	0	0	0	214	886
5:45 PM	0	82	0	0	0	73	1	0	0	0	0	0	0	0	0	0	156	809

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	20	496	0	0	0	452	52	0	0	0	0	0	0	0	0	0	1020
Heavy Trucks	0	12	0		0	16	0		0	0	0		0	0	0		28
Buses	0	12	0		0	0	4		0	0	0		0	0	0		16
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:52 AM

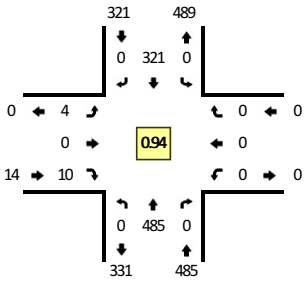
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

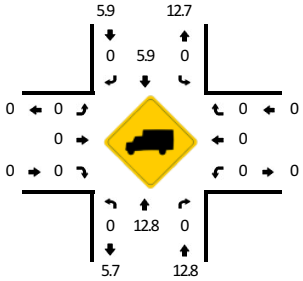
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

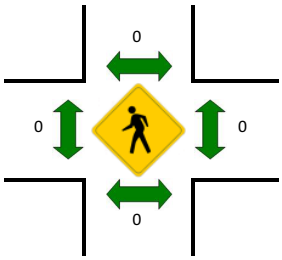
LOCATION: Rte 17 Bus -- Center Dwy
CITY/STATE: Warrenton, VA

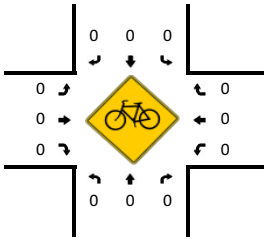
QC JOB #: 16218103
DATE: Tue, May 16 2023

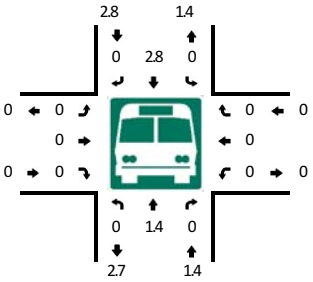
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

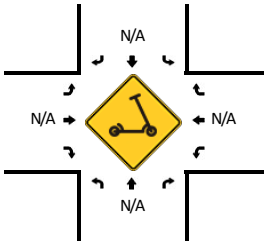












15-Min Count Period Beginning At	Rte 17 Bus (Northbound)				Rte 17 Bus (Southbound)				Center Dwy (Eastbound)				Center Dwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	25	0	0	0	25	1	0	0	0	0	0	0	0	0	0	51	
6:15 AM	0	26	0	0	0	26	0	0	2	0	0	0	0	0	0	0	54	
6:30 AM	0	53	0	0	0	37	1	0	0	0	2	0	0	0	0	0	93	
6:45 AM	0	72	0	0	0	60	0	0	0	0	1	0	0	0	0	0	133	331
7:00 AM	0	74	0	0	0	61	0	0	12	0	21	0	0	0	0	0	168	448
7:15 AM	0	113	0	0	0	58	0	0	28	0	31	0	0	0	0	0	230	624
7:30 AM	0	92	0	0	0	62	0	0	11	0	16	0	0	0	0	0	181	712
7:45 AM	0	128	0	0	0	73	0	0	0	0	3	0	0	0	0	0	204	783
8:00 AM	0	108	0	0	0	93	0	0	2	0	1	0	0	0	0	0	204	819
8:15 AM	0	129	0	0	0	86	0	0	2	0	2	0	0	0	0	0	219	808
8:30 AM	0	120	0	0	0	69	0	0	0	0	4	0	0	0	0	0	193	820
8:45 AM	0	99	0	0	0	79	0	0	1	0	2	0	0	0	0	0	181	797

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	516	0	0	0	344	0	0	8	0	8	0	0	0	0	0	876
Heavy Trucks	0	48	0		0	8	0		0	0	0		0	0	0		56
Buses	0	20	0		0	8	0		0	0	0		0	0	0		28
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

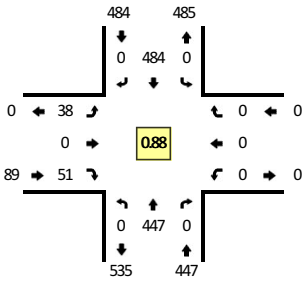
Report generated on 8/22/2023 10:52 AM

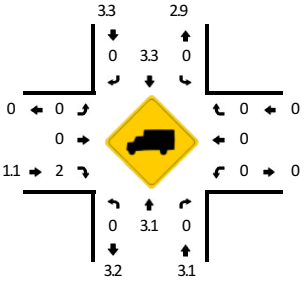
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

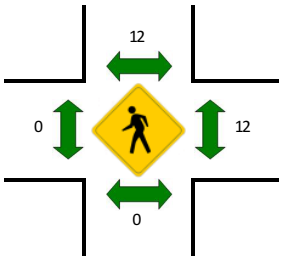
LOCATION: Rte 17 Bus -- Center Dwy | **QC JOB #:** 16218104
CITY/STATE: Warrenton, VA | **DATE:** Tue, May 16 2023

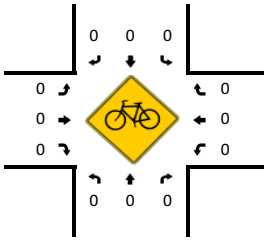
Peak-Hour: 2:00 PM -- 3:00 PM
Peak 15-Min: 2:30 PM -- 2:45 PM

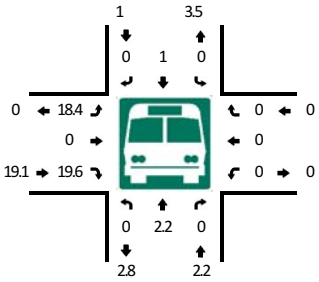


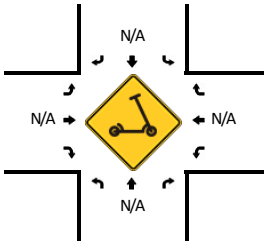


TRUE DATA TO IMPROVE MOBILITY









15-Min Count Period Beginning At	Rte 17 Bus (Northbound)				Rte 17 Bus (Southbound)				Center Dwy (Eastbound)				Center Dwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
2:00 PM	0	117	0	0	0	135	0	0	3	0	2	0	0	0	0	0	257	
2:15 PM	0	124	0	0	0	100	0	0	5	0	6	0	0	0	0	0	235	
2:30 PM	0	105	0	0	0	131	0	0	23	0	30	0	0	0	0	0	289	
2:45 PM	0	101	0	0	0	118	0	0	7	0	13	0	0	0	0	0	239	1020
3:00 PM	0	97	0	0	0	124	0	0	3	0	4	0	0	0	0	0	228	991
3:15 PM	0	97	0	0	0	120	0	0	2	0	3	0	0	0	0	0	222	978
3:30 PM	0	148	0	0	0	132	0	0	4	0	2	0	0	0	0	0	286	975
3:45 PM	0	97	0	0	0	101	0	0	3	0	4	0	0	0	0	0	205	941
4:00 PM	2	98	0	0	0	126	0	0	1	0	2	0	0	0	0	0	229	942
4:15 PM	0	103	0	0	0	118	0	0	0	0	6	0	0	0	0	0	227	947
4:30 PM	0	113	0	0	0	137	0	0	8	0	2	0	0	0	0	0	260	921
4:45 PM	0	96	0	0	0	133	0	0	4	0	0	0	0	0	0	0	233	949
5:00 PM	0	104	0	0	0	98	0	0	2	0	0	0	0	0	0	0	204	924
5:15 PM	0	124	0	0	0	112	1	0	1	0	1	0	0	0	0	0	239	936
5:30 PM	0	105	0	0	0	103	2	0	1	0	1	0	0	0	0	0	212	888
5:45 PM	0	83	0	0	0	75	0	0	0	0	1	0	0	0	0	0	159	814

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	420	0	0	0	524	0	0	92	0	120	0	0	0	0	0	1156
Heavy Trucks	0	8	0		0	28	0		0	0	0		0	0	0		36
Buses	0	8	0		0	8	0		8	0	20		0	0	0		44
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

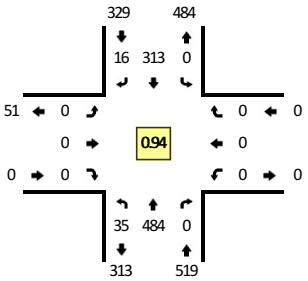
Comments:

Report generated on 8/22/2023 10:53 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Rte 17 Bus -- Eastern Dwy | **QC JOB #:** 16218105
CITY/STATE: Warrenton, VA | **DATE:** Tue, May 16 2023

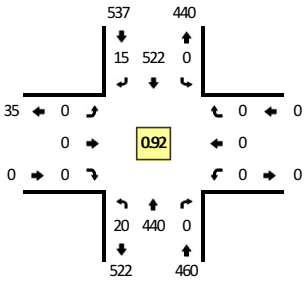
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 8:15 AM -- 8:30 AM


329
484
16
313
0
51
0
0
0

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Rte 17 Bus -- Eastern Dwy | **QC JOB #:** 16218106
CITY/STATE: Warrenton, VA | **DATE:** Tue, May 16 2023

Peak-Hour: 2:00 PM -- 3:00 PM
Peak 15-Min: 2:30 PM -- 2:45 PM


537
440
15
522
0
35
0
0
0

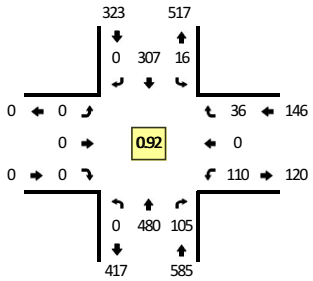
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

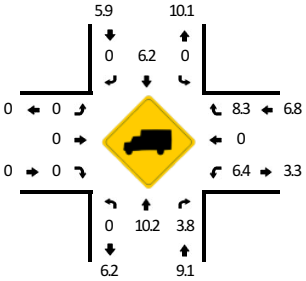
LOCATION: Rte 17 Bus -- Rte 15 Bus
CITY/STATE: Warrenton, VA

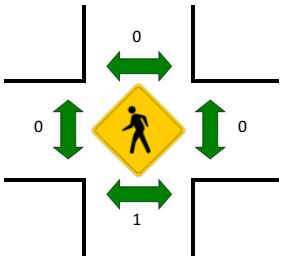
QC JOB #: 16218107
DATE: Tue, May 16 2023

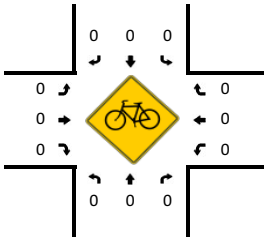
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

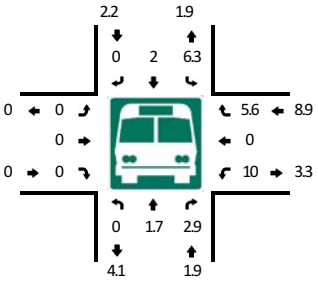


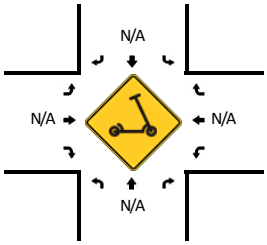
TRUE DATA TO IMPROVE MOBILITY











15-Min Count Period Beginning At	Rte 17 Bus (Northbound)				Rte 17 Bus (Southbound)				Rte 15 Bus (Eastbound)				Rte 15 Bus (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	25	4	0	1	22	0	0	0	0	0	0	6	0	0	0	58	
6:15 AM	0	24	3	1	2	22	0	0	0	0	0	0	8	0	1	0	61	
6:30 AM	0	54	10	0	1	32	0	0	0	0	0	0	4	0	2	0	103	
6:45 AM	0	72	14	0	1	55	0	0	0	0	0	0	10	0	5	0	157	379
7:00 AM	0	81	14	0	8	61	0	0	0	0	0	0	13	0	10	0	187	508
7:15 AM	0	99	14	0	11	72	0	0	0	0	0	0	10	0	13	0	219	666
7:30 AM	0	94	17	0	9	70	0	0	0	0	0	0	13	0	4	0	207	770
7:45 AM	0	124	24	0	9	63	0	0	0	0	0	0	26	0	12	0	258	871
8:00 AM	0	110	18	0	2	92	0	1	0	0	0	0	26	0	5	0	254	938
8:15 AM	0	129	30	0	1	83	0	0	0	0	0	0	36	0	6	0	285	1004
8:30 AM	0	117	33	0	3	69	0	0	0	0	0	0	22	0	13	0	257	1054
8:45 AM	0	95	15	1	12	66	0	0	0	0	0	0	15	0	6	0	210	1006

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	516	120	0	4	332	0	0	0	0	0	0	144	0	24	0	1140
Heavy Trucks	0	36	4		0	4	0		0	0	0		16	0	0		60
Buses	0	20	0		0	4	0		0	0	0		20	0	0		44
Pedestrians		4				0				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:53 AM

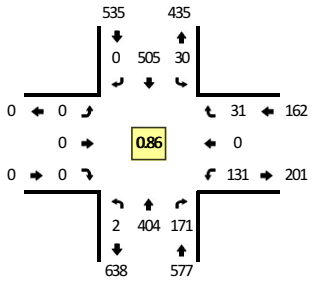
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

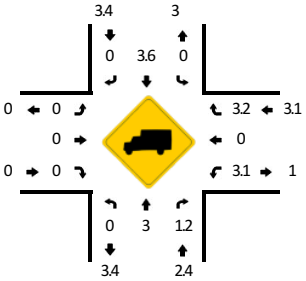
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Rte 17 Bus -- Rte 15 Bus
CITY/STATE: Warrenton, VA

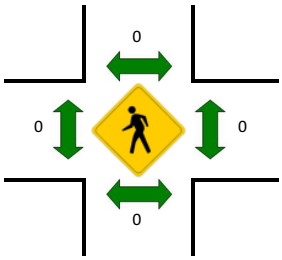
QC JOB #: 16218108
DATE: Tue, May 16 2023

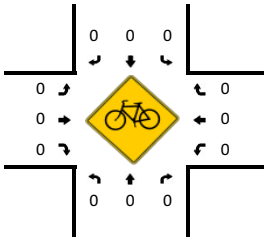
Peak-Hour: 2:45 PM -- 3:45 PM
Peak 15-Min: 3:30 PM -- 3:45 PM

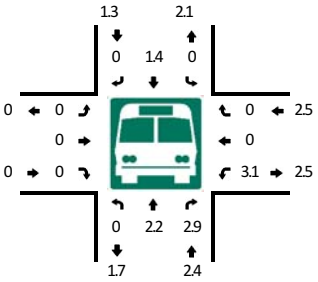


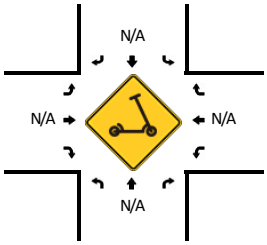


TRUE DATA TO IMPROVE MOBILITY









15-Min Count Period Beginning At	Rte 17 Bus (Northbound)				Rte 17 Bus (Southbound)				Rte 15 Bus (Eastbound)				Rte 15 Bus (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
2:00 PM	0	101	23	0	6	133	0	0	0	0	0	0	31	0	5	0	299	
2:15 PM	0	131	30	0	4	97	0	1	0	0	0	0	27	0	5	0	295	
2:30 PM	0	89	22	1	12	149	0	1	0	0	0	0	21	0	6	0	301	
2:45 PM	0	94	40	0	4	124	0	0	0	0	0	0	34	0	7	0	303	1198
3:00 PM	0	91	34	1	6	130	0	0	0	0	0	0	37	0	5	0	304	1203
3:15 PM	0	88	42	1	8	121	0	0	0	0	0	0	26	0	9	0	295	1203
3:30 PM	0	131	55	0	12	130	0	0	0	0	0	0	34	0	10	0	372	1274
3:45 PM	0	86	47	1	7	99	0	0	0	0	0	0	28	0	11	0	279	1250
4:00 PM	0	100	29	0	8	133	0	0	0	0	0	0	19	0	6	0	295	1241
4:15 PM	0	93	25	0	2	121	0	1	0	0	0	0	24	0	7	0	273	1219
4:30 PM	0	107	38	0	7	127	0	1	0	0	0	0	31	0	7	0	318	1165
4:45 PM	0	97	38	0	2	143	0	0	0	0	0	0	29	0	11	0	320	1206
5:00 PM	0	88	32	0	5	86	0	0	0	0	0	0	24	0	9	0	244	1155
5:15 PM	0	121	27	0	4	106	0	1	0	0	0	0	24	0	5	0	288	1170
5:30 PM	0	109	17	0	2	109	0	0	0	0	0	0	20	0	6	0	263	1115
5:45 PM	0	71	26	0	6	64	0	0	0	0	0	0	24	0	7	0	198	993

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	524	220	0	48	520	0	0	0	0	0	0	136	0	40	0	1488
Heavy Trucks	0	12	0		0	16	0		0	0	0		0	0	4		32
Buses	0	20	8		0	8	0		0	0	0		4	0	0		40
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

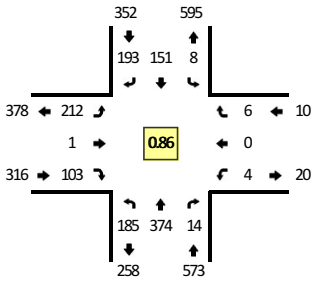
Report generated on 8/22/2023 10:53 AM

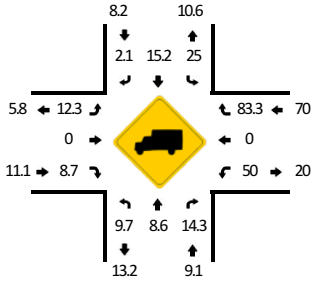
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

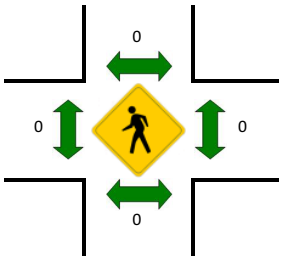
LOCATION: Rte 17 Bus -- Alwington Boulevard | **QC JOB #:** 16218109
CITY/STATE: Warrenton, VA | **DATE:** Tue, May 16 2023

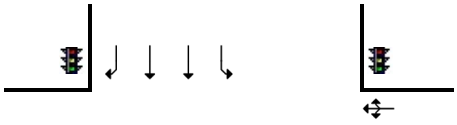
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

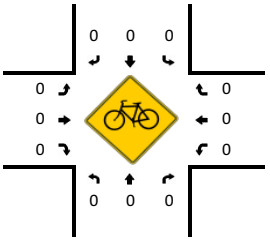


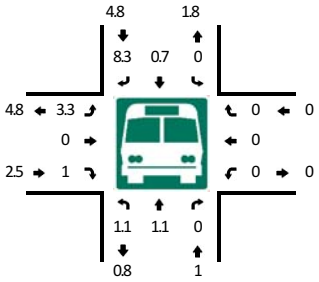


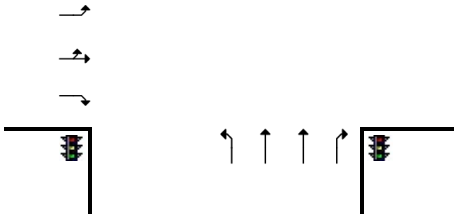
TRUE DATA TO IMPROVE MOBILITY

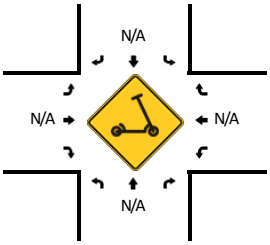












15-Min Count Period Beginning At	Rte 17 Bus (Northbound)				Rte 17 Bus (Southbound)				Alwington Boulevard (Eastbound)				Alwington Boulevard (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	12	23	3	0	1	17	6	0	3	0	9	0	3	0	2	0	79	
6:15 AM	11	28	0	0	0	19	5	0	4	0	6	0	2	0	0	0	75	
6:30 AM	17	54	0	0	0	15	13	0	12	0	11	0	2	0	0	0	124	
6:45 AM	26	96	3	0	2	25	16	0	12	1	10	0	0	0	1	0	192	470
7:00 AM	36	84	0	0	2	42	21	0	11	1	20	0	0	0	0	0	217	608
7:15 AM	37	101	1	0	1	41	26	1	18	0	15	0	0	0	0	0	241	774
7:30 AM	44	78	0	0	1	43	26	0	26	0	21	0	0	0	1	0	240	890
7:45 AM	47	131	5	0	1	32	40	0	32	0	17	0	2	0	0	0	307	1005
8:00 AM	43	86	3	0	4	40	47	1	31	0	12	0	0	0	3	0	270	1058
8:15 AM	45	88	3	0	0	41	71	2	74	0	41	0	0	0	0	0	365	1182
8:30 AM	50	69	3	0	0	38	35	0	75	1	33	0	2	0	3	0	309	1251
8:45 AM	33	74	1	0	1	34	26	1	34	0	24	0	1	0	0	0	229	1173

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	180	352	12	0	0	164	284	8	296	0	164	0	0	0	0	0	1460
Heavy Trucks	20	40	0		0	36	4		4	0	16		0	0	0		120
Buses	4	0	0		0	0	24		20	0	4		0	0	0		52
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

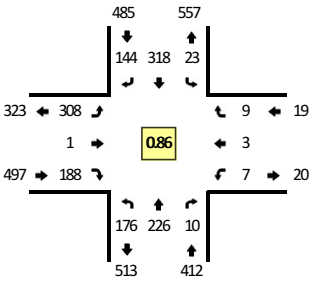
Comments:

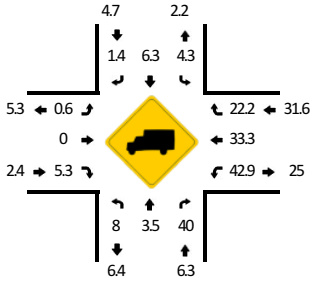
Report generated on 8/22/2023 10:53 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

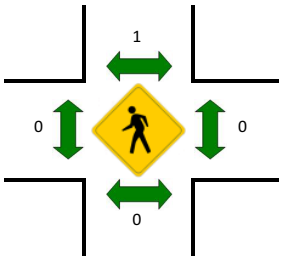
LOCATION: Rte 17 Bus -- Alwington Boulevard | **QC JOB #:** 16218110
CITY/STATE: Warrenton, VA | **DATE:** Tue, May 16 2023

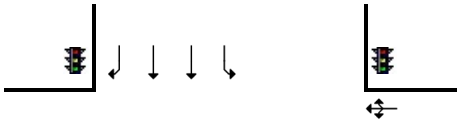
Peak-Hour: 2:45 PM -- 3:45 PM
Peak 15-Min: 3:30 PM -- 3:45 PM

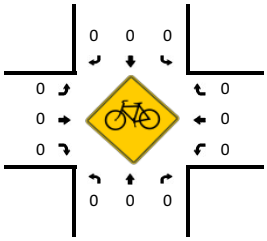


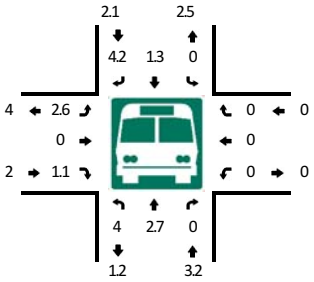


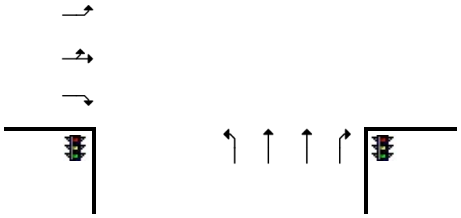
TRUE DATA TO IMPROVE MOBILITY

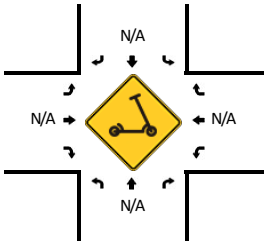












15-Min Count Period Beginning At	Rte 17 Bus (Northbound)				Rte 17 Bus (Southbound)				Alwington Boulevard (Eastbound)				Alwington Boulevard (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
2:00 PM	48	55	3	0	2	76	34	2	71	0	46	0	2	1	2	0	342	
2:15 PM	34	64	1	0	2	65	29	6	76	1	41	0	0	0	3	0	322	
2:30 PM	41	46	2	0	1	101	31	1	62	0	47	0	0	1	1	0	334	
2:45 PM	42	58	6	0	2	89	31	2	60	0	43	0	3	2	4	0	342	1340
3:00 PM	43	57	2	0	2	72	40	2	62	1	44	0	3	0	3	0	331	1329
3:15 PM	48	58	0	0	1	71	36	1	72	0	44	0	0	0	0	0	331	1338
3:30 PM	43	53	2	0	4	86	37	9	114	0	57	0	1	1	2	0	409	1413
3:45 PM	47	58	3	0	1	76	20	2	70	0	51	0	3	0	3	0	334	1405
4:00 PM	38	36	2	0	4	88	20	5	75	0	66	0	1	1	3	0	339	1413
4:15 PM	38	49	1	0	1	74	23	3	65	0	42	0	3	1	2	0	302	1384
4:30 PM	47	60	0	0	2	95	17	3	67	0	48	0	2	0	4	0	345	1320
4:45 PM	52	54	0	0	3	99	26	4	69	0	42	0	0	0	2	0	351	1337
5:00 PM	43	58	1	0	0	77	22	1	59	0	53	0	2	0	3	0	319	1317
5:15 PM	38	78	0	0	1	80	17	1	55	0	52	0	1	0	2	0	325	1340
5:30 PM	37	66	2	0	1	81	12	2	48	0	53	0	1	2	2	0	307	1302
5:45 PM	33	51	1	0	0	52	8	0	50	0	42	0	4	0	1	0	242	1193

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	172	212	8	0	16	344	148	36	456	0	228	0	4	4	8	0	1636
Heavy Trucks	24	4	4		4	16	0		4	0	4		4	0	0		64
Buses	12	4	0		0	0	12		24	0	4		0	0	0		56
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

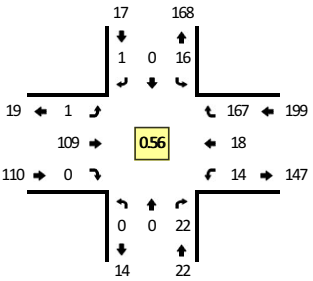
Comments:

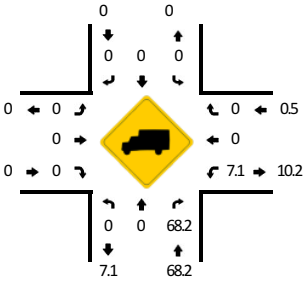
Report generated on 8/22/2023 10:53 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

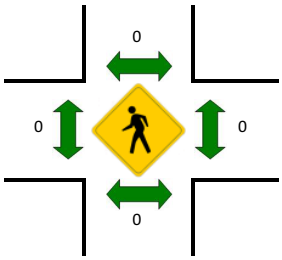
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

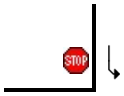
LOCATION: Elementary School Entrance -- Alwington Blvd | **QC JOB #:** 16218111
CITY/STATE: Warrenton, VA | **DATE:** Tue, May 16 2023

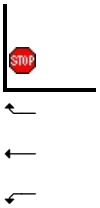
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

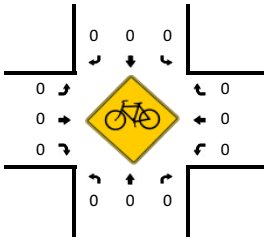


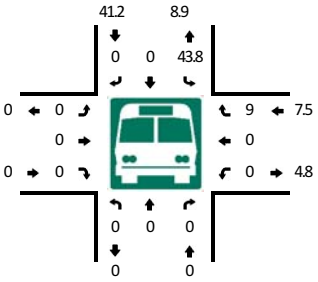


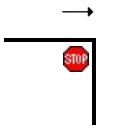


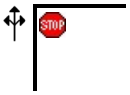


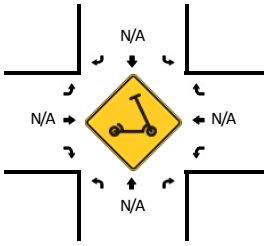












15-Min Count Period Beginning At	Elementary School Entrance (Northbound)				Elementary School Entrance (Southbound)				Alwington Blvd (Eastbound)				Alwington Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	0	0	0	3	0	0	0	0	2	0	0	0	2	2	0	9	
6:15 AM	0	0	0	0	2	0	0	0	0	0	0	0	3	1	2	0	8	
6:30 AM	0	0	0	0	3	0	0	0	0	0	0	0	1	0	3	0	7	
6:45 AM	0	0	0	0	2	0	0	0	0	0	0	0	19	2	1	0	24	48
7:00 AM	0	0	1	0	1	0	0	0	0	0	0	0	21	0	11	0	34	73
7:15 AM	0	0	6	0	6	0	0	0	0	1	0	0	21	1	11	0	46	111
7:30 AM	0	0	10	0	2	0	0	0	0	2	0	0	14	8	12	0	48	152
7:45 AM	0	0	12	0	3	0	0	0	0	1	0	0	3	7	31	0	57	185
8:00 AM	0	0	6	0	2	0	0	0	0	1	0	0	7	4	34	0	54	205
8:15 AM	0	0	2	0	8	0	1	0	0	65	0	0	2	6	72	0	156	315
8:30 AM	0	0	2	0	3	0	0	0	1	42	0	0	2	1	30	0	81	348
8:45 AM	0	0	4	0	3	0	0	0	0	7	0	0	5	1	8	0	28	319

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	8	0	32	0	4	0	0	260	0	0	8	24	288	0	624
Heavy Trucks	0	0	8		0	0	0		0	0	0		0	0	0		8
Buses	0	0	0		24	0	0		0	0	0		0	0	24		48
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

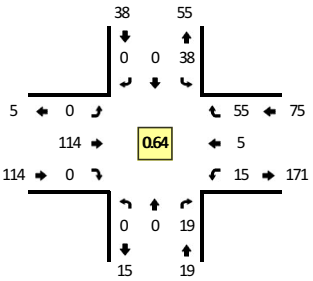
Comments:

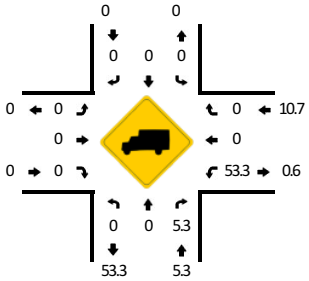
Report generated on 8/22/2023 10:53 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

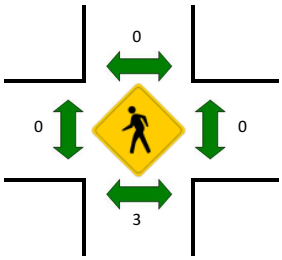
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

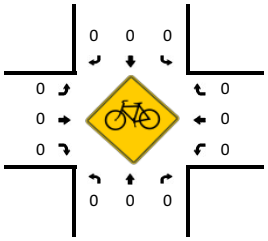
LOCATION: Elementary School Entrance -- Alwington Blvd | **QC JOB #:** 16218112
CITY/STATE: Warrenton, VA | **DATE:** Tue, May 16 2023

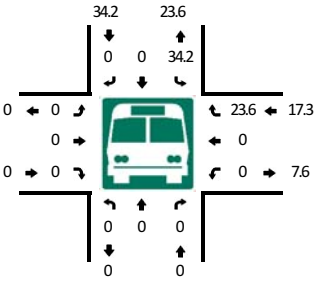
Peak-Hour: 3:15 PM -- 4:15 PM
Peak 15-Min: 3:30 PM -- 3:45 PM

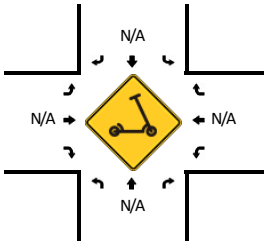












15-Min Count Period Beginning At	Elementary School Entrance (Northbound)				Elementary School Entrance (Southbound)				Alwington Blvd (Eastbound)				Alwington Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
2:00 PM	0	0	2	0	5	0	0	0	0	7	0	0	3	0	3	0	20	
2:15 PM	0	0	3	0	1	0	0	0	0	3	0	0	3	2	4	0	16	
2:30 PM	0	0	0	0	0	0	0	0	0	2	0	0	3	0	11	0	16	
2:45 PM	0	0	4	0	3	0	0	0	0	2	0	0	1	1	13	0	24	76
3:00 PM	0	0	5	0	1	0	0	0	0	1	0	0	4	1	19	0	31	87
3:15 PM	0	0	4	0	4	0	0	0	0	30	0	0	3	2	28	0	71	142
3:30 PM	0	0	4	0	8	0	0	0	0	57	0	0	6	1	20	0	96	222
3:45 PM	0	0	3	0	14	0	0	0	0	13	0	0	4	1	4	0	39	237
4:00 PM	0	0	8	0	12	0	0	0	0	14	0	0	2	1	3	0	40	246
4:15 PM	0	0	6	0	5	0	0	0	0	4	0	0	4	1	3	0	23	198
4:30 PM	0	0	6	0	6	0	0	0	0	7	0	0	3	2	5	0	29	131
4:45 PM	0	0	7	0	5	0	0	0	0	3	0	0	4	1	7	0	27	119
5:00 PM	0	0	8	0	6	0	0	0	0	5	0	0	5	0	4	0	28	107
5:15 PM	0	0	6	0	3	0	0	0	0	1	0	0	2	1	1	0	14	98
5:30 PM	0	0	5	0	3	0	0	0	0	1	0	0	1	0	5	0	15	84
5:45 PM	0	0	10	0	2	0	0	0	0	0	0	0	1	0	1	0	14	71

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	16	0	32	0	0	0	0	228	0	0	24	4	80	0	384
Heavy Trucks	0	0	0		0	0	0		0	0	0		20	0	0		20
Buses	0	0	0		32	0	0		0	0	0		0	0	20		52
Pedestrians		4				0				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:53 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

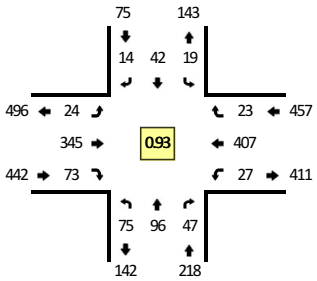
Type of peak hour being reported: Intersection Peak

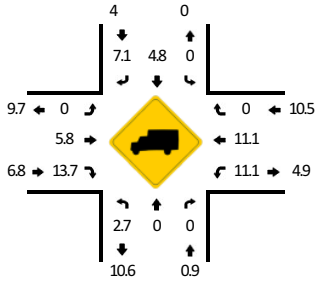
Method for determining peak hour: Total Entering Volume

LOCATION: Culpeper St -- W Shirley Ave
CITY/STATE: Warrenton, VA

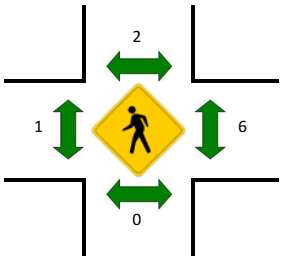
QC JOB #: 16218113
DATE: Thu, May 18 2023

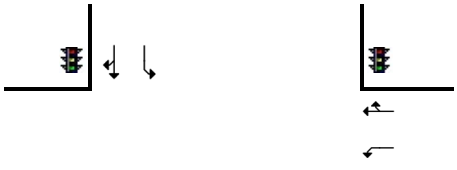
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

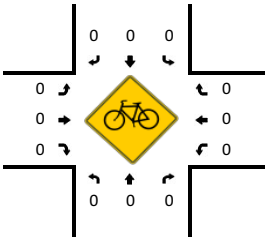


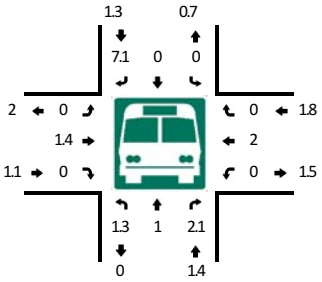


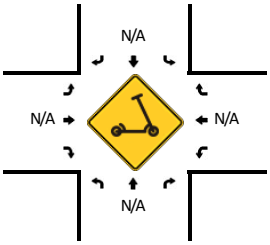
TRUE DATA TO IMPROVE MOBILITY











15-Min Count Period Beginning At	Culpeper St (Northbound)				Culpeper St (Southbound)				W Shirley Ave (Eastbound)				W Shirley Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	9	12	1	0	3	1	0	0	0	21	5	0	0	25	0	0	77	
6:15 AM	14	15	1	0	0	5	0	0	1	39	11	0	3	31	2	0	122	
6:30 AM	10	26	1	0	1	2	2	0	4	34	4	0	4	48	0	0	136	
6:45 AM	16	12	4	0	0	2	1	0	2	76	9	0	1	79	4	0	206	541
7:00 AM	17	21	9	0	4	6	4	0	5	65	11	0	1	79	2	0	224	688
7:15 AM	24	15	17	0	4	5	6	0	4	87	14	0	7	100	3	0	286	852
7:30 AM	14	21	6	0	3	4	5	0	7	69	17	0	7	94	6	0	253	969
7:45 AM	29	24	9	0	6	13	3	0	9	72	20	0	9	121	5	0	320	1083
8:00 AM	11	21	18	0	2	9	5	0	8	86	15	0	5	82	8	0	270	1129
8:15 AM	24	35	12	0	6	9	3	0	3	90	18	0	8	93	6	0	307	1150
8:30 AM	11	16	8	0	5	11	3	0	4	97	20	0	5	111	4	0	295	1192
8:45 AM	20	18	6	0	3	10	2	0	6	72	14	0	7	93	4	0	255	1127

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	116	96	36	0	24	52	12	0	36	288	80	0	36	484	20	0	1280
Heavy Trucks	4	0	0		0	4	0		0	16	4		0	64	0		92
Buses	4	0	0		0	0	0		0	4	0		0	0	0		8
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:53 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

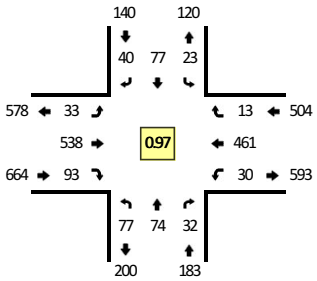
Type of peak hour being reported: Intersection Peak

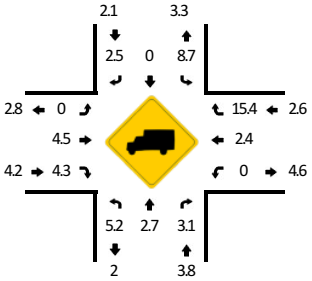
Method for determining peak hour: Total Entering Volume

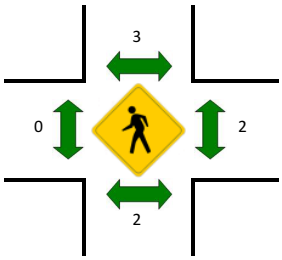
LOCATION: Culpeper St -- W Shirley Ave
CITY/STATE: Warrenton, VA

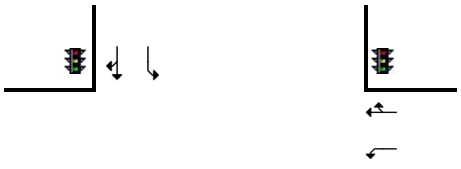
QC JOB #: 16218114
DATE: Thu, May 18 2023

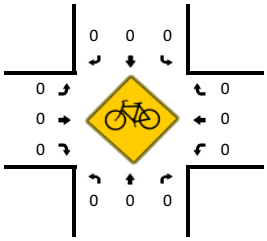
Peak-Hour: 3:00 PM -- 4:00 PM
Peak 15-Min: 3:00 PM -- 3:15 PM

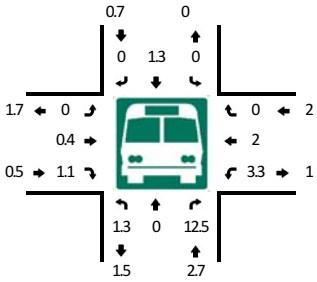


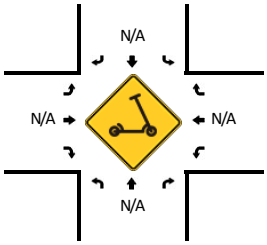












15-Min Count Period Beginning At	Culpeper St (Northbound)				Culpeper St (Southbound)				W Shirley Ave (Eastbound)				W Shirley Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
2:00 PM	24	15	12	0	5	15	9	0	5	113	18	0	3	123	1	0	343	
2:15 PM	17	24	6	0	5	12	6	0	5	124	28	0	7	110	1	0	345	
2:30 PM	19	21	6	0	9	10	3	0	8	113	22	0	14	131	5	0	361	
2:45 PM	24	11	6	0	7	9	7	0	15	104	17	0	9	97	4	0	310	1359
3:00 PM	16	19	12	0	4	21	12	0	8	137	23	0	6	125	3	0	386	1402
3:15 PM	24	20	8	0	9	17	9	0	9	152	19	0	5	98	3	0	373	1430
3:30 PM	22	17	4	0	5	15	8	0	10	130	16	0	13	116	2	0	358	1427
3:45 PM	15	18	8	0	5	24	11	0	6	119	35	0	6	122	5	0	374	1491
4:00 PM	19	18	8	0	6	19	8	0	8	130	25	0	4	115	5	0	365	1470
4:15 PM	21	15	9	0	8	29	3	0	8	105	29	0	7	92	3	0	329	1426
4:30 PM	18	16	8	0	17	19	12	0	14	129	37	0	8	106	1	0	385	1453
4:45 PM	22	17	4	0	5	34	3	0	9	115	40	0	10	107	0	0	366	1445
5:00 PM	21	14	10	0	5	24	5	0	7	112	30	0	9	130	2	0	369	1449
5:15 PM	21	16	6	0	7	32	5	0	7	92	35	0	4	102	1	0	328	1448
5:30 PM	16	16	7	0	5	23	3	0	4	110	31	0	8	91	1	0	315	1378
5:45 PM	14	13	10	0	4	13	7	0	3	100	22	0	6	111	3	0	306	1318

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	64	76	48	0	16	84	48	0	32	548	92	0	24	500	12	0	1544
Heavy Trucks	0	4	0		0	0	0		0	8	4		0	16	0		32
Buses	0	0	4		0	0	0		0	4	0		0	0	0		8
Pedestrians		0				8				0				0			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:53 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Appendix C
Traffic Signal Timings

15-17-29BusJames Madison&1105 Alwington

Phase Timing

9/1/2023 10:30:10 AM

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Min Green	7	12	7	7	7	12	0	0	0	0	0	0	0	0	0	0
Veh Ext	4.0	5.0	4.0	5.0	4.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Green 1	15	30	20	15	15	30	0	0	0	0	0	0	0	0	0	0
Max Green 2	15	30	20	15	15	30	0	0	0	0	0	0	0	0	0	0
Max Green 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Max Ext	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow	4.8	4.8	4.1	3.2	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Clr	3.9	3.9	4.7	3.1	3.9	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Adv Flash	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bike MG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sol DW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Early Wlk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Wlk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Added	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Initial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reduce After	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TTReduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Max Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Revert	4.0	4.0	4.0	4.0	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Neg Ped	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AP Disc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pmt Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pmt Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pmt Ped Clr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Return Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

15-17-29BusJames Madison&1105 Alwington

Phase Options

9/1/2023 10:30:10 AM

Phases	1-8								9-16							
Min Recalls		2	3			6										
Max Recalls																
Ped Recalls																
Soft Recall																
Dual Entry																
Red Rest																
Walk Rest																
Walk Expand																
Ped Recycle																
Sim Ped Term																
PC Thru Clr																
Guar Passage																
No Simult Gap																
Yel Lock		2				6										
Red Lock																
PhaseNext Lock	1	2	3	4	5	6										
No Term Call	1	2	3	4	5	6										
Cond Serv																
CS Enable																
Cond Reserve																
Reserve																
Veh Omit							7	8								
Ped Omit																
Perm Phase																
Protect Calls																
Protect Calls 2																
Flash Entry																
Flash Exit																
Flash Exit Yel																
Flash Exit Red																
Ped Scramble																
No Min Yel																
No Min Red Rev																
Max Scramble Walk																
Flash Yellow		2				6										
Flash FYA																
CNA 1																
CNA 2																

15-17-29BusJames Madison&1105 Alwington

Phase Startup Options

9/1/2023 10:30:10 AM

Startup Flash	0	Mode	Yel->Red
Startup All Red	0	Yellow	0.0

Phases	1-8							9-16							
Startup Phases		2				6										
Startup Yellow																
Startup Red																
Startup No Walk																
Startup Next																
Startup Yel Fls																
Startup FYA																
No Veh Call							7	8								
No Ped Call																

Phase Startup Timing

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Start Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Start Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Start Max Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Unit

Red Revert	4.0	Ped Protect	No	AdvFls in Flash	No

15-17-29BusJames Madison&1105 Alwington

Ring Sequence / Conflicting Phases

9/1/2023 10:30:10 AM

Ringgroup 1

Ring 1	1	2	3	4	0	0	0	0	0	0	0	0	0	0	0	0
Ring 2	5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ringgroup 2

Custom Sequences

Seq 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Conflicting Phases

	1-8							9-16							
Phase 1															
Phase 2															
Phase 3															
Phase 4															
Phase 5															
Phase 6															
Phase 7															
Phase 8															
Phase 9															
Phase 10															
Phase 11															
Phase 12															
Phase 13															
Phase 14															
Phase 15															
Phase 16															

15-17-29BusJames Madison&1105 Alwington

MCE Options

9/1/2023 10:30:10 AM

Phases	1-8								9-16							
MCE Ped Protect																
MCE Veh Call		2		4		6										
MCE Ped Call																
MCE Veh Omit																
MCE Ped Omit																
MCE Veh Sync		2		4		6										
MCE Ped Sync																
MCE Halt Don't Walk																

LRV Phases	1-8							
MCE LRV Term Early								

15-17-29BusJames Madison&1105 Alwington

FYA/FRA

9/1/2023 10:30:10 AM

FYA	1	2	3	4	5	6	7	8
Prot Phs	1	0	0	0	5	0	0	0
Opp Thru	2	0	0	0	6	0	0	0
Start Phs	0	0	0	0	0	0	0	0
Opp Ped	0	0	0	0	0	0	0	0
Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min FYA	3.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0
Skip Prot Red	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
Head Mode	FYA 1	FYA 1	FYA 1	FYA 1	FYA 1	FYA 1	FYA 1	FYA 1

Ped Hawk 1

Veh Phase	0		
Ped Phase	0		
Flash Yel	0.0	Dark Signal	Yes
Flash Delay	0.0	Flash Carryover	0.0
Green Mode	Normal		

Ped Hawk 2

Veh Phase	0		
Ped Phase	0		
Flash Yel	0.0	Dark Signal	Yes
Flash Delay	0.0	Flash Carryover	0.0
Green Mode	Normal		

Ped Hawk 3

Veh Phase	0		
Ped Phase	0		
Flash Yel	0.0	Dark Signal	Yes
Flash Delay	0.0	Flash Carryover	0.0
Green Mode	Normal		

Ped Hawk 4

Veh Phase	0		
Ped Phase	0		
Flash Yel	0.0	Dark Signal	Yes
Flash Delay	0.0	Flash Carryover	0.0
Green Mode	Normal		

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Overlap 2

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Min Green	0.0	Trail Green	0.0	Trail Green 2	0.0	Delay Green	0.0
Yellow	0.0	Red	0.0	Red Revert	0.0		
Walk	0	Ped Clearance	0	Solid DW	0.0	Early Wlk	0.0

Delay Wlk 0.0

Phases	1-8								9-16							
Parents			3													
Negative Green																
Start Next																
Trail Enable																
Trail Ena Next																
Trail Ena 2																
Trail Next 2																
Delay Enable																
Negative Veh																
Negative Ped																
Negative Olap																
Walk Rest																
Walk Thru																
Walk Halt																
Ped Recycle																
Overlap Start																
Overlap Ped Start																
Phase Calls																

Pmt Green	0	Walk	0	Ped Clr	0	
PP Phase	0	PP Delay	0.0			
Min FR	0.0	FR Hold	0.0	FR Delay	0.0	

LRV Start Enable

LRV Enable

Phases	1-8								9-16							
Perm Phases																
Prot Phases																
FR Ena Phases																
FR Grn Phases																
FR Ped Conf																
FR OLPed Conf																

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Coordination Options

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Sync Time	00:00	RTC Set Time	00:00
Transition Mode	Best 2	Ped Adjust	None
Trans Short %	20	Trans Long %	35
Offset Reference	Crd Grp End	Short Cycles	0
Dual Entry	Normal	Overlap F/O	Disabled
Master Sync Mode	RTC	Master Sync Length	0
Adapt Thresh	0	Adapt Step	0
External Plan Max	0		
Hardwire No Match	Sched	Hardwire Sync Fail	0
Override Omit/Recall	No		

Phases	1-8	9-16
No Trans Recall		
Trans Ped Recall		
Trans Phases		

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Hardwire Plans

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Hardwire	Plan Select							Pattern	Offset	Mode
Plan 1								0	0	Hardwire
Plan 2								0	0	Hardwire
Plan 3								0	0	Hardwire
Plan 4								0	0	Hardwire
Plan 5								0	0	Hardwire
Plan 6								0	0	Hardwire
Plan 7								0	0	Hardwire
Plan 8								0	0	Hardwire
Plan 9								0	0	Hardwire
Plan 10								0	0	Hardwire
Plan 11								0	0	Hardwire
Plan 12								0	0	Hardwire
Plan 13								0	0	Hardwire
Plan 14								0	0	Hardwire
Plan 15								0	0	Hardwire
Plan 16								0	0	Hardwire
Plan 17								0	0	Hardwire
Plan 18								0	0	Hardwire
Plan 19								0	0	Hardwire
Plan 20								0	0	Hardwire
Plan 21								0	0	Hardwire
Plan 22								0	0	Hardwire
Plan 23								0	0	Hardwire
Plan 24								0	0	Hardwire
Plan 25								0	0	Hardwire
Plan 26								0	0	Hardwire
Plan 27								0	0	Hardwire
Plan 28								0	0	Hardwire
Plan 29								0	0	Hardwire
Plan 30								0	0	Hardwire
Plan 31								0	0	Hardwire
Plan 32								0	0	Hardwire

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Soft Interconnect

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Mode	Slave	Remote Int Number	0
Yield Delay	0		
Yield Duration	0		
Permissive	0		
Local Hold Limit	0		

Phases	1-8	9-16
Local Control Phases		
Local Hold Phases		
Local Perm Phases		
Local Call Phases		
Remote Perm Phases		
Remote Hold Phases		

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Preempt Inputs

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Preempt Input	1	2	3	4	5	6	7	8	9	10
Delay	0	0	0	0	0	0	0	0	0	0
Checkout Limit	0	0	0	0	0	0	0	0	0	0
Locked	No	No	No	No	No	No	No	No	No	No
Interlock	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
Input Number	0	0	0	0	0	0	0	0	0	0
Input Priority	All	All	All	All	All	All	All	All	All	All
Delay Mode	Inp	Inp	Inp	Inp	Inp	Inp	Inp	Inp	Inp	Inp

Preempt Priority

Preempt	1	2	3	4	5	6	7	8	9	10
Priority	0	0	0	0	0	0	0	0	0	0

Remote Preemption

Remote Preempt	RM 1	RM 2	RM 3	RM 4	RM 5	RM 6	RM 7	RM 8
Int Number	0	0	0	0	0	0	0	0
PE Number	0	0	0	0	0	0	0	0
Mode	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis
Slack	0	0	0	0	0	0	0	0
Travel Time	0	0	0	0	0	0	0	0
Alt TT 1	0	0	0	0	0	0	0	0
Alt TT 2	0	0	0	0	0	0	0	0
Alt TT 3	0	0	0	0	0	0	0	0
Alt TT 4	0	0	0	0	0	0	0	0
Alt TT 5	0	0	0	0	0	0	0	0
Alt TT 6	0	0	0	0	0	0	0	0
Alt TT 7	0	0	0	0	0	0	0	0

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Preempt 1 (Configuration)

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Enabled	No	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs		

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 1 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases		
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases		
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	0	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	0	Min Duration	0
Dwell Extend	0		
Max Dwell	0	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA		

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Preempt 2 (Configuration)

9/1/2023 10:30:10 AM

Enabled	Yes	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs	2	

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 2 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases	2 5	
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases	2 6	
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	5	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	5	Min Duration	0
Dwell Extend	0		
Max Dwell	180	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA	1	

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Preempt 3 (Configuration)

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Enabled	Yes	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs	3	

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 3 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases	3	
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases	2 6	
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	5	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	5	Min Duration	0
Dwell Extend	0		
Max Dwell	180	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA		

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Preempt 4 (Configuration)

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Enabled	Yes	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs	4	

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 4 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases	4	
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases	2 6	
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	5	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	5	Min Duration	0
Dwell Extend	0		
Max Dwell	180	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA		

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Preempt 5 (Configuration)

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Enabled	Yes	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs	5	

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 5 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases	1, 6	
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases	2, 6	
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	5	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	5	Min Duration	0
Dwell Extend	0		
Max Dwell	180	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA	5	

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Preempt 6 (Configuration)

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Enabled	No	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs		

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 6 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases		
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases		
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	0	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	0	Min Duration	0
Dwell Extend	0		
Max Dwell	0	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA		

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Preempt 7 (Configuration)

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Enabled	No	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs		

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 7 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases		
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases		
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	0	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	0	Min Duration	0
Dwell Extend	0		
Max Dwell	0	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA		

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Preempt 8 (Configuration)

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Enabled	No	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs		

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 8 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases		
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases		
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	0	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	0	Min Duration	0
Dwell Extend	0		
Max Dwell	0	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA		

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Preempt 9 (Configuration)

9/1/2023 10:30:10 AM

Enabled	No	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs		

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 9 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases		
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases		
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	0	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	0	Min Duration	0
Dwell Extend	0		
Max Dwell	0	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA		

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Preempt 10 (Configuration)

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Enabled	No	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs		

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 10 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases		
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases		
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	0	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	0	Min Duration	0
Dwell Extend	0		
Max Dwell	0	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA		

15-17-29BusJames Madison&1105 Alwington

9/1/2023 10:30:10 AM

Preempt 1 (Delay)

Delay Mode: Normal

Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

Preempt 2 (Delay)

Delay Mode: Normal

Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

Preempt 3 (Delay)

Delay Mode: Normal

Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

15-17-29BusJames Madison&1105 Alwington

9/1/2023 10:30:10 AM

Preempt 4 (Delay)

Delay Mode: Normal

Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

Preempt 5 (Delay)

Delay Mode: Normal

Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

Preempt 6 (Delay)

Delay Mode: Normal

Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

15-17-29BusJames Madison&1105 Alwington

Preempt 7 (Delay)

9/1/2023 10:30:10 AM

Delay Mode: Normal

Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

Preempt 8 (Delay)

Delay Mode: Normal

Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

Preempt 9 (Delay)

Delay Mode: Normal

Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

15-17-29BusJames Madison&1105 Alwington

Preempt 10 (Delay)

9/1/2023 10:30:10 AM

Delay Mode: Normal

Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

15-17-29BusJames Madison&1105 Alwington

TOD Pattern Events

9/1/2023 10:30:10 AM

	Time	DOW							Holidays								Mode	Pattern	Offset
Event 1	00:00																Sched	0	0
Event 2	00:00																Sched	0	0
Event 3	00:00																Sched	0	0
Event 4	00:00																Sched	0	0
Event 5	00:00																Sched	0	0
Event 6	00:00																Sched	0	0
Event 7	00:00																Sched	0	0
Event 8	00:00																Sched	0	0
Event 9	00:00																Sched	0	0
Event 10	00:00																Sched	0	0
Event 11	00:00																Sched	0	0
Event 12	00:00																Sched	0	0
Event 13	00:00																Sched	0	0
Event 14	00:00																Sched	0	0
Event 15	00:00																Sched	0	0
Event 16	00:00																Sched	0	0
Event 17	00:00																Sched	0	0
Event 18	00:00																Sched	0	0
Event 19	00:00																Sched	0	0
Event 20	00:00																Sched	0	0
Event 21	00:00																Sched	0	0
Event 22	00:00																Sched	0	0
Event 23	00:00																Sched	0	0
Event 24	00:00																Sched	0	0
Event 25	00:00																Sched	0	0
Event 26	00:00																Sched	0	0
Event 27	00:00																Sched	0	0
Event 28	00:00																Sched	0	0
Event 29	00:00																Sched	0	0
Event 30	00:00																Sched	0	0
Event 31	00:00																Sched	0	0
Event 32	00:00																Sched	0	0

15-17-29BusJames Madison&1105 Alwington

Holidays

9/1/2023 10:30:10 AM

	Active Holidays								Month	Day	DOW							WOM
Date 1									0	0								0
Date 2									0	0								0
Date 3									0	0								0
Date 4									0	0								0
Date 5									0	0								0
Date 6									0	0								0
Date 7									0	0								0
Date 8									0	0								0
Date 9									0	0								0
Date 10									0	0								0
Date 11									0	0								0
Date 12									0	0								0
Date 13									0	0								0
Date 14									0	0								0
Date 15									0	0								0
Date 16									0	0								0
Date 17									0	0								0
Date 18									0	0								0
Date 19									0	0								0
Date 20									0	0								0
Date 21									0	0								0
Date 22									0	0								0
Date 23									0	0								0
Date 24									0	0								0
Date 25									0	0								0
Date 26									0	0								0
Date 27									0	0								0
Date 28									0	0								0
Date 29									0	0								0
Date 30									0	0								0
Date 31									0	0								0
Date 32									0	0								0

15-17-29BusJames Madison&1105 Alwington

Control / Config

9/1/2023 10:30:10 AM

Pattern Mode	Free					
Manual Pattern	0	Manual Offset	0			
Stop Time Input	Enabled					
Aux Switch	None		0			
DLS Mode	D4	Time Zone	Est (UTC-5)	GPS Thresh	0	
Password Timeout	5					

	1-8	9-16
Maint Phs Recalls		
Maint Ped Recalls		

Serial 1 Port Configuration

Broadcast Plan/Sync	Disabled	Broadcast Time	00:00
Serial Rebroadcast	Disabled	Response	None

Serial 2 Port Configuration

Broadcast Plan/Sync	Disabled	Broadcast Time	00:00

Ethernet Port Configuration

Broadcast Plan/Sync	Disabled	Broadcast Time	00:00
Serial Rebroadcast	Disabled		

Peer Configuration

Peer 1	0
Peer 2	0
Peer 3	0
Peer 4	0
Peer 5	0
Peer 6	0
Peer 7	0
Peer 8	0

Programmed EPAC Data

11/23/20
2:09:23PM

Intersection Name: Culpeper & E.Shirley **Intersection Alias:** culesh

Access Code: 9999 Channel: 1 Address: 7 Revision: 3.33b

Access Data

Port 2 Comm :19200 Baud
Port 3 Comm :1200 Baud

Phase Data

Vehical Basic Timings

Phase	Min_Grn	Passage	Max1	Max2	Yellow	All Red
1	8	4.0	30	30	4.0	2.0
2	30	4.0	45	50	4.0	2.0
3	8	4.0	30	30	4.0	2.0
4	8	4.0	30	50	4.0	2.0
5	8	4.0	30	30	4.0	2.0
6	30	4.0	45	50	4.0	2.0

Vehical Density Timings

Added Initial	Max_Initial	Time B4 Reduction	Cars Before	Time To Reduce	Min_Gap
0.0	0	0	0	0	0.0
0.0	0	0	0	0	0.0
0.0	0	0	0	0	0.0
0.0	0	0	0	0	0.0
0.0	0	0	0	0	0.0
0.0	0	0	0	0	0.0

Pedestrian Timing

Phase	Walk	Ped Clear	Flashing Walk	Extended Actuated Ped Clear	Rest in Walk
1	0	0	No	0	No
2	0	0	No	0	No
3	7	12	No	0	No
4	7	12	No	0	No
5	0	0	No	0	No
6	7	12	No	0	No

General Control

Initialize	Non-Act Response	Veh Recall	Ped Recall	Recall Delay
Inactive	None	Min	None	0
Green	NonActI	Min	None	0
Inactive	None	None	None	0
Inactive	NonActII	None	None	0
Inactive	None	None	None	0
Green	NonActI	Min	None	0

Miscellaneous

Non Lock	Dual Entry	Last Car Passage	Conditional Service	No Simultaneous Gap Out
Yes	No	No	No	No
No	No	No	No	No
No	No	No	No	No
No	No	No	No	No
Yes	No	No	No	No
No	No	No	No	No

Special Sequence
Default Data

Vehical Detector Phase Assignment

Assigned Phase	Mode	Switched Phase	Extend	Delay

Default Data

Pedestrian Detector
Default Data

Special Detector Phase Assignment

Assign Phase	Mode	Switched Phase	Extend	Delay

:
Default Data

Unit Data

General Control

Startup Time: 5sec Startup State: Flash Red Revert: 4sec
Auto Ped Clear: No Stop Time Reset: No Alternate Sequence: 0
ABC connector Input Modes: 0
ABC connector Output Modes: 0
D connector Input Modes: 0
D connector Output Modes: 0

Ring	Input Respons	Output Selection
1	Ring 1	Ring 1
2	Ring 2	Ring 2
3	None	None
4	None	None

Remote Flash
Test A = Flash

Phase	Flash Entry Phase	Flash Exit Phase

Default Data - No Flash

Channel	Flash Color	Flash Alternat

Default Data - No Flash

Overlaps

Overlaps

Phase(s)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Trail Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trail Yellow	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Trail Red	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Plus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring

Phase	Ring	Next Phase
1	1	2
2	1	3
3	1	4
4	1	1
5	2	6
6	2	7

Phase(s)

Concurrent Phases	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	1	2	3	4	1	1	3	3	9	10	11	12	13	14	15	16
	5	5	7	7	2	2	4	4								
	6	6	8	8	5	6	7	8								

Alternate Sequences

Alternate Sequences

No Alternate Sequences

Port 1 Data

BIU Addr	Port Status	Message 40

Default Data

Phase Pair(s)

Channel Assignment

Control	Channel	Hardware Pin Set		Control	Channel	Hardware Pin Set		Control	Channel	Hardware Pin Set	
Ph.1 Veh	1	1 - Ph.1 RYG	1	Ph.2 Veh	2	2 - Ph.2 RYG	2	Ph.3 Veh	3	3 - Ph.3 RYG	3
Ph.4 Veh	4	4 - Ph.4 RYG	4	Ph.5 Veh	5	5 - Ph.5 RYG	5	Ph.6 Veh	6	6 - Ph.6 RYG	6
Ph.7 Veh	7	7 - Ph.7 RYG	7	Ph.8 Veh	8	8 - Ph.8 RYG	8	Ph.2 Ped	9	10 - Ph.2 DPW	10
Ph.4 Ped	10	12 - Ph.4 DPW	12	Ph.6 Ped	11	14 - Ph.6 DPW	14	Ph.8 Ped	12	16 - Ph.8 DPW	16
Ph.1 OLP	13	17 - Ph.1 RYG	17	Ph.2 OLP	14	18 - Ph.2 RYG	18	Ph.3 OLP	15	19 - Ph.3 RYG	19
Ph.4 OLP	16	20 - Ph.4 RYG	20	Ph.1 Ped	17	9 - Ph.1 DPW	9	Ph.3 Ped	18	11 - Ph.3 DPW	11
Ph.5 Ped	19	13 - Ph.5 DPW	13	Ph.7 Ped	20	15 - Ph.7 DPW	15				

Coordination Data

Dial/Split	Cycle
/	

General Coordination Data

Operation Mode: 0=Free
Coordination Mode: 0=Permissive
Maximun Mode: 2=Max 2
Correction Mode: 0=Dwell

Offset Mode: 0=Beg Grn
Force Mode: 0=Plan
Max Dwell Time: 0
Yield Period: 0

Manual Dial: 1
Manual Split: 1
Manual Offset: 1

Split Times and Phase Mode:

Dial / Split

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode

Traffic Plan Data

Plan: // Offset Time: Alt. Sequence: Mode: Rg 2 Lag Time: Rg 3 Lag Time: Rg 4 Lag Time:

Local TBC Data

Start of Daylight Saving Month: 0 Week: 0 Cycle Zero Reference Hours: 0 Min: 0

End of Daylight Saving Month: 0 Week: 0

Source Day	Equate Days 1	2	3	4	5	6	7

Traffic Data

Event	Day	Time :	D/S/O //	flash	PHASE FUNCTION 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

AUX. Events

Event	Program Day	Hour	Min.	Aux 1	Ouputs 2	3	Det. Diag. D1	Det. Rpt. D2	Det. Mult100 D3	Dimming	Special Function Outputs 1	2	3	4	5	6	7	8
				☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Default Data - No Special Day(s) or Week(s) Programmed

Special Functions

Function	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8
Special Function 1	X							
Special Function 2		X						
Special Function 3			X					
Special Function 4				X				
Special Function 5					X			
Special Function 6						X		
Special Function 7							X	
Special Function 8								X

Phase Function

Phase Function Map	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 1 Max2	X															
Phase 2 Max2		X														
Phase 3 Max2			X													
Phase 4 Max2				X												
Phase 5 Max2					X											
Phase 6 Max2						X										
Phase 7 Max2							X									
Phase 8 Max2								X								
Phase 1 Phase Omit									X							
Phase 2 Phase Omit										X						
Phase 3 Phase Omit											X					
Phase 4 Phase Omit												X				
Phase 5 Phase Omit													X			
Phase 6 Phase Omit														X		
Phase 7 Phase Omit															X	
Phase 8 Phase Omit																X

Dimming Data

Channel	Red	Yellow	Green	Alternate
	☐	☐	☐	☐

Default Data - No Dimming Programmed

Preemption Data

General Preemption Data

Ring	Min Grn/Walk Time
1	10
2	10
3	10
4	10

Flash > Preepmt 1 | Preepmt 2 = Preempt 3 | Preepmt 4 = Preempt 5
Preepmt 1 > Preempt 2 | Preepmt 3 = Preempt 4 | Preepmt 5 = Preempt 6

Preempt Timers

Preempt	Non-Locking	Link to Preempt	Delay	Extend	Duration	MaxCall	Lock-Out	Select: Ped Clear	Select: Yel	Select: Red	Track: Grn	Track: Ped	Track: Yel	Track: Red	Dwell Green	Return: Ped Clear	Return: Yel	Return: Red
1	No	0	0	0	0	0	0	0	0.0	0.0	0	0	0.0	0.0	6	0	0.0	0.0
2	No	0	0	0	0	0	0	0	0.0	0.0	0	0	0.0	0.0	6	0	0.0	0.0
3	No	0	0	0	0	0	0	0	0.0	0.0	0	0	0.0	0.0	6	0	0.0	0.0
4	No	0	0	0	0	0	0	0	0.0	0.0	0	0	0.0	0.0	6	0	0.0	0.0
5	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0
6	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0

Preempt 1

Phase	Exit Phase	Exit Calls
1	No	Yes
2	Yes	No
6	Yes	Yes

Preempt 2

Phase	Exit Phase	Exit Calls
2	Yes	No
4	No	Yes
6	Yes	No

Preempt 3

Phase	Exit Phase	Exit Calls
2	Yes	Yes
5	No	Yes
6	Yes	No

Preempt 4

Phase	Exit Phase	Exit Calls
2	Yes	No
3	No	Yes
6	Yes	No

Preempt 5

Phase	Exit Phase	Exit Calls
1	No	Yes
2	No	Yes
3	No	Yes
4	No	Yes
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes

Preempt 6

Phase	Exit Phase	Exit Calls
1	No	Yes
2	No	Yes
3	No	Yes
4	No	Yes
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes

Priority Timers

Priority	Non-Locking	Delay	Extend	Duration	Dwell	Max_Call	Lock-Out	Skip Phases
1	No	0	0	0	0	0	0	0=Do not Skip Phases
2	No	0	0	0	0	0	0	0=Do not Skip Phases
3	No	0	0	0	0	0	0	0=Do not Skip Phases
4	No	0	0	0	0	0	0	0=Do not Skip Phases
5	No	0	0	0	0	0	0	0=Do not Skip Phases
6	No	0	0	0	0	0	0	0=Do not Skip Phases

Priority 1

Phase	Exit Phase	Exit Calls

Priority 2

Phase	Exit Phase	Exit Calls

Priority 3

Phase	Exit Phase	Exit Calls

Priority 4

Phase	Exit Phase	Exit Calls

Priority 5

Phase	Exit Phase	Exit Calls

Priority 6

Phase	Exit Phase	Exit Calls

Preempt 1

Vehical Phases

Ph.	Track	Dwell	Cycle
1	Red	Green	No
6	Red	Green	No

Pedestrian Phases

Ph	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp	Track	Dwell	Cycle

Default Data

Preempt 2

Vehical Phases

Ph.	Track	Dwell	Cycle
4	Red	Green	No

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle

Default Data

Preempt 3

Vehical Phases

Ph.	Track	Dwell	Cycle
2	Red	Green	No
5	Red	Green	No

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle

Default Data

Preempt 4

Vehical Phases

Ph.	Track	Dwell	Cycle
3	Red	Green	No

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle

Default Data

Preempt 5

Vehical Phases

Ph.	Track	Dwell	Cycle

Default Data

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle

Default Data

Preempt 6

Vehical Phases

Ph.	Track	Dwell	Cycle

Default Data

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle

Default Data

System/Detectors Data

Local Critical Alarms

Revert to Backup: 15 1st Phone:

Local Free: No Cycle Failure: No Coord Failure: No Conflict Flash: No Remote Flash: No 2nd Phone:

Local Fash: No Cycle Fault: No Coord Fault: No Premption: No Voltage Monitor: No

Special Status 1: No Special Status 2: No Special Status 3: No Special Status 4: No Special Status 5: No Special Status 6: No

Traffic Responsive

System Detector	Detector Channel	Veh/Hr	Average Time(mins)	Occupancy Correction/10	Min Volume %	Queue 1 Detectors	System Detectors	Weight Factor	Queue 2 Detectors	System Detectors	Weight Factor

Default Data

Sample Interval:

Default Data

Queue: 1 Input Selection: 0=Average

Detector Failed Level : 0

Queue: 2 Input Selection: 0=Average

Detector Failed Level : 0

Default Data

Queue:

Level	Enter	Leave	Dial / Split / Offset
			/ /

Default Data

Vehical Detector

Diagnostic Value 0

Detector	Max Presence	No Activity	Erratic Count

Default Data - Diag 0 Values

Vehical Detector

Diagnostic Value 1

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 1 Values

Special Detector

Diagnostic Value 0

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 0 Valu

Pedestrian Detector

Diagnostic Value 0

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 0 Values

Pedestrian Detector

Diagnostic Value 1

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 1 Values

Special Detector

Diagnostic Value 1

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 1 Values

Speed Trap Data

Speed Trap:

Measurement:

Detector 1	Detector_2	Distance :

Speed Trap Low Treshold	Speed Trap High Treshold

Dial/Split/Offset

//

Default Data

Default Data

Volume Detector Data

Report Interval

Volume Detector Number	Controller Detector Channel

Default Data

Appendix D
Existing Analysis Worksheets

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	5	0	45	20	88	0	0	34	13	0	0
Future Vol, veh/h	0	5	0	45	20	88	0	0	34	13	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	0	0	24	0	7	0	0	65	8	0	0
Mvmt Flow	0	6	0	50	22	98	0	0	38	14	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

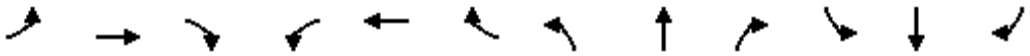
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.3	7.8	6.9	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	69%	0%	100%
Vol Thru, %	0%	100%	31%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	34	5	65	88	13
LT Vol	0	0	45	0	13
Through Vol	0	5	20	0	0
RT Vol	34	0	0	88	0
Lane Flow Rate	38	6	72	98	14
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.039	0.007	0.107	0.106	0.019
Departure Headway (Hd)	3.718	4.215	5.35	3.895	4.675
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	969	840	671	920	770
Service Time	1.719	2.285	3.073	1.617	2.676
HCM Lane V/C Ratio	0.039	0.007	0.107	0.107	0.018
HCM Control Delay	6.9	7.3	8.7	7.1	7.8
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0	0.4	0.4	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	32	357	75	32	476	238	17	57
v/c Ratio	0.17	0.56	0.11	0.20	0.64	0.69	0.09	0.29
Control Delay	40.8	27.6	0.3	42.9	29.3	43.4	38.7	30.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	27.6	0.3	42.9	29.3	43.4	38.7	30.3
Queue Length 50th (ft)	17	163	0	17	239	116	9	19
Queue Length 95th (ft)	45	260	0	47	#424	207	29	55
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	409	853	821	157	745	399	397	396
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.42	0.09	0.20	0.64	0.60	0.04	0.14

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)	28	314	66	28	397	22	78	81	50	15	31	19
Future Volume (vph)	28	314	66	28	397	22	78	81	50	15	31	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99			0.97		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1823	1761	1539	1667	1720			1736		1769	1690	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1823	1761	1539	1667	1720			1736		1769	1690	
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)	32	357	75	32	451	25	89	92	57	17	35	22
RTOR Reduction (vph)	0	0	46	0	1	0	0	10	0	0	20	0
Lane Group Flow (vph)	32	357	29	32	475	0	0	228	0	17	37	0
Heavy Vehicles (%)	0%	9%	6%	11%	13%	0%	6%	2%	4%	0%	3%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	5.0	34.1	34.1	8.1	37.2			16.5		7.0	7.0	
Effective Green, g (s)	5.0	34.1	34.1	8.1	37.2			16.5		7.0	7.0	
Actuated g/C Ratio	0.06	0.38	0.38	0.09	0.41			0.18		0.08	0.08	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	101	669	585	150	713			319		138	131	
v/s Ratio Prot	0.02	0.20		c0.02	c0.28			c0.13		0.01	c0.02	
v/s Ratio Perm			0.02									
v/c Ratio	0.32	0.53	0.05	0.21	0.67			0.72		0.12	0.28	
Uniform Delay, d1	40.7	21.6	17.6	37.8	21.2			34.4		38.5	39.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	2.5	1.0	0.0	1.0	2.6			7.9		0.5	1.6	
Delay (s)	43.2	22.7	17.6	38.8	23.8			42.3		39.0	40.6	
Level of Service	D	C	B	D	C			D		D	D	
Approach Delay (s)		23.3			24.8			42.3			40.2	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	89.7	Sum of lost time (s)	24.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	295	37	48	431	0	0
Future Volume (Veh/h)	295	37	48	431	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	324	41	53	474	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			365		904	324
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			365		904	324
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			95		100	100
cM capacity (veh/h)			1135		295	722

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	324	41	53	474
Volume Left	0	0	53	0
Volume Right	0	41	0	0
cSH	1700	1700	1135	1700
Volume to Capacity	0.19	0.02	0.05	0.28
Queue Length 95th (ft)	0	0	4	0
Control Delay (s)	0.0	0.0	8.3	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.8	
Approach LOS				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	286	0	0	441	41	51
Future Volume (Veh/h)	286	0	0	441	41	51
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	321	0	0	496	46	57
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			321		817	321
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			321		817	321
tC, single (s)			4.1		6.6	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.4
p0 queue free %			100		86	92
cM capacity (veh/h)			1250		327	689

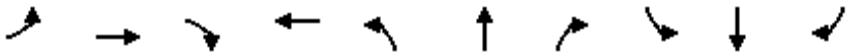
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	321	496	46	57
Volume Left	0	0	46	0
Volume Right	0	0	0	57
cSH	1700	1700	327	689
Volume to Capacity	0.19	0.29	0.14	0.08
Queue Length 95th (ft)	0	0	12	7
Control Delay (s)	0.0	0.0	17.8	10.7
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	13.9	
Approach LOS			B	

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	322	17	24	439	0	0
Future Volume (Veh/h)	322	17	24	439	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	339	18	25	462	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			357		851	339
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			357		851	339
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	100
cM capacity (veh/h)			1213		327	708

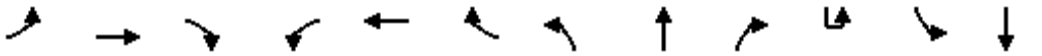
Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	339	18	25	462
Volume Left	0	0	25	0
Volume Right	0	18	0	0
cSH	1700	1700	1213	1700
Volume to Capacity	0.20	0.01	0.02	0.27
Queue Length 95th (ft)	0	0	2	0
Control Delay (s)	0.0	0.0	8.0	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.4	
Approach LOS				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	62	62	76	7	199	460	10	10	181	162
v/c Ratio	0.37	0.37	0.06	0.02	0.45	0.33	0.01	0.03	0.35	0.28
Control Delay	36.0	36.0	0.1	0.2	17.2	17.5	0.0	12.3	29.9	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.0	36.0	0.1	0.2	17.2	17.5	0.0	12.3	29.9	2.6
Queue Length 50th (ft)	27	27	0	0	53	65	0	2	37	0
Queue Length 95th (ft)	63	63	0	0	99	143	0	11	71	15
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	251	251	1291	336	546	1429	837	393	876	667
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	0.25	0.25	0.06	0.02	0.36	0.32	0.01	0.03	0.21	0.24

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	107	0	65	2	0	4	171	396	9	2	7	156
Future Volume (vph)	107	0	65	2	0	4	171	396	9	2	7	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.90		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1316	1316	1291		1003		1674	3409	1647		1436	3103
Flt Permitted	0.95	0.95	1.00		0.99		0.64	1.00	1.00		0.49	1.00
Satd. Flow (perm)	1316	1316	1291		1003		1123	3409	1647		736	3103
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.92	0.86	0.86
Adj. Flow (vph)	124	0	76	2	0	5	199	460	10	2	8	181
RTOR Reduction (vph)	0	0	0	0	6	0	0	0	6	0	0	0
Lane Group Flow (vph)	62	62	76	0	1	0	199	460	4	0	10	181
Heavy Vehicles (%)	27%	0%	22%	50%	0%	75%	10%	8%	0%	0%	29%	14%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	9.3	9.3	79.2		7.0		30.4	29.2	29.2		30.4	19.4
Effective Green, g (s)	9.3	9.3	79.2		7.0		30.4	29.2	29.2		30.4	19.4
Actuated g/C Ratio	0.12	0.12	1.00		0.09		0.38	0.37	0.37		0.38	0.24
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	154	154	1291		88		507	1256	607		293	760
v/s Ratio Prot	c0.05	0.05			0.00		c0.05	c0.13			0.00	0.06
v/s Ratio Perm			c0.06				0.10		0.00		0.01	
v/c Ratio	0.40	0.40	0.06		0.01		0.39	0.37	0.01		0.03	0.24
Uniform Delay, d1	32.4	32.4	0.0		32.9		17.1	18.2	15.8		15.1	24.0
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.7	1.7	0.1		0.0		0.5	0.2	0.0		0.0	0.2
Delay (s)	34.1	34.1	0.1		33.0		17.6	18.4	15.8		15.2	24.1
Level of Service	C	C	A		C		B	B	B		B	C
Approach Delay (s)		21.2			33.0			18.1				20.6
Approach LOS		C			C			B				C

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	79.2	Sum of lost time (s)	32.5
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	139
Future Volume (vph)	139
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1426
Flt Permitted	1.00
Satd. Flow (perm)	1426
Peak-hour factor, PHF	0.86
Adj. Flow (vph)	162
RTOR Reduction (vph)	103
Lane Group Flow (vph)	59
Heavy Vehicles (%)	11%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	28.7
Effective Green, g (s)	28.7
Actuated g/C Ratio	0.36
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	516
v/s Ratio Prot	0.01
v/s Ratio Perm	0.03
v/c Ratio	0.11
Uniform Delay, d1	16.8
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	16.9
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	115	253	66	140	362	231	55	85
Average Queue (ft)	25	122	23	28	152	104	12	31
95th Queue (ft)	70	210	51	88	301	186	38	65
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	1		0	5			0
Queuing Penalty (veh)	0	0		0	1			0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	EB	EB	WB
Directions Served	T	R	L
Maximum Queue (ft)	4	6	56
Average Queue (ft)	0	0	11
95th Queue (ft)	3	4	40
Link Distance (ft)	3093		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		125	255
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	EB	NB	NB
Directions Served	T	L	R
Maximum Queue (ft)	2	74	75
Average Queue (ft)	0	30	33
95th Queue (ft)	2	66	67
Link Distance (ft)	505	382	382
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	WB
Directions Served	R	L
Maximum Queue (ft)	2	38
Average Queue (ft)	0	8
95th Queue (ft)	2	31
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	140	160
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	SB
Directions Served	ULT	TR	T	L>
Maximum Queue (ft)	111	186	4	88
Average Queue (ft)	26	27	0	28
95th Queue (ft)	83	105	4	68
Link Distance (ft)	393	351	787	742
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	126	87	14	52	165	192	140	19	49	96	103	87
Average Queue (ft)	49	17	0	6	71	96	29	2	7	46	37	43
95th Queue (ft)	103	57	8	32	130	168	94	11	28	84	80	77
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0					
Queuing Penalty (veh)							0					

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	8	76	64	86	52
Average Queue (ft)	1	35	34	34	11
95th Queue (ft)	6	66	57	77	37
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 2

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	16	0	14	4	17	0	0	27	20	0	0
Future Vol, veh/h	0	16	0	14	4	17	0	0	27	20	0	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	0	0	0	57	0	18	0	0	7	0	0	0
Mvmt Flow	0	19	0	17	5	20	0	0	32	24	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

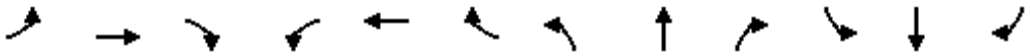
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.3	7.8	6.6	7.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	78%	0%	100%
Vol Thru, %	0%	100%	22%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	27	16	18	17	20
LT Vol	0	0	14	0	20
Through Vol	0	16	4	0	0
RT Vol	27	0	0	17	0
Lane Flow Rate	32	19	21	20	24
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.031	0.022	0.036	0.022	0.028
Departure Headway (Hd)	3.421	4.129	5.967	3.907	4.228
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	1036	865	601	917	841
Service Time	1.476	2.164	3.688	1.628	2.28
HCM Lane V/C Ratio	0.031	0.022	0.035	0.022	0.029
HCM Control Delay	6.6	7.3	8.9	6.7	7.4
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.1	0.1	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	39	477	151	33	477	184	36	143
v/c Ratio	0.22	0.77	0.24	0.19	0.63	0.63	0.14	0.54
Control Delay	43.5	38.9	5.6	43.6	31.4	45.0	36.3	42.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.5	38.9	5.6	43.6	31.4	45.0	36.3	42.5
Queue Length 50th (ft)	21	242	0	18	243	94	18	72
Queue Length 95th (ft)	56	#474	46	50	#475	178	48	139
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	361	620	628	356	752	377	370	380
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	0.11	0.77	0.24	0.09	0.63	0.49	0.10	0.38

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)	37	448	142	31	445	4	82	63	28	34	109	25
Future Volume (vph)	37	448	142	31	445	4	82	63	28	34	109	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1823	1863	1584	1796	1889			1774		1769	1780	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1823	1863	1584	1796	1889			1774		1769	1780	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	39	477	151	33	473	4	87	67	30	36	116	27
RTOR Reduction (vph)	0	0	98	0	0	0	0	7	0	0	8	0
Lane Group Flow (vph)	39	477	53	33	477	0	0	177	0	36	135	0
Heavy Vehicles (%)	0%	3%	3%	3%	3%	0%	2%	2%	4%	0%	2%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	5.5	33.1	33.1	8.8	36.4			14.8		13.2	13.2	
Effective Green, g (s)	5.5	33.1	33.1	8.8	36.4			14.8		13.2	13.2	
Actuated g/C Ratio	0.06	0.35	0.35	0.09	0.39			0.16		0.14	0.14	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	106	656	558	168	732			279		248	250	
v/s Ratio Prot	c0.02	c0.26		0.02	c0.25			c0.10		0.02	c0.08	
v/s Ratio Perm			0.03									
v/c Ratio	0.37	0.73	0.10	0.20	0.65			0.64		0.15	0.54	
Uniform Delay, d1	42.5	26.5	20.4	39.3	23.6			37.0		35.4	37.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	2.9	4.3	0.1	0.8	2.3			5.3		0.4	3.0	
Delay (s)	45.5	30.8	20.5	40.1	25.9			42.3		35.8	40.5	
Level of Service	D	C	C	D	C			D		D	D	
Approach Delay (s)		29.3			26.8			42.3			39.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	93.9	Sum of lost time (s)	24.0
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	478	4	6	449	0	0
Future Volume (Veh/h)	478	4	6	449	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	543	5	7	510	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			548		1067	543
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			548		1067	543
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	100
cM capacity (veh/h)			1032		246	544

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	543	5	7	510
Volume Left	0	0	7	0
Volume Right	0	5	0	0
cSH	1700	1700	1032	1700
Volume to Capacity	0.32	0.00	0.01	0.30
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.0	8.5	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.1	
Approach LOS				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	480	0	0	437	15	3
Future Volume (Veh/h)	480	0	0	437	15	3
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	533	0	0	486	17	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			533		1019	533
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			533		1019	533
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		94	99
cM capacity (veh/h)			1045		265	551

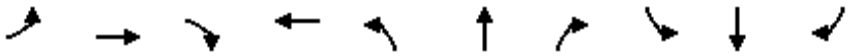
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	533	486	17	3
Volume Left	0	0	17	0
Volume Right	0	0	0	3
cSH	1700	1700	265	551
Volume to Capacity	0.31	0.29	0.06	0.01
Queue Length 95th (ft)	0	0	5	0
Control Delay (s)	0.0	0.0	19.5	11.6
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	18.3	
Approach LOS			C	

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	469	13	22	440	0	0
Future Volume (Veh/h)	469	13	22	440	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	515	14	24	484	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			529		1047	515
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			529		1047	515
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			98		100	100
cM capacity (veh/h)			1004		249	564

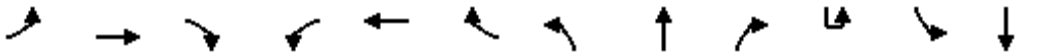
Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	515	14	24	484
Volume Left	0	0	24	0
Volume Right	0	14	0	0
cSH	1700	1700	1004	1700
Volume to Capacity	0.30	0.01	0.02	0.28
Queue Length 95th (ft)	0	0	2	0
Control Delay (s)	0.0	0.0	8.7	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.4	
Approach LOS				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	28.0%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	131	132	205	17	189	263	1	15	369	86
v/c Ratio	0.49	0.50	0.13	0.05	0.43	0.18	0.00	0.04	0.54	0.13
Control Delay	38.8	38.9	0.2	0.2	17.5	17.0	0.0	12.9	32.3	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	38.9	0.2	0.2	17.5	17.0	0.0	12.9	32.3	0.4
Queue Length 50th (ft)	65	65	0	0	57	40	0	4	90	0
Queue Length 95th (ft)	128	129	0	0	102	92	0	15	138	0
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	325	325	1529	379	482	1472	489	409	855	719
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	0.40	0.41	0.13	0.04	0.39	0.18	0.00	0.04	0.43	0.12

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	250	0	195	5	0	11	180	250	1	9	6	351
Future Volume (vph)	250	0	195	5	0	11	180	250	1	9	6	351
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.90		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1655	1529		1502		1721	3541	824		1328	3369
Flt Permitted	0.95	0.95	1.00		0.99		0.53	1.00	1.00		0.59	1.00
Satd. Flow (perm)	1655	1655	1529		1502		964	3541	824		824	3369
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	0	205	5	0	12	189	263	1	9	6	369
RTOR Reduction (vph)	0	0	0	0	16	0	0	0	1	0	0	0
Lane Group Flow (vph)	131	132	205	0	1	0	189	263	0	0	15	369
Heavy Vehicles (%)	1%	0%	3%	20%	0%	9%	7%	4%	100%	0%	83%	5%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	13.0	13.0	87.6		7.1		35.0	33.5	33.5		35.0	23.6
Effective Green, g (s)	13.0	13.0	87.6		7.1		35.0	33.5	33.5		35.0	23.6
Actuated g/C Ratio	0.15	0.15	1.00		0.08		0.40	0.38	0.38		0.40	0.27
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	5.0	5.0			4.0		4.0	5.0	5.0		4.0	5.0
Lane Grp Cap (vph)	245	245	1529		121		483	1354	315		337	907
v/s Ratio Prot	0.08	c0.08			0.00		c0.05	0.07			0.00	c0.11
v/s Ratio Perm			c0.13				0.11		0.00		0.02	
v/c Ratio	0.53	0.54	0.13		0.01		0.39	0.19	0.00		0.04	0.41
Uniform Delay, d1	34.5	34.5	0.0		37.0		17.7	18.0	16.7		16.0	26.3
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.1	4.1	0.2		0.1		0.7	0.1	0.0		0.1	0.6
Delay (s)	38.6	38.6	0.2		37.1		18.5	18.2	16.7		16.0	26.9
Level of Service	D	D	A		D		B	B	B		B	C
Approach Delay (s)		21.8			37.1			18.3				24.4
Approach LOS		C			D			B				C

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	87.6	Sum of lost time (s)	32.5
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	82
Future Volume (vph)	82
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1439
Flt Permitted	1.00
Satd. Flow (perm)	1439
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	86
RTOR Reduction (vph)	50
Lane Group Flow (vph)	36
Heavy Vehicles (%)	10%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	36.6
Effective Green, g (s)	36.6
Actuated g/C Ratio	0.42
Clearance Time (s)	6.3
Vehicle Extension (s)	5.0
Lane Grp Cap (vph)	601
v/s Ratio Prot	0.01
v/s Ratio Perm	0.02
v/c Ratio	0.06
Uniform Delay, d1	15.2
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	15.3
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	200	371	98	150	347	190	105	179
Average Queue (ft)	43	199	38	31	179	91	25	77
95th Queue (ft)	133	329	71	97	304	161	65	142
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	7		0	9		0	2
Queuing Penalty (veh)	0	3		0	3		0	1

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	20
Average Queue (ft)	2
95th Queue (ft)	13
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	255
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	42	27
Average Queue (ft)	13	4
95th Queue (ft)	39	20
Link Distance (ft)	382	382
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	WB
Directions Served	R	L
Maximum Queue (ft)	5	42
Average Queue (ft)	0	7
95th Queue (ft)	5	30
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	140	160
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	SB
Directions Served	ULT	TR	L>
Maximum Queue (ft)	173	126	66
Average Queue (ft)	56	18	24
95th Queue (ft)	136	81	56
Link Distance (ft)	393	351	742
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	159	114	54	52	168	157	110	31	67	150	161	82
Average Queue (ft)	80	41	4	11	78	67	17	2	10	83	90	32
95th Queue (ft)	133	96	26	36	137	126	60	15	40	135	146	67
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0			0		
Queuing Penalty (veh)							0			0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	8	64	55	54	29
Average Queue (ft)	3	19	15	20	13
95th Queue (ft)	10	56	45	46	36
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 6

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	8	0	11	4	47	0	0	12	5	0	0
Future Vol, veh/h	0	8	0	11	4	47	0	0	12	5	0	0
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Heavy Vehicles, %	0	13	0	55	2	7	0	0	35	0	0	0
Mvmt Flow	0	11	0	16	6	67	0	0	17	7	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.4	7.4	6.6	7.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	73%	0%	100%
Vol Thru, %	0%	100%	27%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	8	15	47	5
LT Vol	0	0	11	0	5
Through Vol	0	8	4	0	0
RT Vol	12	0	0	47	0
Lane Flow Rate	17	11	21	67	7
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.017	0.014	0.035	0.072	0.008
Departure Headway (Hd)	3.474	4.327	5.849	3.881	4.283
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	1019	826	615	926	829
Service Time	1.534	2.357	3.559	1.591	2.344
HCM Lane V/C Ratio	0.017	0.013	0.034	0.072	0.008
HCM Control Delay	6.6	7.4	8.8	6.9	7.4
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0	0.1	0.2	0

1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	40	525	99	40	523	199	27	88
v/c Ratio	0.27	0.74	0.14	0.25	0.62	0.67	0.14	0.40
Control Delay	48.7	32.9	1.5	48.0	26.9	47.3	41.6	37.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.7	32.9	1.5	48.0	26.9	47.3	41.6	37.8
Queue Length 50th (ft)	23	271	0	23	270	105	15	37
Queue Length 95th (ft)	61	438	11	61	437	199	43	89
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	149	834	783	159	868	377	355	389
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	0.27	0.63	0.13	0.25	0.60	0.53	0.08	0.23

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	478	90	36	463	13	76	75	30	25	52	28
Future Volume (vph)	36	478	90	36	463	13	76	75	30	25	52	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1642	1828	1539	1745	1816			1713		1638	1719	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1642	1828	1539	1745	1816			1713		1638	1719	
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)	40	525	99	40	509	14	84	82	33	27	57	31
RTOR Reduction (vph)	0	0	59	0	1	0	0	7	0	0	20	0
Lane Group Flow (vph)	40	525	40	40	522	0	0	192	0	27	68	0
Heavy Vehicles (%)	11%	5%	6%	6%	7%	0%	8%	4%	7%	8%	4%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.3	38.2	38.2	8.2	42.1			15.4		8.3	8.3	
Effective Green, g (s)	4.3	38.2	38.2	8.2	42.1			15.4		8.3	8.3	
Actuated g/C Ratio	0.05	0.41	0.41	0.09	0.45			0.16		0.09	0.09	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	75	742	624	152	812			280		144	151	
v/s Ratio Prot	c0.02	c0.29		0.02	c0.29			c0.11		0.02	c0.04	
v/s Ratio Perm			0.03									
v/c Ratio	0.53	0.71	0.06	0.26	0.64			0.69		0.19	0.45	
Uniform Delay, d1	43.9	23.3	17.0	40.1	20.2			37.1		39.8	40.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	9.0	3.3	0.1	1.3	2.0			7.4		0.9	2.9	
Delay (s)	52.9	26.6	17.1	41.4	22.1			44.5		40.6	43.6	
Level of Service	D	C	B	D	C			D		D	D	
Approach Delay (s)		26.8			23.5			44.5			42.9	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	29.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	94.1	Sum of lost time (s)	24.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	469	20	9	453	0	0
Future Volume (Veh/h)	469	20	9	453	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	504	22	10	487	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			526		1011	504
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			526		1011	504
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	100
cM capacity (veh/h)			1051		265	572

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	504	22	10	487
Volume Left	0	0	10	0
Volume Right	0	22	0	0
cSH	1700	1700	1051	1700
Volume to Capacity	0.30	0.01	0.01	0.29
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.0	8.5	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.2	
Approach LOS				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	34.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	473	0	0	427	38	53
Future Volume (Veh/h)	473	0	0	427	38	53
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	550	0	0	497	44	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			550		1047	550
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			550		1047	550
tC, single (s)			4.1		6.5	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.5
p0 queue free %			100		82	88
cM capacity (veh/h)			1030		241	507

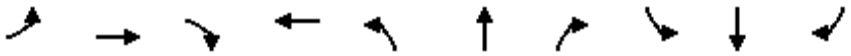
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	550	497	44	62
Volume Left	0	0	44	0
Volume Right	0	0	0	62
cSH	1700	1700	241	507
Volume to Capacity	0.32	0.29	0.18	0.12
Queue Length 95th (ft)	0	0	16	10
Control Delay (s)	0.0	0.0	23.2	13.1
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	17.3	
Approach LOS			C	

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	34.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	507	16	15	430	0	0
Future Volume (Veh/h)	507	16	15	430	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	563	18	17	478	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			581		1075	563
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			581		1075	563
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	100
cM capacity (veh/h)			1003		242	530

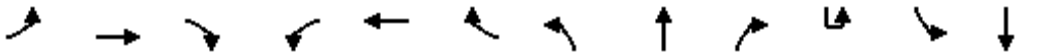
Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	563	18	17	478
Volume Left	0	0	17	0
Volume Right	0	18	0	0
cSH	1700	1700	1003	1700
Volume to Capacity	0.33	0.01	0.02	0.28
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.0	8.7	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.3	
Approach LOS				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	30.0%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	134	136	180	20	165	232	11	18	337	135
v/c Ratio	0.53	0.54	0.12	0.14	0.40	0.17	0.02	0.04	0.55	0.20
Control Delay	38.5	38.6	0.2	26.9	17.7	17.3	0.1	13.6	32.5	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	38.6	0.2	26.9	17.7	17.3	0.1	13.6	32.5	1.3
Queue Length 50th (ft)	60	61	0	4	46	33	0	5	75	0
Queue Length 95th (ft)	128	130	0	26	95	83	0	17	129	9
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	369	370	1485	156	472	1378	632	512	889	763
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	0.36	0.37	0.12	0.13	0.35	0.17	0.02	0.04	0.38	0.18

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	260	2	175	3	6	11	160	225	11	11	7	327
Future Volume (vph)	260	2	175	3	6	11	160	225	11	11	7	327
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.93		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1661	1485		1339		1737	3474	1211		1678	3276
Flt Permitted	0.95	0.95	1.00		0.99		0.55	1.00	1.00		0.61	1.00
Satd. Flow (perm)	1655	1661	1485		1339		1003	3474	1211		1072	3276
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	268	2	180	3	6	11	165	232	11	11	7	337
RTOR Reduction (vph)	0	0	0	0	10	0	0	0	7	0	0	0
Lane Group Flow (vph)	134	136	180	0	10	0	165	232	4	0	18	337
Heavy Vehicles (%)	1%	0%	6%	33%	33%	27%	6%	6%	36%	0%	14%	8%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	11.6	11.6	82.6		7.3		31.2	30.0	30.0		31.2	21.4
Effective Green, g (s)	11.6	11.6	82.6		7.3		31.2	30.0	30.0		31.2	21.4
Actuated g/C Ratio	0.14	0.14	1.00		0.09		0.38	0.36	0.36		0.38	0.26
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	232	233	1485		118		465	1261	439		413	848
v/s Ratio Prot	0.08	c0.08			0.01		c0.04	c0.07			0.00	c0.10
v/s Ratio Perm			c0.12				0.09		0.00		0.02	
v/c Ratio	0.58	0.58	0.12		0.08		0.35	0.18	0.01		0.04	0.40
Uniform Delay, d1	33.2	33.2	0.0		34.6		17.7	17.9	16.8		16.2	25.3
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.5	3.7	0.2		0.3		0.5	0.1	0.0		0.0	0.3
Delay (s)	36.7	36.9	0.2		34.9		18.1	18.0	16.8		16.2	25.6
Level of Service	D	D	A		C		B	B	B		B	C
Approach Delay (s)		22.1			34.9			18.0				22.5
Approach LOS		C			C			B				C

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	82.6	Sum of lost time (s)	32.5
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	131
Future Volume (vph)	131
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1507
Flt Permitted	1.00
Satd. Flow (perm)	1507
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	135
RTOR Reduction (vph)	81
Lane Group Flow (vph)	54
Heavy Vehicles (%)	5%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	33.0
Effective Green, g (s)	33.0
Actuated g/C Ratio	0.40
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	602
v/s Ratio Prot	0.01
v/s Ratio Perm	0.02
v/c Ratio	0.09
Uniform Delay, d1	15.4
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	15.5
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	149	357	73	173	400	218	78	118
Average Queue (ft)	39	191	28	39	176	105	20	51
95th Queue (ft)	106	313	57	114	316	187	55	98
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	5		0	8		0	0
Queuing Penalty (veh)	0	2		0	3		0	0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	EB	WB
Directions Served	R	L
Maximum Queue (ft)	2	31
Average Queue (ft)	0	3
95th Queue (ft)	0	19
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	125	255
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	EB	NB	NB
Directions Served	T	L	R
Maximum Queue (ft)	2	82	84
Average Queue (ft)	0	30	35
95th Queue (ft)	2	67	68
Link Distance (ft)	505	382	382
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	WB
Directions Served	R	L
Maximum Queue (ft)	5	37
Average Queue (ft)	0	5
95th Queue (ft)	5	25
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	140	160
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	SB
Directions Served	ULT	UTR	L>
Maximum Queue (ft)	252	119	93
Average Queue (ft)	69	22	30
95th Queue (ft)	182	83	70
Link Distance (ft)	393	351	742
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	154	120	47	63	142	139	72	44	57	146	162	85
Average Queue (ft)	82	41	3	16	68	67	14	5	10	80	84	38
95th Queue (ft)	137	98	22	49	121	119	52	24	35	133	139	73
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)										0		
Queuing Penalty (veh)										0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	20	63	57	60	29
Average Queue (ft)	2	14	24	12	6
95th Queue (ft)	11	48	49	44	24
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 5

MOVEMENT SUMMARY

Site: 101 [Taylor Middle School Addition - AM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.547	10.2	LOS B	4.5	120.3	0.28	0.12	0.28	24.3
6	T1	427	10.0	469	10.0	0.547	10.5	LOS B	4.5	120.3	0.28	0.12	0.28	23.2
16	R2	73	11.0	80	11.0	0.547	10.6	LOS B	4.5	120.3	0.28	0.12	0.28	22.6
Approach		501	10.1	551	10.1	0.547	10.5	LOS B	4.5	120.3	0.28	0.12	0.28	23.1
North: Falmouth Street														
7	L2	75	21.0	82	21.0	0.202	8.9	LOS A	1.2	34.3	0.67	0.57	0.67	23.2
14	R2	34	9.0	37	9.0	0.202	8.1	LOS A	1.2	34.3	0.67	0.57	0.67	22.3
Approach		109	17.3	120	17.3	0.202	8.7	LOS A	1.2	34.3	0.67	0.57	0.67	22.9
West: E Shirley Avenue														
5u	U	1	0.0	1	0.0	0.131	4.6	LOS A	0.8	20.5	0.33	0.17	0.33	25.4
5	L2	31	19.0	34	19.0	0.131	5.4	LOS A	0.8	20.5	0.33	0.17	0.33	24.7
2	T1	297	9.0	326	9.0	0.131	1.4	LOS A	0.8	20.5	0.09	0.05	0.09	25.5
Approach		329	9.9	362	9.9	0.131	1.8	LOS A	0.8	20.5	0.11	0.06	0.11	25.4
All Vehicles		939	10.9	1032	10.9	0.547	7.2	LOS A	4.5	120.3	0.27	0.15	0.27	23.8

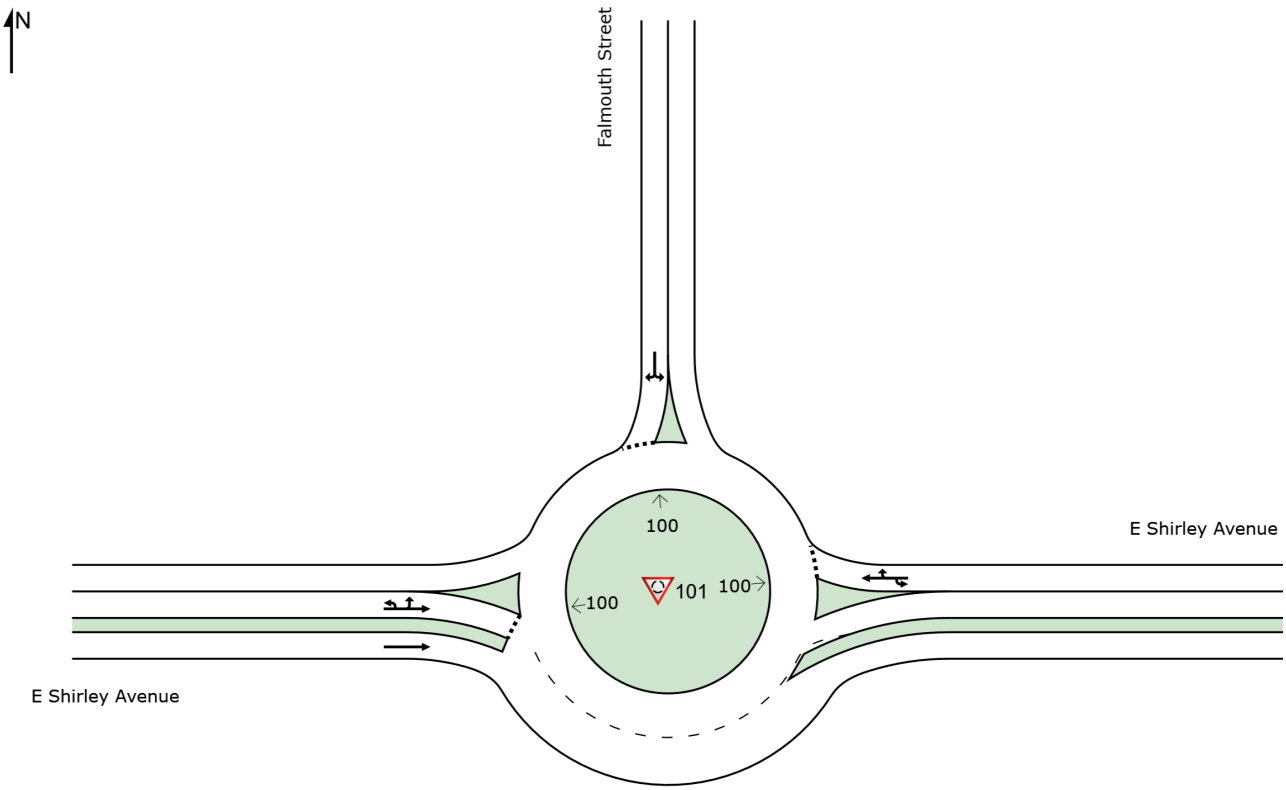
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Taylor Middle School Addition - AM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [Taylor Middle School Addition - Commuter PM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.622	12.2	LOS B	6.2	175.5	0.25	0.09	0.25	23.7
6	T1	413	21.0	454	21.0	0.622	12.9	LOS B	6.2	175.5	0.25	0.09	0.25	22.6
16	R2	135	4.0	148	4.0	0.622	12.3	LOS B	6.2	175.5	0.25	0.09	0.25	22.1
Approach		549	16.8	603	16.8	0.622	12.7	LOS B	6.2	175.5	0.25	0.09	0.25	22.5
North: Falmouth Street														
7	L2	108	1.0	119	1.0	0.222	7.7	LOS A	1.4	36.7	0.69	0.57	0.69	23.3
14	R2	32	9.0	35	9.0	0.222	8.2	LOS A	1.4	36.7	0.69	0.57	0.69	22.4
Approach		140	2.8	154	2.8	0.222	7.8	LOS A	1.4	36.7	0.69	0.57	0.69	23.1
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.185	5.2	LOS A	1.1	29.3	0.37	0.21	0.37	25.5
5	L2	18	11.0	20	11.0	0.185	5.7	LOS A	1.1	29.3	0.37	0.21	0.37	24.8
2	T1	462	5.0	508	5.0	0.185	1.7	LOS A	1.1	29.3	0.12	0.07	0.12	25.4
Approach		482	5.2	530	5.2	0.185	1.9	LOS A	1.1	29.3	0.13	0.07	0.13	25.4
All Vehicles		1171	10.3	1287	10.3	0.622	7.7	LOS A	6.2	175.5	0.25	0.14	0.25	23.7

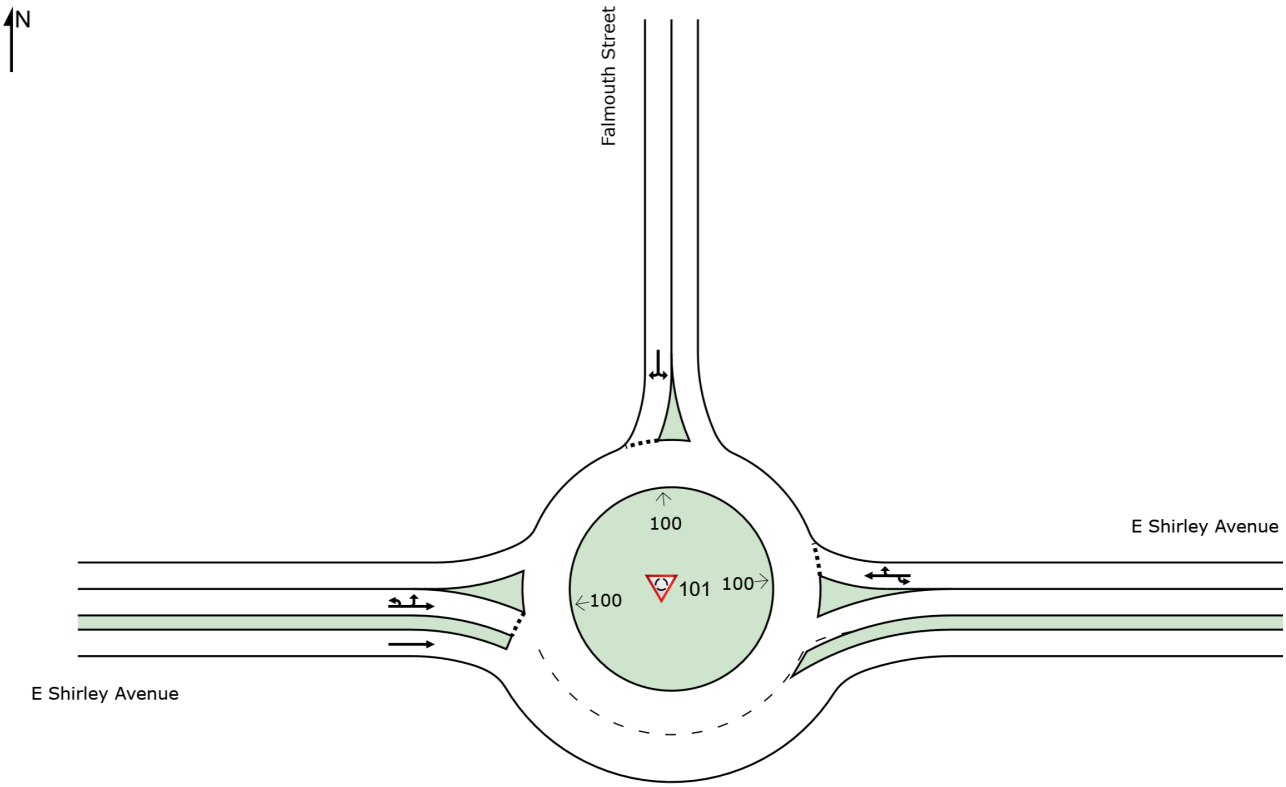
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Taylor Middle School Addition - Commuter PM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [Taylor Middle School Addition - School PM Peak (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	2	0.0	2	0.0	0.501	9.0	LOS A	3.9	100.3	0.23	0.09	0.23	24.6
6	T1	405	4.0	409	4.0	0.501	9.2	LOS A	3.9	100.3	0.23	0.09	0.23	23.5
16	R2	126	6.0	127	6.0	0.501	9.2	LOS A	3.9	100.3	0.23	0.09	0.23	22.9
Approach		533	4.5	538	4.5	0.501	9.2	LOS A	3.9	100.3	0.23	0.09	0.23	23.3
North: Falmouth Street														
7	L2	119	7.0	120	7.0	0.194	7.1	LOS A	1.2	30.6	0.61	0.47	0.61	23.5
14	R2	23	0.0	23	0.0	0.194	6.7	LOS A	1.2	30.6	0.61	0.47	0.61	22.5
Approach		142	5.9	143	5.9	0.194	7.0	LOS A	1.2	30.6	0.61	0.47	0.61	23.3
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.189	5.4	LOS A	1.1	29.8	0.39	0.23	0.39	25.4
5	L2	26	23.0	26	23.0	0.189	6.3	LOS A	1.1	29.8	0.39	0.23	0.39	24.7
2	T1	500	5.0	505	5.0	0.189	1.7	LOS A	1.1	29.8	0.11	0.07	0.11	25.4
Approach		528	5.9	533	5.9	0.189	1.9	LOS A	1.1	29.8	0.13	0.08	0.13	25.4
All Vehicles		1203	5.2	1215	5.2	0.501	5.7	LOS A	3.9	100.3	0.23	0.13	0.23	24.2

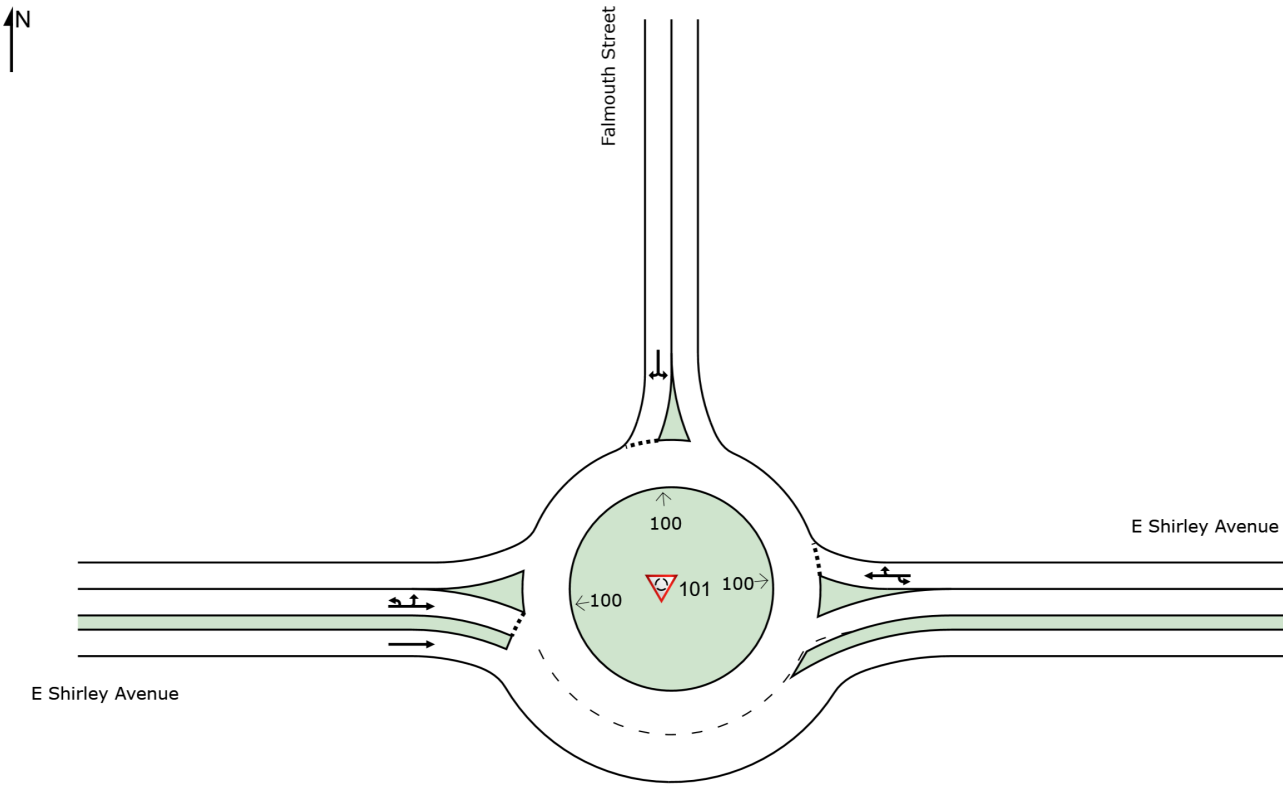
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Taylor Middle School Addition - School PM Peak (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Appendix E
2026 Background Analysis Worksheets

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	5	0	46	21	91	0	0	35	13	0	0
Future Vol, veh/h	0	5	0	46	21	91	0	0	35	13	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	24	0	7	0	0	65	8	0	0
Mvmt Flow	0	5	0	50	23	99	0	0	38	14	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.3	7.8	6.9	7.8
HCM LOS	A	A	A	A

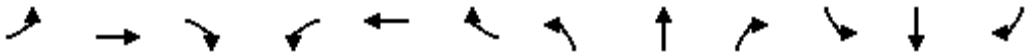
Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	69%	0%	100%
Vol Thru, %	0%	100%	31%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	35	5	67	91	13
LT Vol	0	0	46	0	13
Through Vol	0	5	21	0	0
RT Vol	35	0	0	91	0
Lane Flow Rate	38	5	73	99	14
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.039	0.006	0.108	0.107	0.018
Departure Headway (Hd)	3.719	4.216	5.347	3.895	4.677
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	969	840	672	921	770
Service Time	1.719	2.284	3.067	1.615	2.678
HCM Lane V/C Ratio	0.039	0.006	0.109	0.107	0.018
HCM Control Delay	6.9	7.3	8.7	7.1	7.8
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0	0.4	0.4	0.1

1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	32	352	74	32	470	234	16	57
v/c Ratio	0.19	0.53	0.11	0.21	0.60	0.70	0.09	0.29
Control Delay	45.0	26.5	0.3	45.7	26.5	45.2	41.2	32.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.0	26.5	0.3	45.7	26.5	45.2	41.2	32.0
Queue Length 50th (ft)	17	161	0	17	235	116	9	19
Queue Length 95th (ft)	50	267	0	50	380	220	30	59
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	168	793	774	153	822	410	388	387
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	0.19	0.44	0.10	0.21	0.57	0.57	0.04	0.15

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	324	68	29	409	23	80	83	52	15	32	20
Future Volume (vph)	29	324	68	29	409	23	80	83	52	15	32	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99			0.97		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1823	1761	1539	1667	1720			1735		1769	1690	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1823	1761	1539	1667	1720			1735		1769	1690	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	352	74	32	445	25	87	90	57	16	35	22
RTOR Reduction (vph)	0	0	45	0	2	0	0	11	0	0	20	0
Lane Group Flow (vph)	32	352	29	32	468	0	0	223	0	16	37	0
Heavy Vehicles (%)	0%	9%	6%	11%	13%	0%	6%	2%	4%	0%	3%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.4	36.6	36.6	8.2	40.4			16.6		7.1	7.1	
Effective Green, g (s)	4.4	36.6	36.6	8.2	40.4			16.6		7.1	7.1	
Actuated g/C Ratio	0.05	0.40	0.40	0.09	0.44			0.18		0.08	0.08	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	86	696	608	147	751			311		135	129	
v/s Ratio Prot	0.02	0.20		c0.02	c0.27			c0.13		0.01	c0.02	
v/s Ratio Perm			0.02									
v/c Ratio	0.37	0.51	0.05	0.22	0.62			0.72		0.12	0.28	
Uniform Delay, d1	42.7	21.1	17.2	39.2	20.2			35.7		39.8	40.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	3.7	0.8	0.0	1.0	1.8			8.2		0.5	1.7	
Delay (s)	46.4	21.9	17.3	40.2	22.0			44.0		40.3	42.0	
Level of Service	D	C	B	D	C			D		D	D	
Approach Delay (s)		22.9			23.2			44.0			41.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	92.5	Sum of lost time (s)	24.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	304	37	48	444	0	0
Future Volume (Veh/h)	304	37	48	444	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	330	74	96	483	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			404		1005	330
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			404		1005	330
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			91		100	100
cM capacity (veh/h)			1098		246	716

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	330	74	96	483
Volume Left	0	0	96	0
Volume Right	0	74	0	0
cSH	1700	1700	1098	1700
Volume to Capacity	0.19	0.04	0.09	0.28
Queue Length 95th (ft)	0	0	7	0
Control Delay (s)	0.0	0.0	8.6	0.0
Lane LOS			A	
Approach Delay (s)	0.0		1.4	
Approach LOS				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	295	0	0	454	41	51
Future Volume (Veh/h)	295	0	0	454	41	51
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	321	0	0	493	82	102
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			321		814	321
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			321		814	321
tC, single (s)			4.1		6.6	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.4
p0 queue free %			100		75	85
cM capacity (veh/h)			1250		328	689

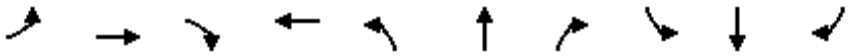
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	321	493	82	102
Volume Left	0	0	82	0
Volume Right	0	0	0	102
cSH	1700	1700	328	689
Volume to Capacity	0.19	0.29	0.25	0.15
Queue Length 95th (ft)	0	0	24	13
Control Delay (s)	0.0	0.0	19.6	11.1
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	14.9	
Approach LOS			B	

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	332	17	24	452	0	0
Future Volume (Veh/h)	332	17	24	452	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.95	0.50	0.50	0.95	0.95	0.95
Hourly flow rate (vph)	349	34	48	476	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			383		921	349
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			383		921	349
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		100	100
cM capacity (veh/h)			1187		291	699

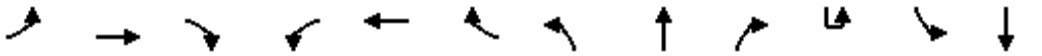
Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	349	34	48	476
Volume Left	0	0	48	0
Volume Right	0	34	0	0
cSH	1700	1700	1187	1700
Volume to Capacity	0.21	0.02	0.04	0.28
Queue Length 95th (ft)	0	0	3	0
Control Delay (s)	0.0	0.0	8.2	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.7	
Approach LOS				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	60	60	73	6	191	443	10	10	175	155
v/c Ratio	0.36	0.36	0.06	0.02	0.43	0.32	0.01	0.03	0.33	0.26
Control Delay	35.8	35.8	0.1	0.2	16.9	17.3	0.0	12.2	29.2	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.8	35.8	0.1	0.2	16.9	17.3	0.0	12.2	29.2	2.4
Queue Length 50th (ft)	26	26	0	0	50	62	0	2	35	0
Queue Length 95th (ft)	64	64	0	0	99	143	0	11	70	15
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	271	271	1291	349	528	1413	830	396	841	689
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	0.22	0.22	0.06	0.02	0.36	0.31	0.01	0.03	0.21	0.22

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	110	0	67	2	0	4	176	408	9	2	7	161
Future Volume (vph)	110	0	67	2	0	4	176	408	9	2	7	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.91		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1316	1316	1291		1015		1674	3409	1647		1436	3103
Flt Permitted	0.95	0.95	1.00		0.98		0.64	1.00	1.00		0.50	1.00
Satd. Flow (perm)	1316	1316	1291		1015		1130	3409	1647		749	3103
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	0	73	2	0	4	191	443	10	2	8	175
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	6	0	0	0
Lane Group Flow (vph)	60	60	73	0	1	0	191	443	4	0	10	175
Heavy Vehicles (%)	27%	0%	22%	50%	0%	75%	10%	8%	0%	0%	29%	14%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	9.0	9.0	78.5		7.0		30.0	28.7	28.7		30.0	19.4
Effective Green, g (s)	9.0	9.0	78.5		7.0		30.0	28.7	28.7		30.0	19.4
Actuated g/C Ratio	0.11	0.11	1.00		0.09		0.38	0.37	0.37		0.38	0.25
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	150	150	1291		90		505	1246	602		297	766
v/s Ratio Prot	c0.05	0.05			0.00		c0.05	c0.13			0.00	0.06
v/s Ratio Perm			c0.06				0.09		0.00		0.01	
v/c Ratio	0.40	0.40	0.06		0.01		0.38	0.36	0.01		0.03	0.23
Uniform Delay, d1	32.2	32.2	0.0		32.6		16.9	18.2	15.8		15.1	23.6
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.7	1.7	0.1		0.0		0.5	0.2	0.0		0.0	0.2
Delay (s)	34.0	34.0	0.1		32.6		17.4	18.3	15.8		15.1	23.7
Level of Service	C	C	A		C		B	B	B		B	C
Approach Delay (s)		21.2			32.6			18.0				20.3
Approach LOS		C			C			B				C

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	78.5	Sum of lost time (s)	32.5
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	143
Future Volume (vph)	143
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1426
Flt Permitted	1.00
Satd. Flow (perm)	1426
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	155
RTOR Reduction (vph)	99
Lane Group Flow (vph)	56
Heavy Vehicles (%)	11%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	28.4
Effective Green, g (s)	28.4
Actuated g/C Ratio	0.36
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	515
v/s Ratio Prot	0.01
v/s Ratio Perm	0.03
v/c Ratio	0.11
Uniform Delay, d1	16.6
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	16.7
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	105	264	67	149	331	222	53	90
Average Queue (ft)	25	122	24	31	145	100	13	35
95th Queue (ft)	70	226	54	98	275	182	40	75
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	1		0	4			0
Queuing Penalty (veh)	0	0		0	1			0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	EB	EB	WB
Directions Served	T	R	L
Maximum Queue (ft)	5	9	75
Average Queue (ft)	0	0	14
95th Queue (ft)	5	5	49
Link Distance (ft)	3093		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		125	255
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	EB	NB	NB
Directions Served	T	L	R
Maximum Queue (ft)	2	83	74
Average Queue (ft)	0	29	30
95th Queue (ft)	2	68	64
Link Distance (ft)	505	382	382
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	WB
Directions Served	R	L
Maximum Queue (ft)	4	43
Average Queue (ft)	0	6
95th Queue (ft)	3	26
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	140	160
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	SB
Directions Served	ULT	TR	T	L>
Maximum Queue (ft)	121	174	4	80
Average Queue (ft)	22	26	0	25
95th Queue (ft)	77	103	3	63
Link Distance (ft)	393	351	787	742
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		0		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	124	87	10	57	162	194	144	19	43	119	114	93
Average Queue (ft)	52	18	0	6	72	96	29	2	5	49	43	43
95th Queue (ft)	103	59	7	33	132	166	90	12	25	92	92	81
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0			0		
Queuing Penalty (veh)							0			0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	10	82	72	89	48
Average Queue (ft)	1	37	35	32	11
95th Queue (ft)	7	68	59	76	37
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 2

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	16	0	14	4	18	0	0	28	21	0	0
Future Vol, veh/h	0	16	0	14	4	18	0	0	28	21	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	57	0	18	0	0	7	0	0	0
Mvmt Flow	0	17	0	15	4	20	0	0	30	23	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.2	7.8	6.6	7.4
HCM LOS	A	A	A	A

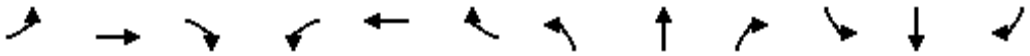
Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	78%	0%	100%
Vol Thru, %	0%	100%	22%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	28	16	18	18	21
LT Vol	0	0	14	0	21
Through Vol	0	16	4	0	0
RT Vol	28	0	0	18	0
Lane Flow Rate	30	17	20	20	23
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.029	0.02	0.032	0.021	0.027
Departure Headway (Hd)	3.411	4.121	5.96	3.9	4.217
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	1040	867	602	918	844
Service Time	1.462	2.154	3.681	1.621	2.265
HCM Lane V/C Ratio	0.029	0.02	0.033	0.022	0.027
HCM Control Delay	6.6	7.2	8.9	6.7	7.4
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.1	0.1	0.1

1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	40	491	155	34	491	189	37	147
v/c Ratio	0.26	0.74	0.23	0.22	0.61	0.65	0.15	0.57
Control Delay	49.8	35.4	4.8	49.2	28.7	48.8	39.3	46.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.8	35.4	4.8	49.2	28.7	48.8	39.3	46.0
Queue Length 50th (ft)	23	258	0	19	257	101	19	77
Queue Length 95th (ft)	63	423	43	56	420	195	53	153
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	154	791	762	152	838	364	357	366
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	0.26	0.62	0.20	0.22	0.59	0.52	0.10	0.40

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	462	146	32	458	4	84	65	29	35	112	26
Future Volume (vph)	38	462	146	32	458	4	84	65	29	35	112	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1823	1863	1584	1796	1889			1774		1769	1780	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1823	1863	1584	1796	1889			1774		1769	1780	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	40	491	155	34	487	4	89	69	31	37	119	28
RTOR Reduction (vph)	0	0	96	0	0	0	0	7	0	0	8	0
Lane Group Flow (vph)	40	491	59	34	491	0	0	182	0	37	139	0
Heavy Vehicles (%)	0%	3%	3%	3%	3%	0%	2%	2%	4%	0%	2%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.4	37.0	37.0	8.1	40.7			15.2		13.6	13.6	
Effective Green, g (s)	4.4	37.0	37.0	8.1	40.7			15.2		13.6	13.6	
Actuated g/C Ratio	0.04	0.38	0.38	0.08	0.42			0.16		0.14	0.14	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	81	704	598	148	785			275		245	247	
v/s Ratio Prot	c0.02	c0.26		0.02	c0.26			c0.10		0.02	c0.08	
v/s Ratio Perm			0.04									
v/c Ratio	0.49	0.70	0.10	0.23	0.63			0.66		0.15	0.56	
Uniform Delay, d1	45.7	25.7	19.7	42.0	22.6			38.9		37.1	39.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	6.3	3.3	0.1	1.1	1.8			6.5		0.4	3.6	
Delay (s)	52.0	29.0	19.8	43.1	24.4			45.4		37.5	42.9	
Level of Service	D	C	B	D	C			D		D	D	
Approach Delay (s)		28.2			25.6			45.4			41.8	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	31.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	97.9	Sum of lost time (s)	24.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	492	4	6	463	0	0
Future Volume (Veh/h)	492	4	6	463	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	535	8	12	503	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			543		1062	535
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			543		1062	535
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	100
cM capacity (veh/h)			1036		247	549

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	535	8	12	503
Volume Left	0	0	12	0
Volume Right	0	8	0	0
cSH	1700	1700	1036	1700
Volume to Capacity	0.31	0.00	0.01	0.30
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.0	8.5	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.2	
Approach LOS				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	495	0	0	450	15	3
Future Volume (Veh/h)	495	0	0	450	15	3
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	538	0	0	489	30	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			538		1027	538
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			538		1027	538
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		89	99
cM capacity (veh/h)			1040		262	547

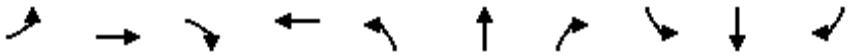
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	538	489	30	6
Volume Left	0	0	30	0
Volume Right	0	0	0	6
cSH	1700	1700	262	547
Volume to Capacity	0.32	0.29	0.11	0.01
Queue Length 95th (ft)	0	0	10	1
Control Delay (s)	0.0	0.0	20.5	11.7
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	19.0	
Approach LOS			C	

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	483	13	22	453	0	0
Future Volume (Veh/h)	483	13	22	453	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	525	26	44	492	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			551		1105	525
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			551		1105	525
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			96		100	100
cM capacity (veh/h)			985		225	557

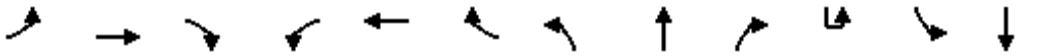
Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	525	26	44	492
Volume Left	0	0	44	0
Volume Right	0	26	0	0
cSH	1700	1700	985	1700
Volume to Capacity	0.31	0.02	0.04	0.29
Queue Length 95th (ft)	0	0	4	0
Control Delay (s)	0.0	0.0	8.8	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.7	
Approach LOS				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	136	136	212	17	195	272	1	15	381	88
v/c Ratio	0.56	0.56	0.14	0.05	0.47	0.19	0.00	0.04	0.59	0.14
Control Delay	40.3	40.3	0.2	0.2	18.2	16.8	0.0	12.9	32.6	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.3	40.3	0.2	0.2	18.2	16.8	0.0	12.9	32.6	0.4
Queue Length 50th (ft)	63	63	0	0	55	38	0	4	87	0
Queue Length 95th (ft)	130	130	0	0	106	93	0	15	141	0
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	343	343	1529	386	464	1455	487	395	949	722
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	0.40	0.40	0.14	0.04	0.42	0.19	0.00	0.04	0.40	0.12

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	258	0	201	5	0	11	185	258	1	9	6	362
Future Volume (vph)	258	0	201	5	0	11	185	258	1	9	6	362
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.90		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1655	1529		1502		1721	3541	824		1328	3369
Flt Permitted	0.95	0.95	1.00		0.99		0.53	1.00	1.00		0.58	1.00
Satd. Flow (perm)	1655	1655	1529		1502		953	3541	824		817	3369
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	272	0	212	5	0	12	195	272	1	9	6	381
RTOR Reduction (vph)	0	0	0	0	16	0	0	0	1	0	0	0
Lane Group Flow (vph)	136	136	212	0	1	0	195	272	0	0	15	381
Heavy Vehicles (%)	1%	0%	3%	20%	0%	9%	7%	4%	100%	0%	83%	5%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	11.3	11.3	83.3		7.1		32.4	31.2	31.2		32.4	22.0
Effective Green, g (s)	11.3	11.3	83.3		7.1		32.4	31.2	31.2		32.4	22.0
Actuated g/C Ratio	0.14	0.14	1.00		0.09		0.39	0.37	0.37		0.39	0.26
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	224	224	1529		128		466	1326	308		325	889
v/s Ratio Prot	c0.08	0.08			0.00		c0.05	c0.08			0.00	c0.11
v/s Ratio Perm			c0.14				0.11		0.00		0.02	
v/c Ratio	0.61	0.61	0.14		0.01		0.42	0.21	0.00		0.05	0.43
Uniform Delay, d1	33.9	33.9	0.0		34.9		17.5	17.6	16.3		15.7	25.4
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.6	4.6	0.2		0.0		0.6	0.1	0.0		0.1	0.3
Delay (s)	38.5	38.5	0.2		34.9		18.1	17.7	16.3		15.8	25.8
Level of Service	D	D	A		C		B	B	B		B	C
Approach Delay (s)		21.7			34.9			17.9				23.6
Approach LOS		C			C			B				C

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	83.3	Sum of lost time (s)	32.5
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	84
Future Volume (vph)	84
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1439
Flt Permitted	1.00
Satd. Flow (perm)	1439
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	88
RTOR Reduction (vph)	53
Lane Group Flow (vph)	35
Heavy Vehicles (%)	10%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	33.3
Effective Green, g (s)	33.3
Actuated g/C Ratio	0.40
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	575
v/s Ratio Prot	0.01
v/s Ratio Perm	0.02
v/c Ratio	0.06
Uniform Delay, d1	15.4
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	15.4
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	213	342	79	173	362	206	124	198
Average Queue (ft)	45	193	37	35	179	98	30	84
95th Queue (ft)	131	311	66	106	306	176	77	154
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	6		0	8		0	3
Queuing Penalty (veh)	0	2		0	3		0	1

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	24
Average Queue (ft)	2
95th Queue (ft)	13
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	255
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	38	27
Average Queue (ft)	10	4
95th Queue (ft)	35	19
Link Distance (ft)	382	382
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	53
Average Queue (ft)	7
95th Queue (ft)	30
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	160
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	SB
Directions Served	ULT	TR	T	L>
Maximum Queue (ft)	188	150	2	68
Average Queue (ft)	57	17	0	28
95th Queue (ft)	145	79	2	59
Link Distance (ft)	393	351	787	742
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	152	113	46	50	169	164	127	27	59	155	159	79
Average Queue (ft)	82	41	4	11	77	70	18	1	10	87	91	31
95th Queue (ft)	134	96	23	36	131	129	69	14	38	140	145	66
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0			0		
Queuing Penalty (veh)							0			0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	8	69	56	58	29
Average Queue (ft)	3	18	14	21	12
95th Queue (ft)	9	55	43	48	36
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 6

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

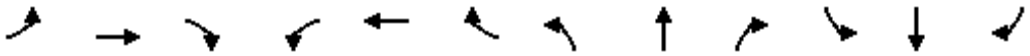
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	8	0	11	4	48	0	0	12	5	0	0
Future Vol, veh/h	0	8	0	11	4	48	0	0	12	5	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	13	0	55	2	7	0	0	35	0	0	0
Mvmt Flow	0	9	0	12	4	52	0	0	13	5	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.4	7.3	6.5	7.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	73%	0%	100%
Vol Thru, %	0%	100%	27%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	8	15	48	5
LT Vol	0	0	11	0	5
Through Vol	0	8	4	0	0
RT Vol	12	0	0	48	0
Lane Flow Rate	13	9	16	52	5
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.012	0.01	0.026	0.056	0.006
Departure Headway (Hd)	3.434	4.304	5.84	3.872	4.241
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	1035	833	616	930	840
Service Time	1.479	2.323	3.543	1.575	2.285
HCM Lane V/C Ratio	0.013	0.011	0.026	0.056	0.006
HCM Control Delay	6.5	7.4	8.7	6.8	7.3
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0	0	0.1	0.2	0

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	40	535	101	40	532	203	28	91
v/c Ratio	0.27	0.75	0.15	0.25	0.63	0.67	0.15	0.41
Control Delay	49.1	33.8	1.6	48.4	27.5	48.0	41.7	38.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.1	33.8	1.6	48.4	27.5	48.0	41.7	38.7
Queue Length 50th (ft)	23	283	0	23	281	110	16	40
Queue Length 95th (ft)	62	452	12	61	449	204	44	92
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	148	828	778	158	862	374	352	386
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	0.27	0.65	0.13	0.25	0.62	0.54	0.08	0.24

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	492	93	37	477	13	78	77	31	26	54	29
Future Volume (vph)	37	492	93	37	477	13	78	77	31	26	54	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1642	1828	1539	1745	1816			1713		1638	1719	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1642	1828	1539	1745	1816			1713		1638	1719	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	535	101	40	518	14	85	84	34	28	59	32
RTOR Reduction (vph)	0	0	60	0	1	0	0	7	0	0	19	0
Lane Group Flow (vph)	40	535	41	40	531	0	0	196	0	28	72	0
Heavy Vehicles (%)	11%	5%	6%	6%	7%	0%	8%	4%	7%	8%	4%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.3	38.4	38.4	8.2	42.3			15.7		8.5	8.5	
Effective Green, g (s)	4.3	38.4	38.4	8.2	42.3			15.7		8.5	8.5	
Actuated g/C Ratio	0.05	0.41	0.41	0.09	0.45			0.17		0.09	0.09	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	74	740	623	150	810			283		146	154	
v/s Ratio Prot	c0.02	c0.29		0.02	c0.29			c0.11		0.02	c0.04	
v/s Ratio Perm			0.03									
v/c Ratio	0.54	0.72	0.07	0.27	0.66			0.69		0.19	0.47	
Uniform Delay, d1	44.3	23.7	17.2	40.5	20.6			37.3		40.0	41.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	9.7	3.7	0.1	1.3	2.1			7.7		0.9	3.0	
Delay (s)	54.0	27.5	17.3	41.8	22.7			45.0		40.8	44.0	
Level of Service	D	C	B	D	C			D		D	D	
Approach Delay (s)		27.5			24.0			45.0			43.3	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	29.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	94.8	Sum of lost time (s)	24.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	483	20	9	467	0	0
Future Volume (Veh/h)	483	20	9	467	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.93	0.50	0.50	0.93	0.93	0.93
Hourly flow rate (vph)	519	40	18	502	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			559		1057	519
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			559		1057	519
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	100
cM capacity (veh/h)			1022		247	561

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	519	40	18	502
Volume Left	0	0	18	0
Volume Right	0	40	0	0
cSH	1700	1700	1022	1700
Volume to Capacity	0.31	0.02	0.02	0.30
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.0	8.6	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.3	
Approach LOS				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	487	0	0	440	38	53
Future Volume (Veh/h)	487	0	0	440	38	53
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	529	0	0	478	76	106
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			529		1007	529
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			529		1007	529
tC, single (s)			4.1		6.5	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.5
p0 queue free %			100		70	80
cM capacity (veh/h)			1048		255	521

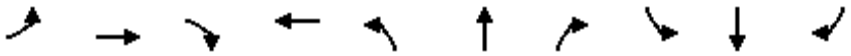
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	529	478	76	106
Volume Left	0	0	76	0
Volume Right	0	0	0	106
cSH	1700	1700	255	521
Volume to Capacity	0.31	0.28	0.30	0.20
Queue Length 95th (ft)	0	0	30	19
Control Delay (s)	0.0	0.0	25.0	13.7
Lane LOS			D	B
Approach Delay (s)	0.0	0.0	18.4	
Approach LOS			C	

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	522	16	15	443	0	0
Future Volume (Veh/h)	522	16	15	443	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	567	32	30	482	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			599		1109	567
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			599		1109	567
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		100	100
cM capacity (veh/h)			988		227	527

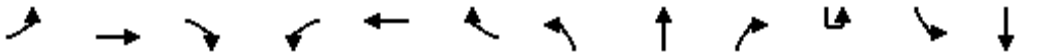
Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	567	32	30	482
Volume Left	0	0	30	0
Volume Right	0	32	0	0
cSH	1700	1700	988	1700
Volume to Capacity	0.33	0.02	0.03	0.28
Queue Length 95th (ft)	0	0	2	0
Control Delay (s)	0.0	0.0	8.8	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.5	
Approach LOS				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	138	140	186	20	170	239	11	18	347	139
v/c Ratio	0.53	0.54	0.13	0.15	0.41	0.17	0.02	0.04	0.57	0.21
Control Delay	38.5	38.7	0.2	27.3	18.1	17.5	0.1	13.8	33.0	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	38.7	0.2	27.3	18.1	17.5	0.1	13.8	33.0	1.4
Queue Length 50th (ft)	62	63	0	4	48	34	0	5	78	0
Queue Length 95th (ft)	132	133	0	27	99	87	0	18	135	9
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	388	390	1485	154	469	1380	633	500	838	780
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	0.36	0.36	0.13	0.13	0.36	0.17	0.02	0.04	0.41	0.18

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	268	2	180	6	3	11	165	232	11	11	7	337
Future Volume (vph)	268	2	180	6	3	11	165	232	11	11	7	337
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.93		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1661	1485		1329		1737	3474	1211		1678	3276
Flt Permitted	0.95	0.95	1.00		0.99		0.54	1.00	1.00		0.60	1.00
Satd. Flow (perm)	1655	1661	1485		1329		994	3474	1211		1065	3276
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	276	2	186	6	3	11	170	239	11	11	7	347
RTOR Reduction (vph)	0	0	0	0	10	0	0	0	7	0	0	0
Lane Group Flow (vph)	138	140	186	0	10	0	170	239	4	0	18	347
Heavy Vehicles (%)	1%	0%	6%	33%	33%	27%	6%	6%	36%	0%	14%	8%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	11.9	11.9	83.2		7.3		31.5	30.3	30.3		31.5	21.6
Effective Green, g (s)	11.9	11.9	83.2		7.3		31.5	30.3	30.3		31.5	21.6
Actuated g/C Ratio	0.14	0.14	1.00		0.09		0.38	0.36	0.36		0.38	0.26
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	236	237	1485		116		464	1265	441		412	850
v/s Ratio Prot	0.08	c0.08			0.01		c0.04	c0.07			0.00	c0.11
v/s Ratio Perm			c0.13				0.09		0.00		0.02	
v/c Ratio	0.58	0.59	0.13		0.09		0.37	0.19	0.01		0.04	0.41
Uniform Delay, d1	33.3	33.4	0.0		34.9		17.8	18.1	16.9		16.2	25.5
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.7	3.9	0.2		0.3		0.5	0.1	0.0		0.0	0.3
Delay (s)	37.0	37.3	0.2		35.2		18.3	18.1	16.9		16.3	25.8
Level of Service	D	D	A		D		B	B	B		B	C
Approach Delay (s)		22.3			35.2			18.2				22.6
Approach LOS		C			D			B				C

Intersection Summary			
HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	83.2	Sum of lost time (s)	32.5
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	135
Future Volume (vph)	135
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1507
Flt Permitted	1.00
Satd. Flow (perm)	1507
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	139
RTOR Reduction (vph)	83
Lane Group Flow (vph)	56
Heavy Vehicles (%)	5%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	33.5
Effective Green, g (s)	33.5
Actuated g/C Ratio	0.40
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	606
v/s Ratio Prot	0.01
v/s Ratio Perm	0.02
v/c Ratio	0.09
Uniform Delay, d1	15.4
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	15.5
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	186	410	69	183	401	227	84	130
Average Queue (ft)	40	213	28	39	182	107	21	53
95th Queue (ft)	118	349	58	113	342	191	58	101
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	8		0	8		0	1
Queuing Penalty (veh)	0	3		0	3		0	0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	33
Average Queue (ft)	4
95th Queue (ft)	20
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	255
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	EB	NB	NB
Directions Served	T	L	R
Maximum Queue (ft)	10	83	88
Average Queue (ft)	0	25	35
95th Queue (ft)	2	63	75
Link Distance (ft)	505	382	382
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	33
Average Queue (ft)	6
95th Queue (ft)	26
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	160
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	SB
Directions Served	ULT	UTR	T	L>
Maximum Queue (ft)	256	132	7	92
Average Queue (ft)	82	20	0	31
95th Queue (ft)	200	80	5	71
Link Distance (ft)	393	351	787	742
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	146	116	61	68	135	134	84	39	40	157	162	84
Average Queue (ft)	81	42	5	16	70	67	14	5	11	84	88	37
95th Queue (ft)	133	96	29	51	120	119	47	24	32	136	145	69
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)										0		
Queuing Penalty (veh)										0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	22	66	64	59	29
Average Queue (ft)	2	16	26	14	4
95th Queue (ft)	13	51	53	46	21
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 6

MOVEMENT SUMMARY

Site: 101 [2026 Background - AM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.564	10.6	LOS B	4.8	128.4	0.29	0.13	0.29	24.2
6	T1	440	10.0	484	10.0	0.564	10.9	LOS B	4.8	128.4	0.29	0.13	0.29	23.1
16	R2	75	11.0	82	11.0	0.564	11.0	LOS B	4.8	128.4	0.29	0.13	0.29	22.5
Approach		516	10.1	567	10.1	0.564	10.9	LOS B	4.8	128.4	0.29	0.13	0.29	23.0
North: Falmouth Street														
7	L2	77	21.0	85	21.0	0.211	9.2	LOS A	1.3	36.1	0.69	0.59	0.69	23.2
14	R2	35	9.0	38	9.0	0.211	8.3	LOS A	1.3	36.1	0.69	0.59	0.69	22.2
Approach		112	17.3	123	17.3	0.211	8.9	LOS A	1.3	36.1	0.69	0.59	0.69	22.9
West: E Shirley Avenue														
5u	U	1	0.0	1	0.0	0.135	4.7	LOS A	0.8	21.3	0.34	0.18	0.34	25.4
5	L2	32	19.0	35	19.0	0.135	5.4	LOS A	0.8	21.3	0.34	0.18	0.34	24.7
2	T1	306	9.0	336	9.0	0.135	1.4	LOS A	0.8	21.3	0.09	0.05	0.09	25.5
Approach		339	9.9	373	9.9	0.135	1.8	LOS A	0.8	21.3	0.12	0.06	0.12	25.4
All Vehicles		967	10.9	1063	10.9	0.564	7.5	LOS A	4.8	128.4	0.27	0.16	0.27	23.8

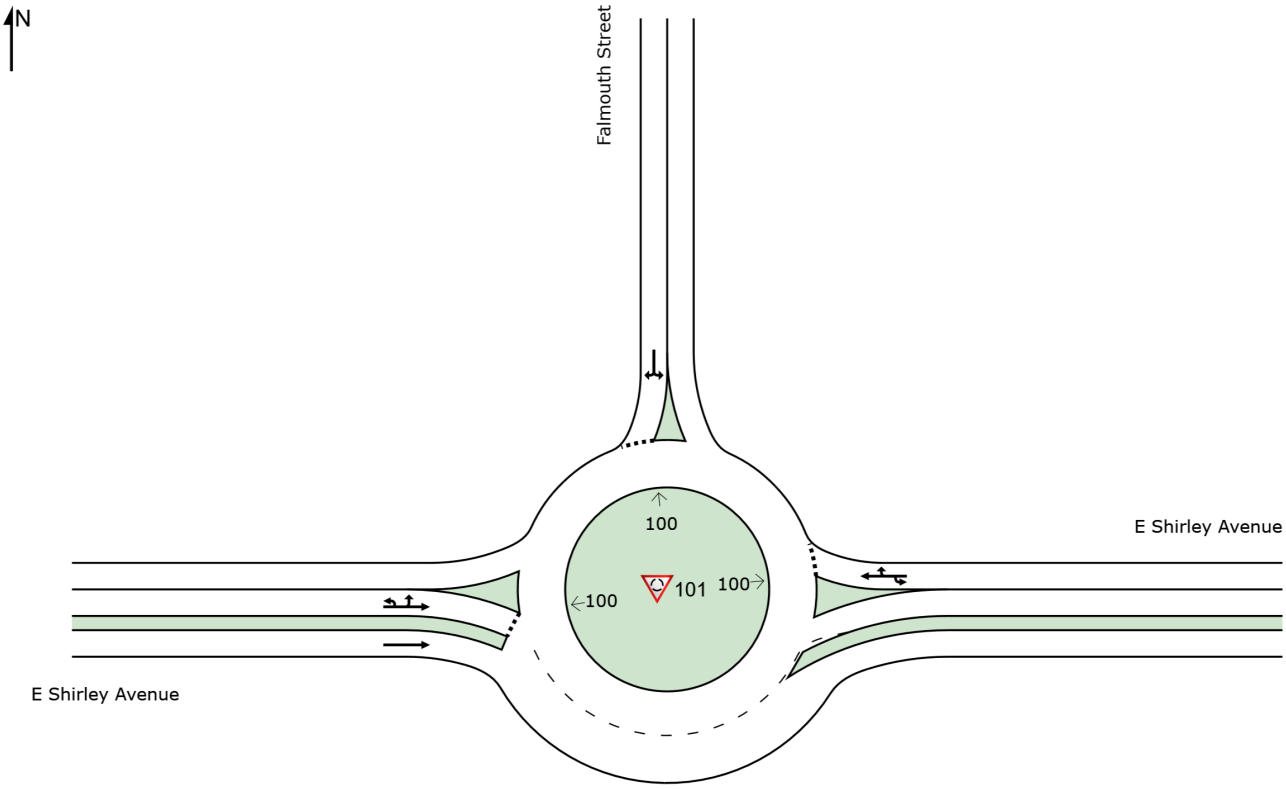
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [2026 Background - AM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [2026 Background - Commuter Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.643	12.8	LOS B	6.7	190.3	0.27	0.10	0.27	23.5
6	T1	426	21.0	468	21.0	0.643	13.5	LOS B	6.7	190.3	0.27	0.10	0.27	22.5
16	R2	139	4.0	153	4.0	0.643	13.0	LOS B	6.7	190.3	0.27	0.10	0.27	22.0
Approach		566	16.8	622	16.8	0.643	13.4	LOS B	6.7	190.3	0.27	0.10	0.27	22.4
North: Falmouth Street														
7	L2	111	1.0	122	1.0	0.233	8.0	LOS A	1.5	38.9	0.71	0.59	0.71	23.3
14	R2	33	9.0	36	9.0	0.233	8.5	LOS A	1.5	38.9	0.71	0.59	0.71	22.3
Approach		144	2.8	158	2.8	0.233	8.1	LOS A	1.5	38.9	0.71	0.59	0.71	23.0
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.191	5.3	LOS A	1.2	30.5	0.38	0.22	0.38	25.5
5	L2	19	11.0	21	11.0	0.191	5.8	LOS A	1.2	30.5	0.38	0.22	0.38	24.8
2	T1	476	5.0	523	5.0	0.191	1.7	LOS A	1.2	30.5	0.12	0.07	0.12	25.4
Approach		497	5.2	546	5.2	0.191	1.9	LOS A	1.2	30.5	0.13	0.07	0.13	25.4
All Vehicles		1207	10.4	1326	10.4	0.643	8.0	LOS A	6.7	190.3	0.27	0.15	0.27	23.6

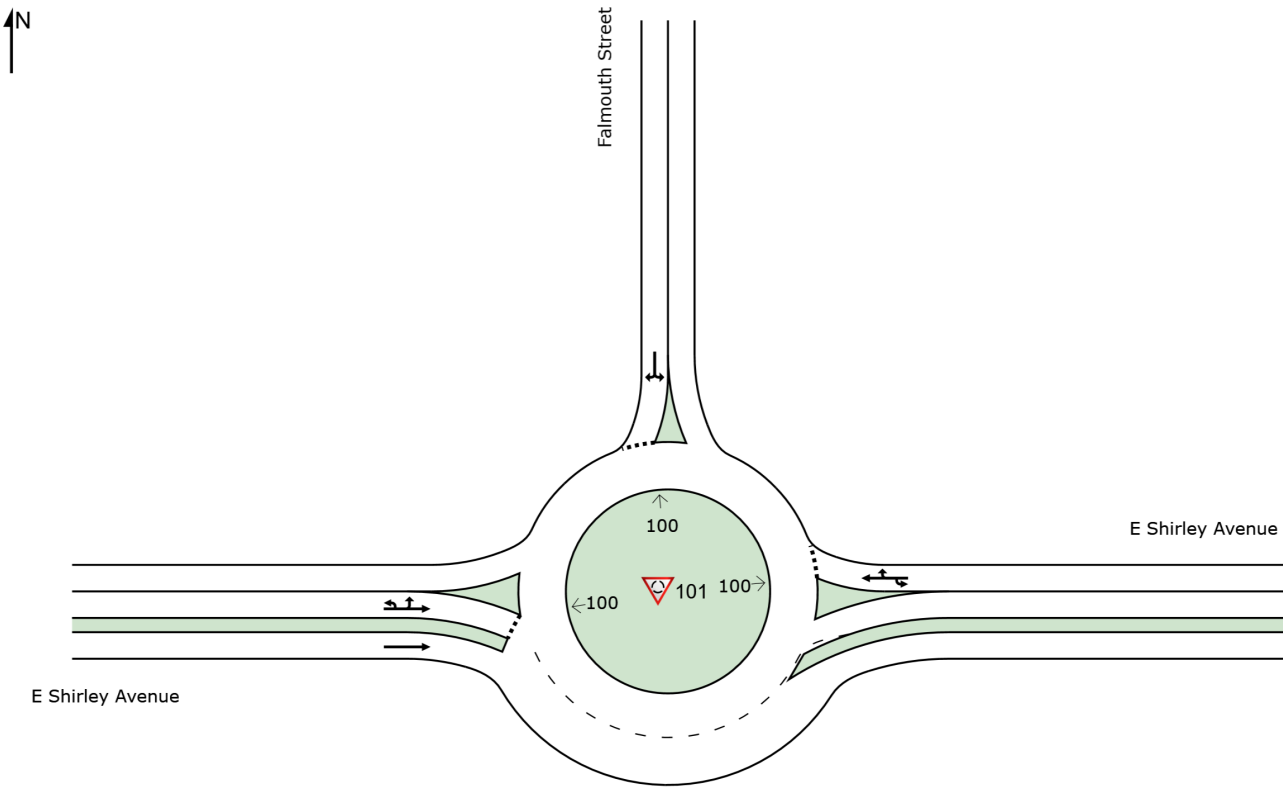
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [2026 Background - Commuter Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [2026 Background - School PM (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	2	0.0	2	0.0	0.517	9.3	LOS A	4.1	106.5	0.24	0.09	0.24	24.5
6	T1	417	4.0	421	4.0	0.517	9.5	LOS A	4.1	106.5	0.24	0.09	0.24	23.4
16	R2	130	6.0	131	6.0	0.517	9.5	LOS A	4.1	106.5	0.24	0.09	0.24	22.8
Approach		549	4.5	555	4.5	0.517	9.5	LOS A	4.1	106.5	0.24	0.09	0.24	23.3
North: Falmouth Street														
7	L2	123	7.0	124	7.0	0.203	7.3	LOS A	1.2	32.4	0.62	0.49	0.62	23.4
14	R2	24	0.0	24	0.0	0.203	6.9	LOS A	1.2	32.4	0.62	0.49	0.62	22.5
Approach		147	5.9	148	5.9	0.203	7.2	LOS A	1.2	32.4	0.62	0.49	0.62	23.3
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.195	5.5	LOS A	1.2	31.0	0.40	0.23	0.40	25.4
5	L2	27	23.0	27	23.0	0.195	6.5	LOS A	1.2	31.0	0.40	0.23	0.40	24.7
2	T1	515	5.0	520	5.0	0.195	1.7	LOS A	1.2	31.0	0.12	0.07	0.12	25.4
Approach		544	5.9	549	5.9	0.195	2.0	LOS A	1.2	31.0	0.13	0.08	0.13	25.4
All Vehicles		1240	5.2	1253	5.2	0.517	5.9	LOS A	4.1	106.5	0.24	0.13	0.24	24.2

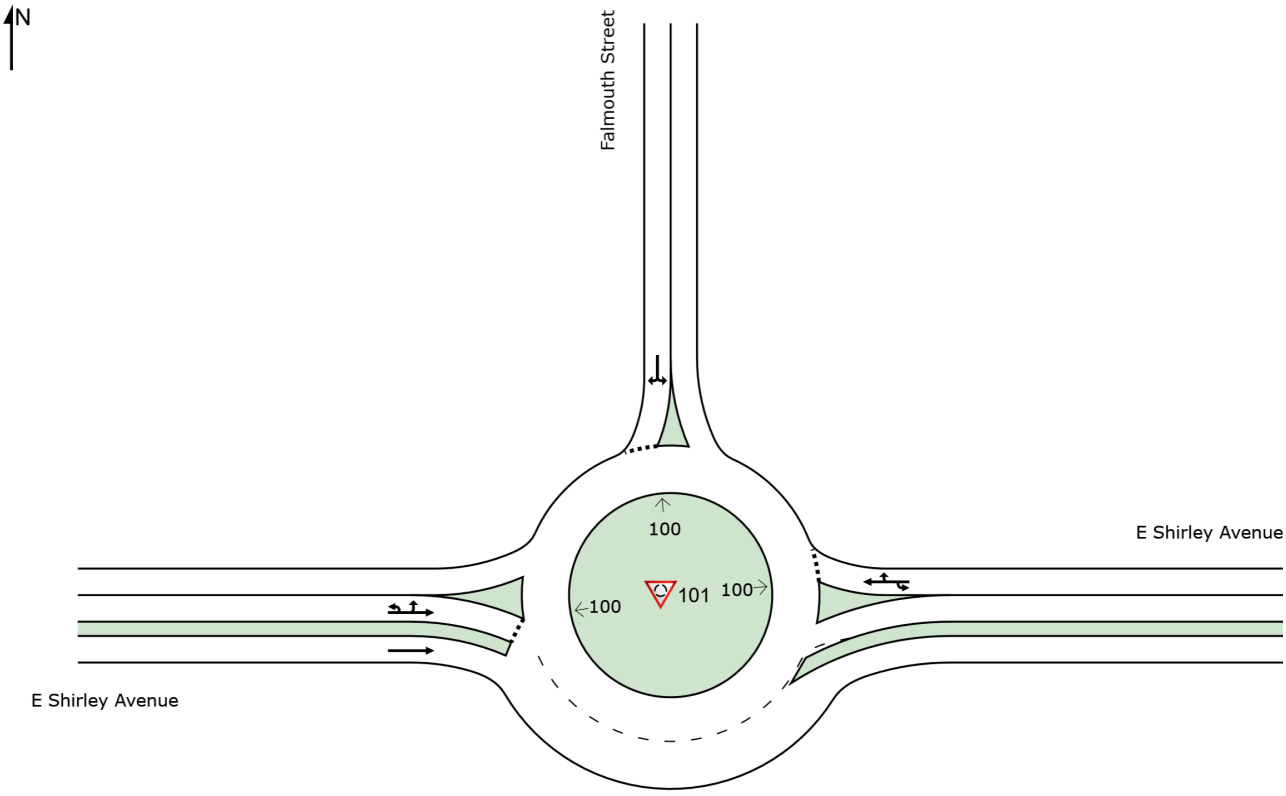
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [2026 Background - School PM (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [2032 Background - AM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.689	14.3	LOS B	7.7	209.4	0.39	0.18	0.39	23.2
6	T1	527	10.0	579	10.0	0.689	14.6	LOS B	7.7	209.4	0.39	0.18	0.39	22.2
16	R2	100	11.0	110	11.0	0.689	14.6	LOS B	7.7	209.4	0.39	0.18	0.39	21.7
Approach		628	10.1	690	10.1	0.689	14.6	LOS B	7.7	209.4	0.39	0.18	0.39	22.2
North: Falmouth Street														
7	L2	90	21.0	99	21.0	0.271	11.3	LOS B	1.7	49.2	0.77	0.70	0.77	22.7
14	R2	37	9.0	41	9.0	0.271	10.3	LOS B	1.7	49.2	0.77	0.70	0.77	21.8
Approach		127	17.5	140	17.5	0.271	11.0	LOS B	1.7	49.2	0.77	0.70	0.77	22.4
West: E Shirley Avenue														
5u	U	1	0.0	1	0.0	0.155	5.0	LOS A	0.9	25.1	0.38	0.21	0.38	25.3
5	L2	34	19.0	37	19.0	0.155	5.8	LOS A	0.9	25.1	0.38	0.21	0.38	24.6
2	T1	350	9.0	385	9.0	0.155	1.4	LOS A	0.9	25.1	0.10	0.06	0.10	25.5
Approach		385	9.9	423	9.9	0.155	1.9	LOS A	0.9	25.1	0.13	0.07	0.13	25.4
All Vehicles		1140	10.9	1253	10.9	0.689	9.9	LOS A	7.7	209.4	0.34	0.20	0.34	23.2

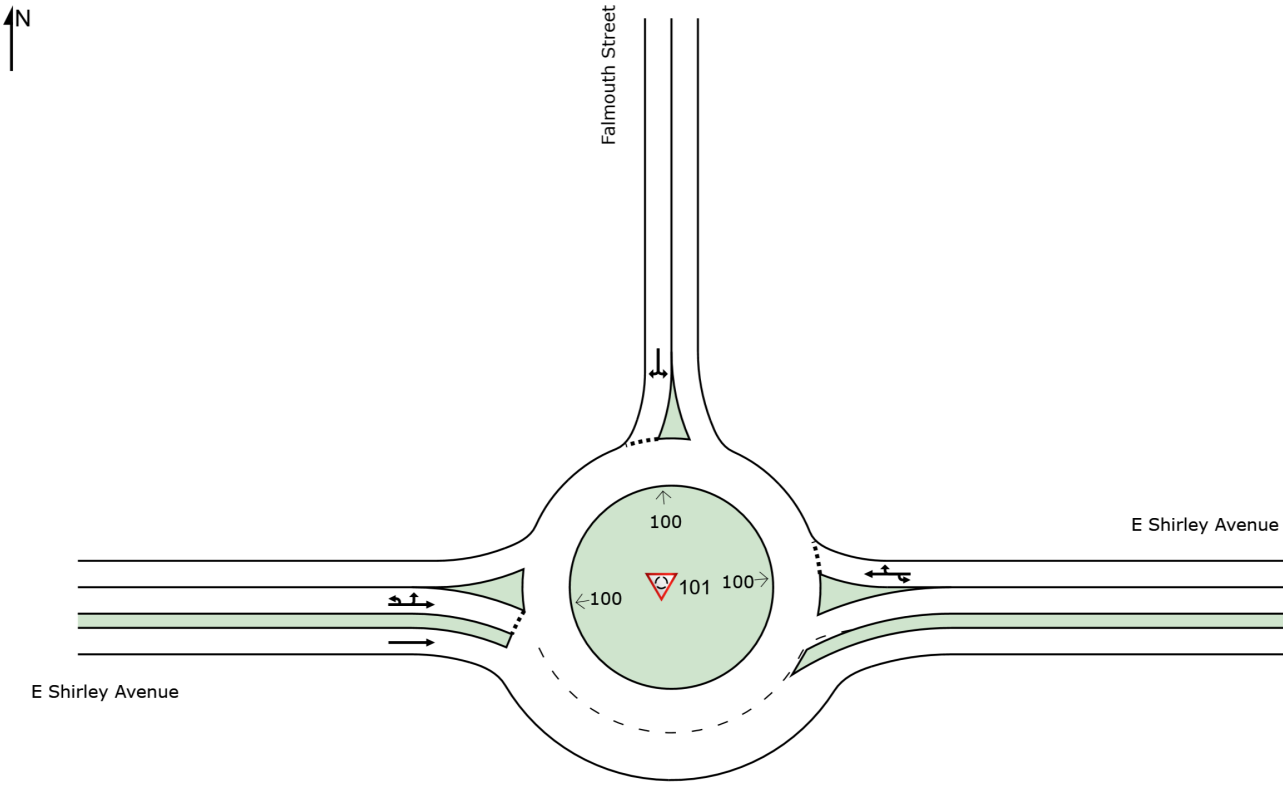
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [2032 Background - AM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [2032 Background - Commuter Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.765	18.0	LOS B	11.6	329.9	0.39	0.15	0.39	22.3
6	T1	505	21.0	555	21.0	0.765	18.7	LOS B	11.6	329.9	0.39	0.15	0.39	21.4
16	R2	166	4.0	182	4.0	0.765	18.1	LOS B	11.6	329.9	0.39	0.15	0.39	20.9
Approach		672	16.8	738	16.8	0.765	18.6	LOS B	11.6	329.9	0.39	0.15	0.39	21.3
North: Falmouth Street														
7	L2	145	1.0	159	1.0	0.329	10.4	LOS B	2.3	59.6	0.81	0.73	0.81	22.7
14	R2	35	9.0	38	9.0	0.329	11.1	LOS B	2.3	59.6	0.81	0.73	0.81	21.8
Approach		180	2.6	198	2.6	0.329	10.6	LOS B	2.3	59.6	0.81	0.73	0.81	22.5
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.239	6.2	LOS A	1.5	39.9	0.46	0.30	0.46	25.3
5	L2	20	11.0	22	11.0	0.239	6.7	LOS A	1.5	39.9	0.46	0.30	0.46	24.6
2	T1	586	5.0	644	5.0	0.239	1.9	LOS A	1.5	39.9	0.14	0.09	0.14	25.4
Approach		608	5.2	668	5.2	0.239	2.2	LOS A	1.5	39.9	0.15	0.10	0.15	25.3
All Vehicles		1460	10.2	1604	10.2	0.765	10.7	LOS B	11.6	329.9	0.34	0.20	0.34	23.0

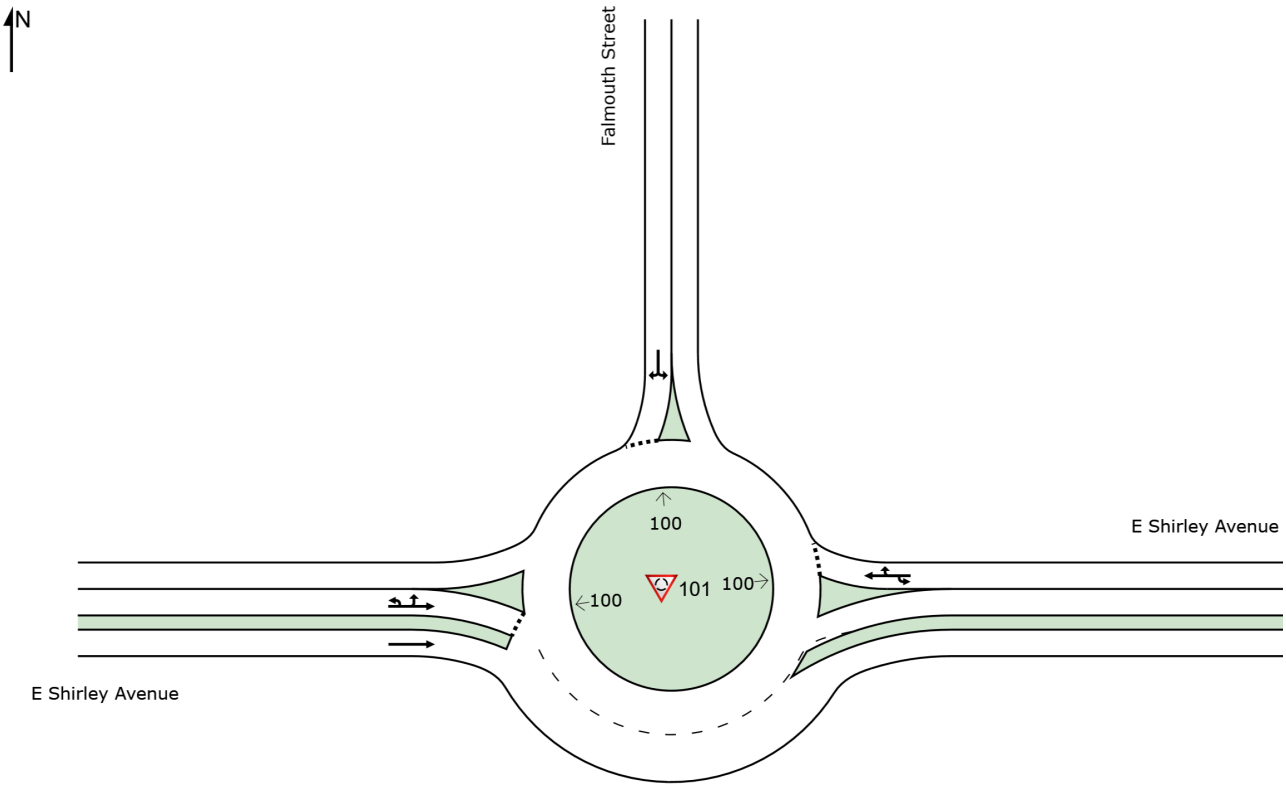
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [2032 Background - Commuter Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [2032 Background - School PM (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	2	0.0	2	0.0	0.602	11.2	LOS B	5.7	148.8	0.29	0.12	0.29	24.0
6	T1	484	4.0	489	4.0	0.602	11.3	LOS B	5.7	148.8	0.29	0.12	0.29	23.0
16	R2	152	6.0	154	6.0	0.602	11.4	LOS B	5.7	148.8	0.29	0.12	0.29	22.4
Approach		638	4.5	644	4.5	0.602	11.3	LOS B	5.7	148.8	0.29	0.12	0.29	22.8
North: Falmouth Street														
7	L2	144	7.0	145	7.0	0.250	8.4	LOS A	1.6	41.8	0.68	0.57	0.68	23.1
14	R2	25	0.0	25	0.0	0.250	7.9	LOS A	1.6	41.8	0.68	0.57	0.68	22.2
Approach		169	6.0	171	6.0	0.250	8.3	LOS A	1.6	41.8	0.68	0.57	0.68	23.0
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.225	6.0	LOS A	1.4	36.8	0.44	0.28	0.44	25.3
5	L2	28	23.0	28	23.0	0.225	7.0	LOS A	1.4	36.8	0.44	0.28	0.44	24.6
2	T1	590	5.0	596	5.0	0.225	1.8	LOS A	1.4	36.8	0.13	0.08	0.13	25.4
Approach		620	5.8	626	5.8	0.225	2.1	LOS A	1.4	36.8	0.14	0.09	0.14	25.4
All Vehicles		1427	5.2	1441	5.2	0.602	6.9	LOS A	5.7	148.8	0.27	0.16	0.27	23.9

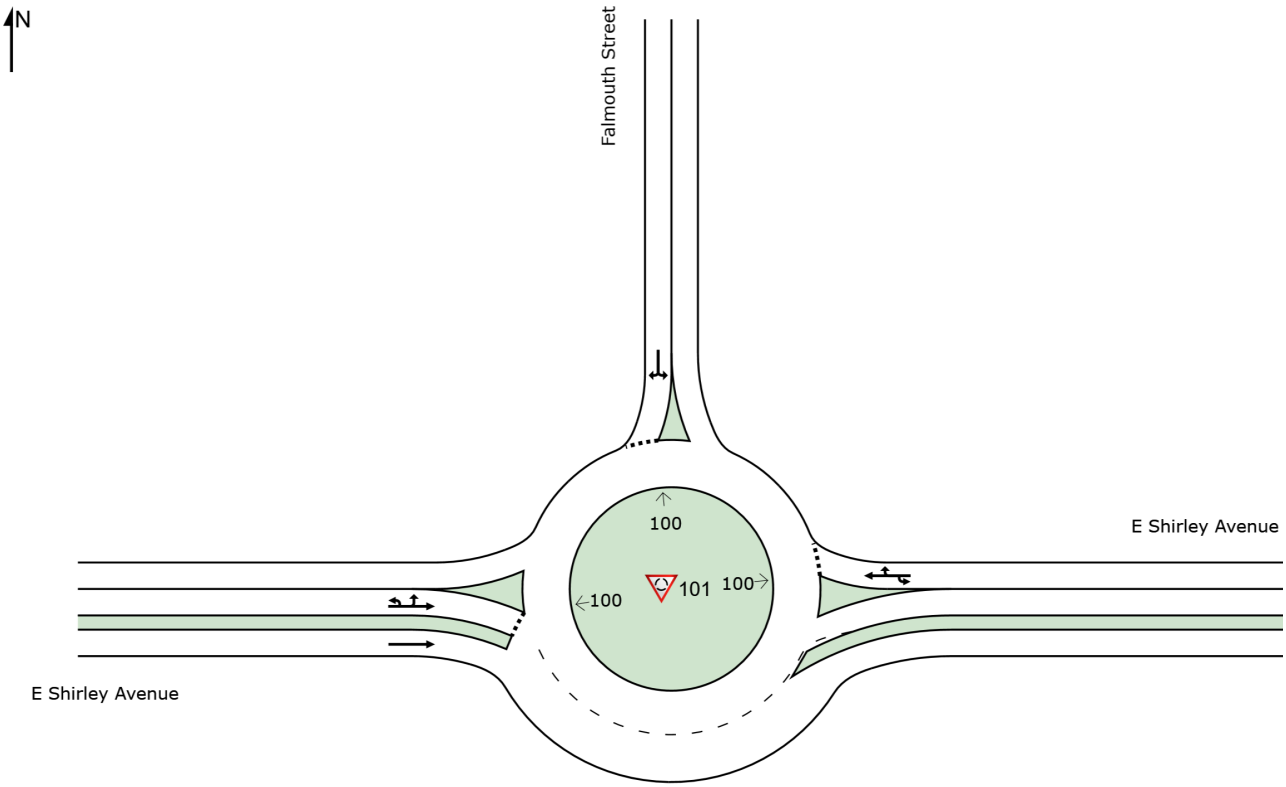
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [2032 Background - School PM (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Appendix F
2026 Future Analysis Worksheets

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	5	0	46	21	175	0	0	35	79	0	0
Future Vol, veh/h	0	5	0	46	21	175	0	0	35	79	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	24	0	7	0	0	65	8	0	0
Mvmt Flow	0	5	0	50	23	190	0	0	38	86	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.6	8.2	7.2	8.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	69%	0%	100%
Vol Thru, %	0%	100%	31%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	35	5	67	175	79
LT Vol	0	0	46	0	79
Through Vol	0	5	21	0	0
RT Vol	35	0	0	175	0
Lane Flow Rate	38	5	73	190	86
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.042	0.007	0.111	0.212	0.116
Departure Headway (Hd)	3.998	4.564	5.471	4.017	4.868
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	900	787	648	879	740
Service Time	2.002	2.577	3.266	1.811	2.87
HCM Lane V/C Ratio	0.042	0.006	0.113	0.216	0.116
HCM Control Delay	7.2	7.6	9	7.9	8.5
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0	0.4	0.8	0.4

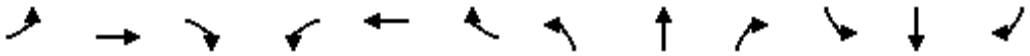
1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	32	393	74	32	500	234	16	57
v/c Ratio	0.19	0.57	0.11	0.21	0.63	0.71	0.09	0.29
Control Delay	45.6	27.2	0.3	46.3	26.8	47.0	41.7	32.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.6	27.2	0.3	46.3	26.8	47.0	41.7	32.5
Queue Length 50th (ft)	18	188	0	18	260	120	9	20
Queue Length 95th (ft)	50	297	0	50	406	#239	30	59
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	166	804	784	152	824	386	383	384
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	0.19	0.49	0.09	0.21	0.61	0.61	0.04	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)	29	362	68	29	437	23	80	83	52	15	32	20
Future Volume (vph)	29	362	68	29	437	23	80	83	52	15	32	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99			0.97		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1823	1761	1539	1667	1720			1735		1769	1690	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1823	1761	1539	1667	1720			1735		1769	1690	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	393	74	32	475	25	87	90	57	16	35	22
RTOR Reduction (vph)	0	0	44	0	2	0	0	11	0	0	20	0
Lane Group Flow (vph)	32	393	30	32	498	0	0	223	0	16	37	0
Heavy Vehicles (%)	0%	9%	6%	11%	13%	0%	6%	2%	4%	0%	3%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.4	37.7	37.7	8.2	41.5			16.5		7.1	7.1	
Effective Green, g (s)	4.4	37.7	37.7	8.2	41.5			16.5		7.1	7.1	
Actuated g/C Ratio	0.05	0.40	0.40	0.09	0.44			0.18		0.08	0.08	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	85	710	620	146	763			306		134	128	
v/s Ratio Prot	0.02	0.22		c0.02	c0.29			c0.13		0.01	c0.02	
v/s Ratio Perm			0.02									
v/c Ratio	0.38	0.55	0.05	0.22	0.65			0.73		0.12	0.29	
Uniform Delay, d1	43.2	21.4	17.0	39.7	20.4			36.4		40.3	40.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	3.8	1.2	0.0	1.0	2.2			9.0		0.5	1.7	
Delay (s)	47.0	22.6	17.0	40.7	22.6			45.4		40.8	42.5	
Level of Service	D	C	B	D	C			D		D	D	
Approach Delay (s)		23.3			23.7			45.4			42.1	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	93.5	Sum of lost time (s)	24.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	367	12	19	472	0	0
Future Volume (Veh/h)	367	12	19	472	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	399	24	38	513	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			423		988	399
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			423		988	399
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			96		100	100
cM capacity (veh/h)			1080		267	655

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	399	24	38	513
Volume Left	0	0	38	0
Volume Right	0	24	0	0
cSH	1700	1700	1080	1700
Volume to Capacity	0.23	0.01	0.04	0.30
Queue Length 95th (ft)	0	0	3	0
Control Delay (s)	0.0	0.0	8.5	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.6	
Approach LOS				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	35.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	358	0	0	482	12	19
Future Volume (Veh/h)	358	0	0	482	12	19
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	389	0	0	524	24	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			389		913	389
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			389		913	389
tC, single (s)			4.1		6.6	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.4
p0 queue free %			100		92	94
cM capacity (veh/h)			1181		286	630

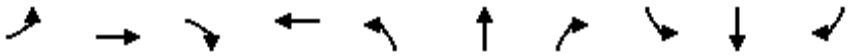
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	389	524	24	38
Volume Left	0	0	24	0
Volume Right	0	0	0	38
cSH	1700	1700	286	630
Volume to Capacity	0.23	0.31	0.08	0.06
Queue Length 95th (ft)	0	0	7	5
Control Delay (s)	0.0	0.0	18.7	11.1
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	14.0	
Approach LOS			B	

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	35.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	338	80	25	423	57	44
Future Volume (Veh/h)	338	80	25	423	57	44
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.95	0.50	0.50	0.95	0.95	0.95
Hourly flow rate (vph)	356	160	50	445	60	46
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			516		901	356
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			516		901	356
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		80	93
cM capacity (veh/h)			1060		297	693

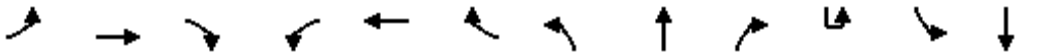
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	356	160	50	445	106
Volume Left	0	0	50	0	60
Volume Right	0	160	0	0	46
cSH	1700	1700	1060	1700	395
Volume to Capacity	0.21	0.09	0.05	0.26	0.27
Queue Length 95th (ft)	0	0	4	0	27
Control Delay (s)	0.0	0.0	8.6	0.0	17.4
Lane LOS			A		C
Approach Delay (s)	0.0		0.9		17.4
Approach LOS					C

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	60	60	145	6	283	403	10	10	142	155
v/c Ratio	0.38	0.38	0.11	0.01	0.57	0.28	0.01	0.02	0.28	0.24
Control Delay	38.2	38.2	0.2	0.0	18.8	16.2	0.0	11.7	30.8	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.2	38.2	0.2	0.0	18.8	16.2	0.0	11.7	30.8	0.9
Queue Length 50th (ft)	27	27	0	0	79	55	0	2	30	0
Queue Length 95th (ft)	68	68	0	0	146	129	0	11	63	0
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	225	225	1291	429	618	1482	858	420	723	699
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	0.27	0.27	0.11	0.01	0.46	0.27	0.01	0.02	0.20	0.22

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	110	0	133	2	0	4	260	371	9	2	7	131
Future Volume (vph)	110	0	133	2	0	4	260	371	9	2	7	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.91		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1316	1316	1291		1015		1674	3409	1647		1436	3103
Flt Permitted	0.95	0.95	1.00		0.98		0.66	1.00	1.00		0.51	1.00
Satd. Flow (perm)	1316	1316	1291		1015		1166	3409	1647		778	3103
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	0	145	2	0	4	283	403	10	2	8	142
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	6	0	0	0
Lane Group Flow (vph)	60	60	145	0	1	0	283	403	4	0	10	142
Heavy Vehicles (%)	27%	0%	22%	50%	0%	75%	10%	8%	0%	0%	29%	14%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	9.1	9.1	81.6		7.0		33.0	31.7	31.7		33.0	19.3
Effective Green, g (s)	9.1	9.1	81.6		7.0		33.0	31.7	31.7		33.0	19.3
Actuated g/C Ratio	0.11	0.11	1.00		0.09		0.40	0.39	0.39		0.40	0.24
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	146	146	1291		87		556	1324	639		325	733
v/s Ratio Prot	c0.05	0.05			0.00		c0.09	0.12			0.00	0.05
v/s Ratio Perm			c0.11				c0.12		0.00		0.01	
v/c Ratio	0.41	0.41	0.11		0.01		0.51	0.30	0.01		0.03	0.19
Uniform Delay, d1	33.8	33.8	0.0		34.1		17.4	17.3	15.3		14.6	24.9
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.9	1.9	0.2		0.0		0.7	0.1	0.0		0.0	0.1
Delay (s)	35.6	35.6	0.2		34.1		18.2	17.4	15.3		14.6	25.1
Level of Service	D	D	A		C		B	B	B		B	C
Approach Delay (s)		16.2			34.1			17.7				21.2
Approach LOS		B			C			B				C

Intersection Summary			
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	81.6	Sum of lost time (s)	32.5
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	143
Future Volume (vph)	143
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1426
Flt Permitted	1.00
Satd. Flow (perm)	1426
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	155
RTOR Reduction (vph)	101
Lane Group Flow (vph)	54
Heavy Vehicles (%)	11%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	28.4
Effective Green, g (s)	28.4
Actuated g/C Ratio	0.35
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	496
v/s Ratio Prot	0.01
v/s Ratio Perm	0.03
v/c Ratio	0.11
Uniform Delay, d1	18.0
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	18.1
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	98	280	64	172	378	212	52	99
Average Queue (ft)	27	138	24	30	172	112	14	36
95th Queue (ft)	75	237	52	97	309	193	40	78
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	1		0	6			0
Queuing Penalty (veh)	0	0		0	2			0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	46
Average Queue (ft)	5
95th Queue (ft)	26
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	255
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	66	72
Average Queue (ft)	13	19
95th Queue (ft)	44	56
Link Distance (ft)	382	382
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	WB	NB
Directions Served	R	L	LR
Maximum Queue (ft)	27	40	79
Average Queue (ft)	1	7	31
95th Queue (ft)	16	30	61
Link Distance (ft)			380
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	140	160	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	SB
Directions Served	ULT	TR	T	L>
Maximum Queue (ft)	111	135	6	82
Average Queue (ft)	22	25	0	26
95th Queue (ft)	74	87	6	67
Link Distance (ft)	393	351	787	742
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	144	78	22	61	210	198	131	23	45	102	93	114
Average Queue (ft)	52	16	1	6	97	89	26	3	6	45	35	49
95th Queue (ft)	110	55	11	33	165	158	81	14	27	84	75	89
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)					0	0	0					
Queuing Penalty (veh)					0	0	0					

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	8	76	86	88	70
Average Queue (ft)	1	37	45	35	33
95th Queue (ft)	5	67	72	79	59
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 3

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

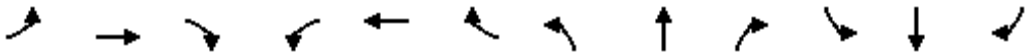
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	16	0	14	4	36	0	0	28	30	0	0
Future Vol, veh/h	0	16	0	14	4	36	0	0	28	30	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	57	0	18	0	0	7	0	0	0
Mvmt Flow	0	17	0	15	4	39	0	0	30	33	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.3	7.5	6.6	7.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	78%	0%	100%
Vol Thru, %	0%	100%	22%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	28	16	18	36	30
LT Vol	0	0	14	0	30
Through Vol	0	16	4	0	0
RT Vol	28	0	0	36	0
Lane Flow Rate	30	17	20	39	33
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.029	0.02	0.032	0.043	0.039
Departure Headway (Hd)	3.452	4.154	5.978	3.918	4.252
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	1025	858	600	913	836
Service Time	1.513	2.196	3.705	1.644	2.306
HCM Lane V/C Ratio	0.029	0.02	0.033	0.043	0.039
HCM Control Delay	6.6	7.3	8.9	6.8	7.5
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.1	0.1	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	40	504	155	34	497	189	37	147
v/c Ratio	0.26	0.75	0.23	0.22	0.62	0.66	0.15	0.57
Control Delay	50.1	36.1	4.8	49.4	28.8	49.1	39.4	46.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.1	36.1	4.8	49.4	28.8	49.1	39.4	46.2
Queue Length 50th (ft)	23	268	0	19	262	102	20	78
Queue Length 95th (ft)	63	438	43	56	426	195	53	153
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	154	788	760	152	836	363	355	364
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	0.26	0.64	0.20	0.22	0.59	0.52	0.10	0.40

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	474	146	32	463	4	84	65	29	35	112	26
Future Volume (vph)	38	474	146	32	463	4	84	65	29	35	112	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1823	1863	1584	1796	1889			1774		1769	1780	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1823	1863	1584	1796	1889			1774		1769	1780	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	40	504	155	34	493	4	89	69	31	37	119	28
RTOR Reduction (vph)	0	0	96	0	0	0	0	7	0	0	8	0
Lane Group Flow (vph)	40	504	59	34	497	0	0	182	0	37	139	0
Heavy Vehicles (%)	0%	3%	3%	3%	3%	0%	2%	2%	4%	0%	2%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.4	37.3	37.3	8.1	41.0			15.2		13.6	13.6	
Effective Green, g (s)	4.4	37.3	37.3	8.1	41.0			15.2		13.6	13.6	
Actuated g/C Ratio	0.04	0.38	0.38	0.08	0.42			0.15		0.14	0.14	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	81	707	601	148	788			274		244	246	
v/s Ratio Prot	c0.02	c0.27		0.02	c0.26			c0.10		0.02	c0.08	
v/s Ratio Perm			0.04									
v/c Ratio	0.49	0.71	0.10	0.23	0.63			0.67		0.15	0.57	
Uniform Delay, d1	45.8	25.9	19.6	42.1	22.6			39.1		37.2	39.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	6.3	3.7	0.1	1.1	1.9			6.6		0.4	3.6	
Delay (s)	52.1	29.5	19.7	43.2	24.5			45.7		37.6	43.1	
Level of Service	D	C	B	D	C			D		D	D	
Approach Delay (s)		28.7			25.7			45.7			42.0	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	98.2	Sum of lost time (s)	24.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	508	0	0	468	0	0
Future Volume (Veh/h)	508	0	0	468	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	552	0	0	509	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			552		1061	552
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			552		1061	552
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1028		250	537

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	552	0	0	509
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.32	0.00	0.00	0.30
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				
Approach Delay (s)	0.0		0.0	
Approach LOS				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	511	0	0	464	0	0
Future Volume (Veh/h)	511	0	0	464	0	0
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	555	0	0	504	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			555		1059	555
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			555		1059	555
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1026		251	535

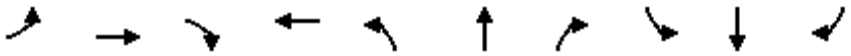
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	555	504	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.33	0.30	0.00	0.00
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS			A	

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	483	29	28	447	20	4
Future Volume (Veh/h)	483	29	28	447	20	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	525	58	56	486	22	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			583		1123	525
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			583		1123	525
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			94		90	99
cM capacity (veh/h)			958		217	557

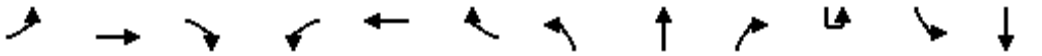
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	525	58	56	486	26
Volume Left	0	0	56	0	22
Volume Right	0	58	0	0	4
cSH	1700	1700	958	1700	239
Volume to Capacity	0.31	0.03	0.06	0.29	0.11
Queue Length 95th (ft)	0	0	5	0	9
Control Delay (s)	0.0	0.0	9.0	0.0	21.9
Lane LOS			A		C
Approach Delay (s)	0.0		0.9		21.9
Approach LOS					C

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	35.4%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	136	136	221	17	214	268	1	15	378	88
v/c Ratio	0.53	0.53	0.14	0.05	0.53	0.19	0.00	0.04	0.59	0.14
Control Delay	37.9	37.9	0.2	0.2	20.5	17.4	0.0	13.7	32.5	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.9	37.9	0.2	0.2	20.5	17.4	0.0	13.7	32.5	0.5
Queue Length 50th (ft)	62	62	0	0	62	38	0	4	86	0
Queue Length 95th (ft)	125	125	0	0	122	95	0	15	140	1
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	417	417	1529	547	418	1415	465	388	858	767
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.33	0.14	0.03	0.51	0.19	0.00	0.04	0.44	0.11

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	258	0	210	5	0	11	203	255	1	9	6	359
Future Volume (vph)	258	0	210	5	0	11	203	255	1	9	6	359
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.90		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1655	1529		1502		1721	3541	824		1328	3369
Flt Permitted	0.95	0.95	1.00		0.99		0.53	1.00	1.00		0.59	1.00
Satd. Flow (perm)	1655	1655	1529		1502		955	3541	824		820	3369
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	272	0	221	5	0	12	214	268	1	9	6	378
RTOR Reduction (vph)	0	0	0	0	16	0	0	0	1	0	0	0
Lane Group Flow (vph)	136	136	221	0	1	0	214	268	0	0	15	378
Heavy Vehicles (%)	1%	0%	3%	20%	0%	9%	7%	4%	100%	0%	83%	5%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	11.8	11.8	83.0		7.1		31.6	30.4	30.4		31.6	21.8
Effective Green, g (s)	11.8	11.8	83.0		7.1		31.6	30.4	30.4		31.6	21.8
Actuated g/C Ratio	0.14	0.14	1.00		0.09		0.38	0.37	0.37		0.38	0.26
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	235	235	1529		128		454	1296	301		319	884
v/s Ratio Prot	c0.08	0.08			0.00		c0.06	c0.08			0.00	0.11
v/s Ratio Perm			c0.14				c0.12		0.00		0.02	
v/c Ratio	0.58	0.58	0.14		0.01		0.47	0.21	0.00		0.05	0.43
Uniform Delay, d1	33.3	33.3	0.0		34.7		18.2	18.0	16.7		16.1	25.4
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.4	3.4	0.2		0.0		0.8	0.1	0.0		0.1	0.3
Delay (s)	36.7	36.7	0.2		34.8		19.0	18.1	16.7		16.2	25.8
Level of Service	D	D	A		C		B	B	B		B	C
Approach Delay (s)		20.3			34.8			18.5				23.5
Approach LOS		C			C			B				C

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	83.0	Sum of lost time (s)	32.5
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	84
Future Volume (vph)	84
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1439
Flt Permitted	1.00
Satd. Flow (perm)	1439
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	88
RTOR Reduction (vph)	52
Lane Group Flow (vph)	36
Heavy Vehicles (%)	10%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	33.6
Effective Green, g (s)	33.6
Actuated g/C Ratio	0.40
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	582
v/s Ratio Prot	0.01
v/s Ratio Perm	0.02
v/c Ratio	0.06
Uniform Delay, d1	15.1
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	15.1
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	214	363	89	164	344	215	106	184
Average Queue (ft)	41	207	38	34	182	99	27	84
95th Queue (ft)	117	329	68	110	310	179	72	153
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	8		0	9		0	3
Queuing Penalty (veh)	0	3		0	3		0	1

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	EB	WB	NB
Directions Served	T	R	L	LR
Maximum Queue (ft)	3	4	60	46
Average Queue (ft)	0	0	9	14
95th Queue (ft)	3	5	37	36
Link Distance (ft)	204			380
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		140	160	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	SB
Directions Served	ULT	TR	L>
Maximum Queue (ft)	208	139	79
Average Queue (ft)	57	18	28
95th Queue (ft)	151	78	62
Link Distance (ft)	393	351	742
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	157	111	46	53	190	139	98	32	80	156	166	72
Average Queue (ft)	80	37	5	11	90	71	16	1	12	83	87	30
95th Queue (ft)	132	89	26	36	155	125	53	13	47	137	144	64
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0		0	0		
Queuing Penalty (veh)							0		0	0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	11	64	67	57	43
Average Queue (ft)	3	19	25	21	20
95th Queue (ft)	10	55	57	49	42
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 7

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	8	0	11	4	76	0	0	12	72	0	0
Future Vol, veh/h	0	8	0	11	4	76	0	0	12	72	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	13	0	55	2	7	0	0	35	0	0	0
Mvmt Flow	0	9	0	12	4	83	0	0	13	78	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.6	7.5	6.7	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	73%	0%	100%
Vol Thru, %	0%	100%	27%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	8	15	76	72
LT Vol	0	0	11	0	72
Through Vol	0	8	4	0	0
RT Vol	12	0	0	76	0
Lane Flow Rate	13	9	16	83	78
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.013	0.011	0.027	0.092	0.093
Departure Headway (Hd)	3.542	4.457	5.969	3.999	4.292
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	993	795	598	891	827
Service Time	1.627	2.531	3.719	1.747	2.358
HCM Lane V/C Ratio	0.013	0.011	0.027	0.093	0.094
HCM Control Delay	6.7	7.6	8.9	7.2	7.8
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0	0	0.1	0.3	0.3

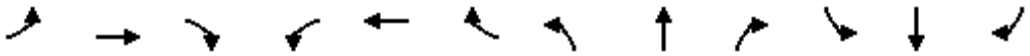
1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	40	557	101	40	563	203	28	91
v/c Ratio	0.27	0.78	0.15	0.25	0.66	0.68	0.15	0.41
Control Delay	49.4	35.2	1.6	48.7	28.5	48.3	41.8	38.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.4	35.2	1.6	48.7	28.5	48.3	41.8	38.9
Queue Length 50th (ft)	24	300	0	24	306	114	16	41
Queue Length 95th (ft)	62	#509	12	61	#522	204	44	92
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	148	823	775	157	858	372	350	384
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	0.27	0.68	0.13	0.25	0.66	0.55	0.08	0.24

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)	37	512	93	37	505	13	78	77	31	26	54	29
Future Volume (vph)	37	512	93	37	505	13	78	77	31	26	54	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1642	1828	1539	1745	1816			1713		1638	1719	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1642	1828	1539	1745	1816			1713		1638	1719	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	557	101	40	549	14	85	84	34	28	59	32
RTOR Reduction (vph)	0	0	60	0	1	0	0	7	0	0	19	0
Lane Group Flow (vph)	40	557	41	40	562	0	0	196	0	28	72	0
Heavy Vehicles (%)	11%	5%	6%	6%	7%	0%	8%	4%	7%	8%	4%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.3	38.9	38.9	8.2	42.8			15.7		8.6	8.6	
Effective Green, g (s)	4.3	38.9	38.9	8.2	42.8			15.7		8.6	8.6	
Actuated g/C Ratio	0.05	0.41	0.41	0.09	0.45			0.16		0.09	0.09	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	74	745	627	149	814			281		147	154	
v/s Ratio Prot	c0.02	c0.30		0.02	c0.31			c0.11		0.02	c0.04	
v/s Ratio Perm			0.03									
v/c Ratio	0.54	0.75	0.07	0.27	0.69			0.70		0.19	0.47	
Uniform Delay, d1	44.6	24.1	17.2	40.8	21.0			37.6		40.2	41.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	9.7	4.4	0.1	1.3	2.7			7.9		0.9	3.0	
Delay (s)	54.3	28.5	17.3	42.1	23.8			45.6		41.0	44.3	
Level of Service	D	C	B	D	C			D		D	D	
Approach Delay (s)		28.3			25.0			45.6			43.5	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	95.4	Sum of lost time (s)	24.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	511	12	19	495	0	0
Future Volume (Veh/h)	511	12	19	495	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.93	0.50	0.50	0.93	0.93	0.93
Hourly flow rate (vph)	549	24	38	532	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			573		1157	549
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			573		1157	549
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		100	100
cM capacity (veh/h)			1010		211	539

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	549	24	38	532
Volume Left	0	0	38	0
Volume Right	0	24	0	0
cSH	1700	1700	1010	1700
Volume to Capacity	0.32	0.01	0.04	0.31
Queue Length 95th (ft)	0	0	3	0
Control Delay (s)	0.0	0.0	8.7	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.6	
Approach LOS				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	515	0	0	504	12	19
Future Volume (Veh/h)	515	0	0	504	12	19
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	560	0	0	548	24	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			560		1108	560
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			560		1108	560
tC, single (s)			4.1		6.5	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.5
p0 queue free %			100		89	92
cM capacity (veh/h)			1021		221	500

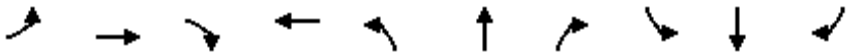
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	560	548	24	38
Volume Left	0	0	24	0
Volume Right	0	0	0	38
cSH	1700	1700	221	500
Volume to Capacity	0.33	0.32	0.11	0.08
Queue Length 95th (ft)	0	0	9	6
Control Delay (s)	0.0	0.0	23.2	12.8
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	16.8	
Approach LOS			C	

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	528	44	7	453	54	46
Future Volume (Veh/h)	528	44	7	453	54	46
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	574	88	14	492	59	50
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			662		1094	574
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			662		1094	574
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		75	90
cM capacity (veh/h)			936		236	522

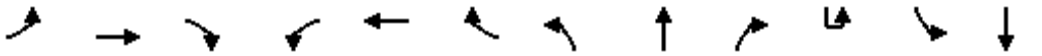
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	574	88	14	492	109
Volume Left	0	0	14	0	59
Volume Right	0	88	0	0	50
cSH	1700	1700	936	1700	315
Volume to Capacity	0.34	0.05	0.01	0.29	0.35
Queue Length 95th (ft)	0	0	1	0	37
Control Delay (s)	0.0	0.0	8.9	0.0	22.4
Lane LOS			A		C
Approach Delay (s)	0.0		0.2		22.4
Approach LOS					C

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	40.3%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	138	140	255	20	199	236	11	18	315	139
v/c Ratio	0.53	0.54	0.17	0.15	0.47	0.17	0.02	0.04	0.53	0.21
Control Delay	38.3	38.5	0.3	27.1	19.1	17.5	0.1	13.9	32.9	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.3	38.5	0.3	27.1	19.1	17.5	0.1	13.9	32.9	1.4
Queue Length 50th (ft)	63	64	0	4	57	33	0	5	71	0
Queue Length 95th (ft)	130	132	0	26	115	86	0	18	123	9
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	388	389	1485	154	468	1385	634	501	838	771
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	0.36	0.36	0.17	0.13	0.43	0.17	0.02	0.04	0.38	0.18

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	268	2	247	6	3	11	193	229	11	11	7	306
Future Volume (vph)	268	2	247	6	3	11	193	229	11	11	7	306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.93		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1661	1485		1329		1737	3474	1211		1678	3276
Flt Permitted	0.95	0.95	1.00		0.99		0.56	1.00	1.00		0.60	1.00
Satd. Flow (perm)	1655	1661	1485		1329		1025	3474	1211		1068	3276
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	276	2	255	6	3	11	199	236	11	11	7	315
RTOR Reduction (vph)	0	0	0	0	10	0	0	0	7	0	0	0
Lane Group Flow (vph)	138	140	255	0	10	0	199	236	4	0	18	315
Heavy Vehicles (%)	1%	0%	6%	33%	33%	27%	6%	6%	36%	0%	14%	8%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	11.9	11.9	83.2		7.3		31.5	30.3	30.3		31.5	21.1
Effective Green, g (s)	11.9	11.9	83.2		7.3		31.5	30.3	30.3		31.5	21.1
Actuated g/C Ratio	0.14	0.14	1.00		0.09		0.38	0.36	0.36		0.38	0.25
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	236	237	1485		116		477	1265	441		413	830
v/s Ratio Prot	0.08	c0.08			0.01		c0.05	0.07			0.00	0.10
v/s Ratio Perm			c0.17				c0.11		0.00		0.02	
v/c Ratio	0.58	0.59	0.17		0.09		0.42	0.19	0.01		0.04	0.38
Uniform Delay, d1	33.3	33.4	0.0		34.9		18.1	18.0	16.9		16.2	25.6
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.7	3.9	0.3		0.3		0.6	0.1	0.0		0.0	0.3
Delay (s)	37.0	37.3	0.3		35.2		18.7	18.1	16.9		16.3	25.9
Level of Service	D	D	A		D		B	B	B		B	C
Approach Delay (s)		19.5			35.2			18.4				22.6
Approach LOS		B			D			B				C

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	83.2	Sum of lost time (s)	32.5
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	135
Future Volume (vph)	135
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1507
Flt Permitted	1.00
Satd. Flow (perm)	1507
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	139
RTOR Reduction (vph)	84
Lane Group Flow (vph)	55
Heavy Vehicles (%)	5%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	33.0
Effective Green, g (s)	33.0
Actuated g/C Ratio	0.40
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	597
v/s Ratio Prot	0.01
v/s Ratio Perm	0.02
v/c Ratio	0.09
Uniform Delay, d1	15.7
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	15.8
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	186	401	74	161	397	225	86	147
Average Queue (ft)	45	210	30	39	199	107	23	54
95th Queue (ft)	131	350	59	113	353	192	61	107
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	7		0	10		0	0
Queuing Penalty (veh)	0	3		0	4		0	0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	40
Average Queue (ft)	5
95th Queue (ft)	26
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	255
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	54	69
Average Queue (ft)	10	17
95th Queue (ft)	38	50
Link Distance (ft)	382	382
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	WB	NB
Directions Served	R	L	LR
Maximum Queue (ft)	4	31	91
Average Queue (ft)	0	4	33
95th Queue (ft)	3	20	64
Link Distance (ft)			380
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	140	160	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	SB
Directions Served	ULT	UTR	T	L>
Maximum Queue (ft)	199	132	6	76
Average Queue (ft)	65	21	0	32
95th Queue (ft)	157	79	5	69
Link Distance (ft)	393	351	787	742
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	165	114	52	70	167	128	74	43	39	142	160	81
Average Queue (ft)	81	43	6	17	79	61	11	6	9	76	79	40
95th Queue (ft)	136	97	30	52	139	114	43	25	29	126	132	72
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)										0		
Queuing Penalty (veh)										0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	23	64	62	60	53
Average Queue (ft)	3	14	33	12	28
95th Queue (ft)	13	48	54	44	46
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 7

MOVEMENT SUMMARY

Site: 101 [2026 Future - AM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.530	9.9	LOS A	4.1	111.2	0.30	0.14	0.30	24.3
6	T1	403	10.0	443	10.0	0.530	10.3	LOS B	4.1	111.2	0.30	0.14	0.30	23.2
16	R2	75	11.0	82	11.0	0.530	10.3	LOS B	4.1	111.2	0.30	0.14	0.30	22.7
Approach		479	10.1	526	10.1	0.530	10.3	LOS B	4.1	111.2	0.30	0.14	0.30	23.1
North: Falmouth Street														
7	L2	77	21.0	85	21.0	0.219	9.0	LOS A	1.3	37.0	0.67	0.56	0.67	23.3
14	R2	44	9.0	48	9.0	0.219	8.2	LOS A	1.3	37.0	0.67	0.56	0.67	22.3
Approach		121	16.6	133	16.6	0.219	8.7	LOS A	1.3	37.0	0.67	0.56	0.67	22.9
West: E Shirley Avenue														
5u	U	1	0.0	1	0.0	0.127	4.6	LOS A	0.7	19.8	0.34	0.18	0.34	25.3
5	L2	39	19.0	43	19.0	0.127	5.4	LOS A	0.7	19.8	0.34	0.18	0.34	24.6
2	T1	276	9.0	303	9.0	0.127	1.2	LOS A	0.7	19.8	0.08	0.04	0.08	25.5
Approach		316	10.2	347	10.2	0.127	1.8	LOS A	0.7	19.8	0.11	0.06	0.11	25.4
All Vehicles		916	11.0	1007	11.0	0.530	7.1	LOS A	4.1	111.2	0.28	0.17	0.28	23.8

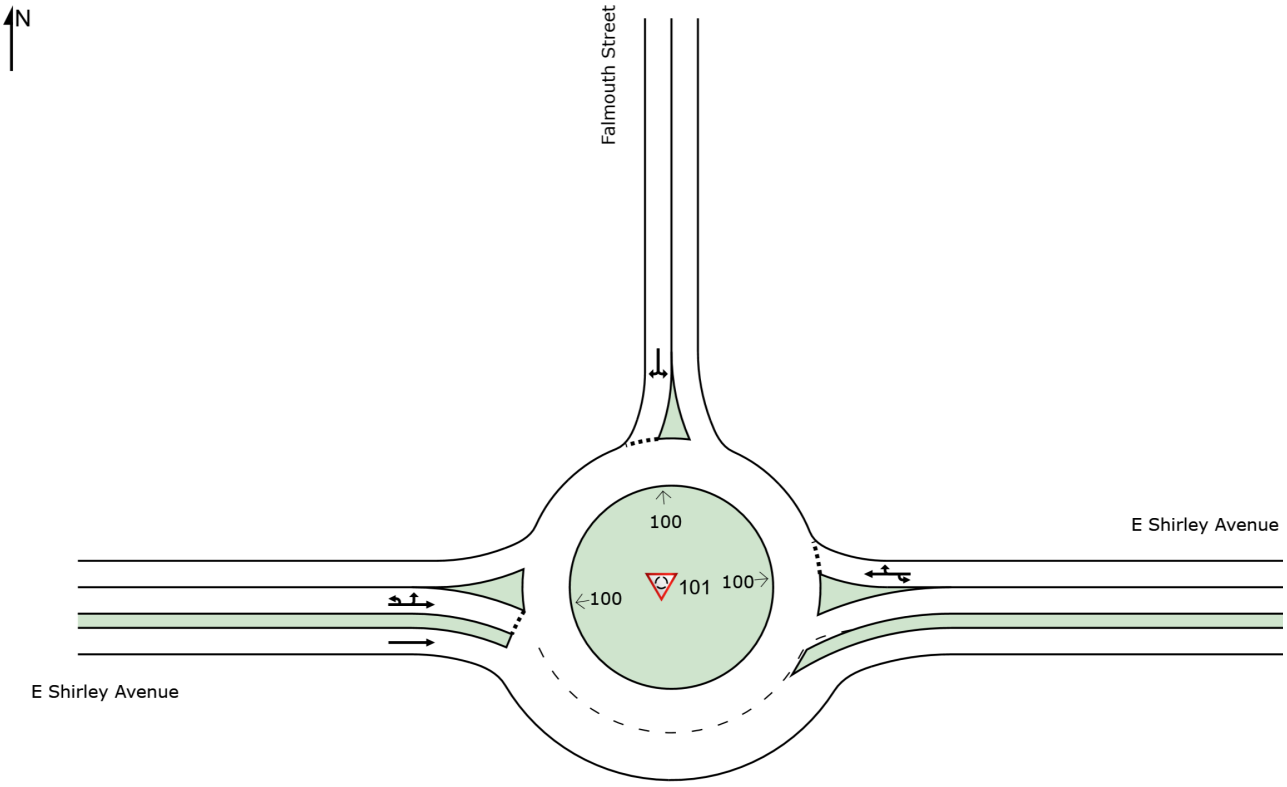
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [2026 Future - AM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [2026 Future - Commuter Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.640	12.8	LOS B	6.6	187.8	0.28	0.10	0.28	23.5
6	T1	423	21.0	465	21.0	0.640	13.5	LOS B	6.6	187.8	0.28	0.10	0.28	22.5
16	R2	139	4.0	153	4.0	0.640	12.9	LOS B	6.6	187.8	0.28	0.10	0.28	22.0
Approach		563	16.8	619	16.8	0.640	13.3	LOS B	6.6	187.8	0.28	0.10	0.28	22.4
North: Falmouth Street														
7	L2	111	1.0	122	1.0	0.238	8.0	LOS A	1.6	39.8	0.71	0.59	0.71	23.3
14	R2	36	9.0	40	9.0	0.238	8.6	LOS A	1.6	39.8	0.71	0.59	0.71	22.3
Approach		147	3.0	162	3.0	0.238	8.2	LOS A	1.6	39.8	0.71	0.59	0.71	23.0
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.190	5.3	LOS A	1.2	30.3	0.38	0.22	0.38	25.5
5	L2	20	11.0	22	11.0	0.190	5.8	LOS A	1.2	30.3	0.38	0.22	0.38	24.8
2	T1	473	5.0	520	5.0	0.190	1.7	LOS A	1.2	30.3	0.12	0.07	0.12	25.4
Approach		495	5.2	544	5.2	0.190	1.9	LOS A	1.2	30.3	0.13	0.07	0.13	25.4
All Vehicles		1205	10.3	1324	10.3	0.640	8.0	LOS A	6.6	187.8	0.27	0.15	0.27	23.6

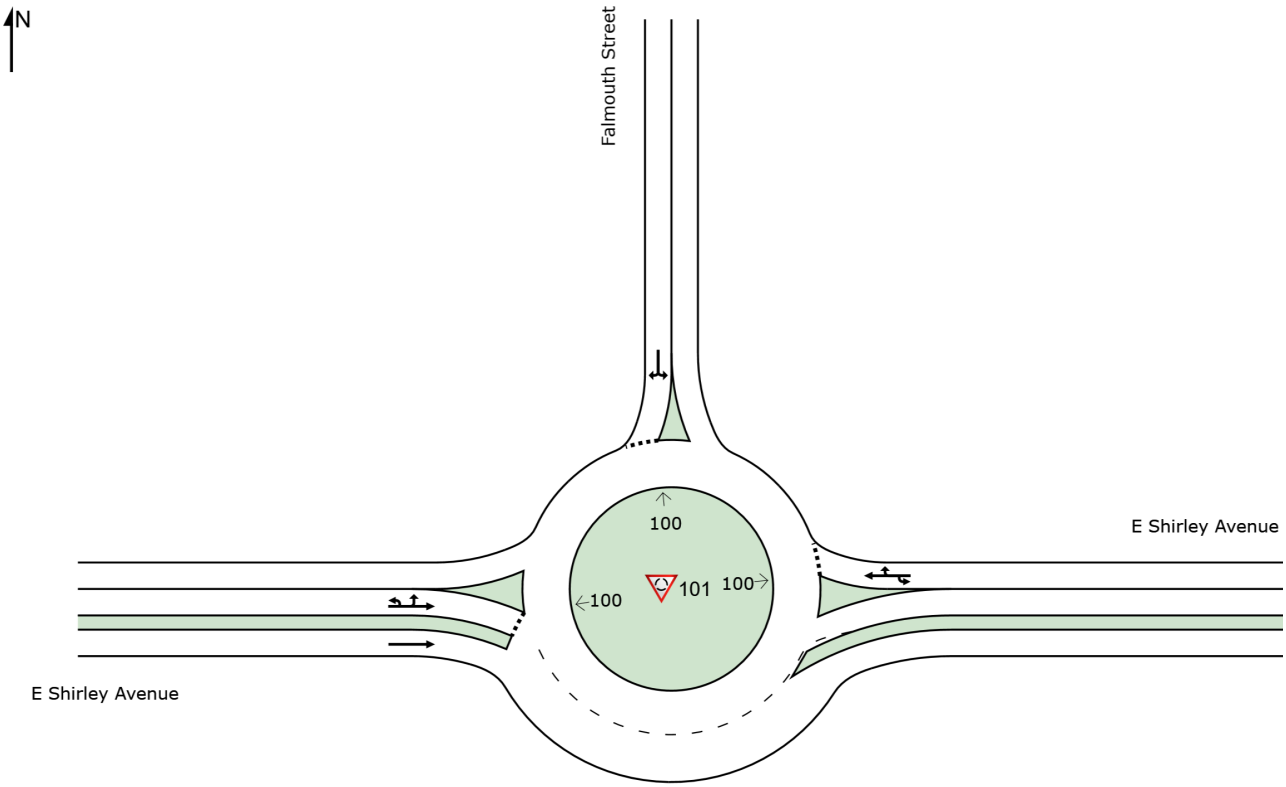
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [2026 Future - Commuter Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [2026 Future - School PM (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	2	0.0	2	0.0	0.520	9.5	LOS A	4.1	106.2	0.27	0.12	0.27	24.5
6	T1	414	4.0	418	4.0	0.520	9.6	LOS A	4.1	106.2	0.27	0.12	0.27	23.4
16	R2	130	6.0	131	6.0	0.520	9.7	LOS A	4.1	106.2	0.27	0.12	0.27	22.8
Approach		546	4.5	552	4.5	0.520	9.6	LOS A	4.1	106.2	0.27	0.12	0.27	23.2
North: Falmouth Street														
7	L2	123	7.0	124	7.0	0.210	7.4	LOS A	1.3	33.5	0.62	0.49	0.62	23.4
14	R2	29	0.0	29	0.0	0.210	7.0	LOS A	1.3	33.5	0.62	0.49	0.62	22.5
Approach		152	5.7	154	5.7	0.210	7.3	LOS A	1.3	33.5	0.62	0.49	0.62	23.2
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.187	5.4	LOS A	1.1	29.7	0.39	0.23	0.39	25.3
5	L2	34	23.0	34	23.0	0.187	6.4	LOS A	1.1	29.7	0.39	0.23	0.39	24.6
2	T1	484	5.0	489	5.0	0.187	1.6	LOS A	1.1	29.7	0.11	0.07	0.11	25.4
Approach		520	6.2	525	6.2	0.187	1.9	LOS A	1.1	29.7	0.13	0.08	0.13	25.4
All Vehicles		1218	5.3	1230	5.3	0.520	6.0	LOS A	4.1	106.2	0.25	0.15	0.25	24.1

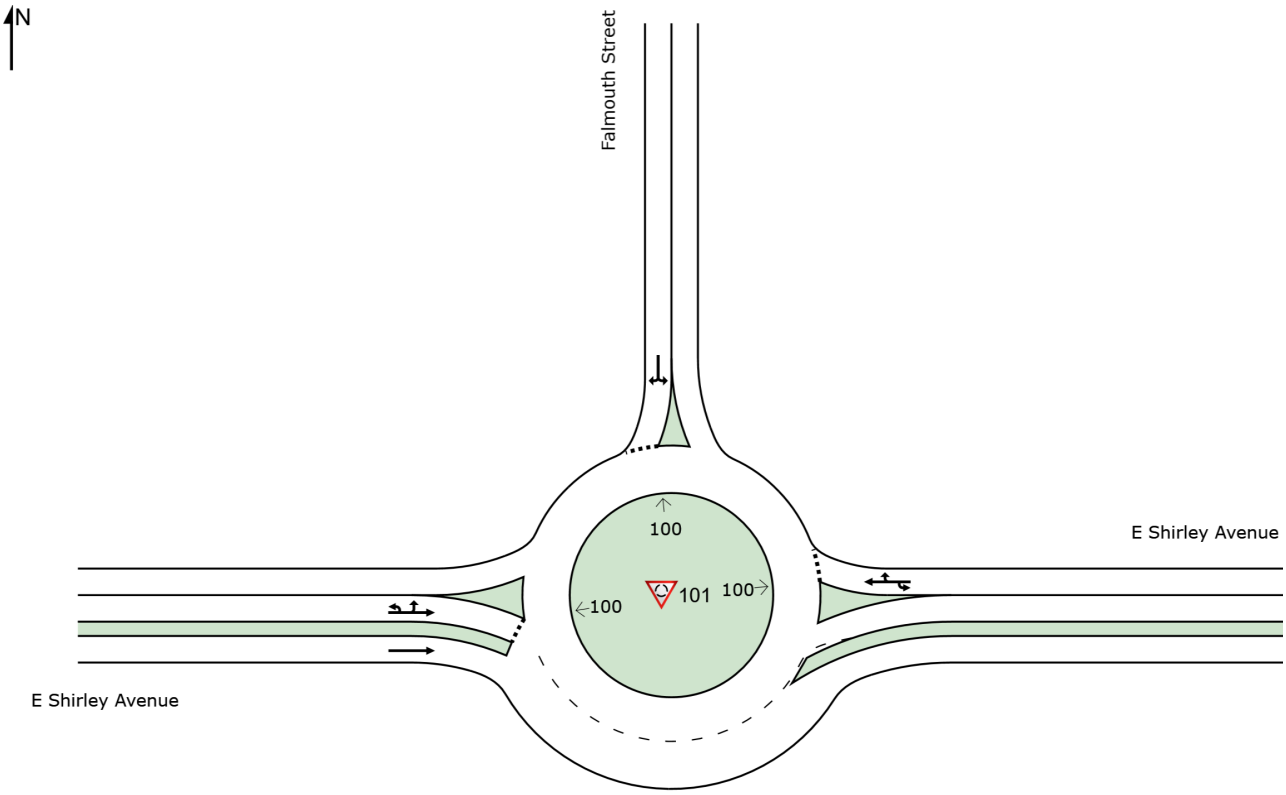
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [2026 Future - School PM (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Appendix G
2032 Background Analysis Worksheets

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	51	0	49	41	96	0	0	37	14	0	0
Future Vol, veh/h	0	51	0	49	41	96	0	0	37	14	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	24	0	7	0	0	65	8	0	0
Mvmt Flow	0	55	0	53	45	104	0	0	40	15	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

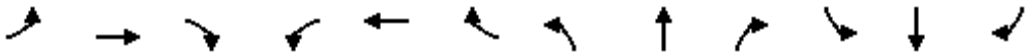
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.6	8	7.1	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	54%	0%	100%
Vol Thru, %	0%	100%	46%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	37	51	90	96	14
LT Vol	0	0	49	0	14
Through Vol	0	51	41	0	0
RT Vol	37	0	0	96	0
Lane Flow Rate	40	55	98	104	15
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.044	0.065	0.144	0.114	0.021
Departure Headway (Hd)	3.9	4.243	5.307	3.925	4.862
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	923	832	675	910	740
Service Time	1.901	2.333	3.047	1.664	2.864
HCM Lane V/C Ratio	0.043	0.066	0.145	0.114	0.02
HCM Control Delay	7.1	7.6	8.9	7.2	8
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0.2	0.5	0.4	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	34	391	78	34	553	249	17	60
v/c Ratio	0.21	0.56	0.11	0.23	0.69	0.75	0.09	0.31
Control Delay	46.8	26.8	0.3	47.5	28.8	50.5	42.4	33.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.8	26.8	0.3	47.5	28.8	50.5	42.4	33.3
Queue Length 50th (ft)	21	187	0	21	302	142	10	22
Queue Length 95th (ft)	53	296	0	53	#507	#264	31	62
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	163	789	771	149	809	379	376	377
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	0.21	0.50	0.10	0.23	0.68	0.66	0.05	0.16

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)	31	360	72	31	485	24	85	89	55	16	34	21
Future Volume (vph)	31	360	72	31	485	24	85	89	55	16	34	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99			0.97		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1823	1761	1539	1667	1721			1736		1769	1691	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1823	1761	1539	1667	1721			1736		1769	1691	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	34	391	78	34	527	26	92	97	60	17	37	23
RTOR Reduction (vph)	0	0	46	0	2	0	0	11	0	0	21	0
Lane Group Flow (vph)	34	391	32	34	551	0	0	238	0	17	39	0
Heavy Vehicles (%)	0%	9%	6%	11%	13%	0%	6%	2%	4%	0%	3%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.3	39.0	39.0	8.2	42.9			17.0		7.2	7.2	
Effective Green, g (s)	4.3	39.0	39.0	8.2	42.9			17.0		7.2	7.2	
Actuated g/C Ratio	0.05	0.41	0.41	0.09	0.45			0.18		0.08	0.08	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	82	719	629	143	773			309		133	127	
v/s Ratio Prot	0.02	0.22		c0.02	c0.32			c0.14		0.01	c0.02	
v/s Ratio Perm			0.02									
v/c Ratio	0.41	0.54	0.05	0.24	0.71			0.77		0.13	0.31	
Uniform Delay, d1	44.3	21.4	17.0	40.7	21.3			37.3		41.2	41.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	4.6	1.1	0.0	1.2	3.4			11.9		0.6	1.9	
Delay (s)	48.9	22.5	17.1	41.9	24.6			49.3		41.8	43.6	
Level of Service	D	C	B	D	C			D		D	D	
Approach Delay (s)		23.4			25.6			49.3			43.2	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	30.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	95.4	Sum of lost time (s)	24.0
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	348	37	48	531	0	0
Future Volume (Veh/h)	348	37	48	531	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	378	74	96	577	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			452		1147	378
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			452		1147	378
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			91		100	100
cM capacity (veh/h)			1053		202	673

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	378	74	96	577
Volume Left	0	0	96	0
Volume Right	0	74	0	0
cSH	1700	1700	1053	1700
Volume to Capacity	0.22	0.04	0.09	0.34
Queue Length 95th (ft)	0	0	8	0
Control Delay (s)	0.0	0.0	8.8	0.0
Lane LOS			A	
Approach Delay (s)	0.0		1.2	
Approach LOS				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	338	0	0	542	41	51
Future Volume (Veh/h)	338	0	0	542	41	51
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	367	0	0	589	82	102
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			367		956	367
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			367		956	367
tC, single (s)			4.1		6.6	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.4
p0 queue free %			100		70	84
cM capacity (veh/h)			1203		269	648

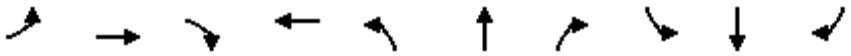
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	367	589	82	102
Volume Left	0	0	82	0
Volume Right	0	0	0	102
cSH	1700	1700	269	648
Volume to Capacity	0.22	0.35	0.30	0.16
Queue Length 95th (ft)	0	0	31	14
Control Delay (s)	0.0	0.0	24.1	11.6
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	17.2	
Approach LOS			C	

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	377	17	24	540	0	0
Future Volume (Veh/h)	377	17	24	540	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.95	0.50	0.50	0.95	0.95	0.95
Hourly flow rate (vph)	397	34	48	568	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			431		1061	397
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			431		1061	397
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		100	100
cM capacity (veh/h)			1139		240	657

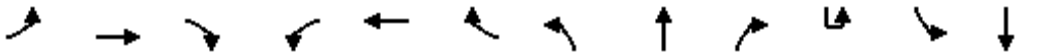
Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	397	34	48	568
Volume Left	0	0	48	0
Volume Right	0	34	0	0
cSH	1700	1700	1139	1700
Volume to Capacity	0.23	0.02	0.04	0.33
Queue Length 95th (ft)	0	0	3	0
Control Delay (s)	0.0	0.0	8.3	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.6	
Approach LOS				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	31.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	85	86	84	6	205	514	11	11	204	184
v/c Ratio	0.46	0.47	0.07	0.02	0.47	0.37	0.01	0.03	0.38	0.30
Control Delay	38.8	39.0	0.1	0.2	17.9	18.2	0.0	12.7	30.5	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	39.0	0.1	0.2	17.9	18.2	0.0	12.7	30.5	2.8
Queue Length 50th (ft)	37	37	0	0	57	77	0	3	43	0
Queue Length 95th (ft)	88	88	0	0	110	172	0	12	82	20
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	263	263	1291	336	515	1402	825	374	859	687
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	0.32	0.33	0.07	0.02	0.40	0.37	0.01	0.03	0.24	0.27

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	157	0	77	2	0	4	189	473	10	2	8	188
Future Volume (vph)	157	0	77	2	0	4	189	473	10	2	8	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.91		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1316	1316	1291		1015		1674	3409	1647		1430	3103
Flt Permitted	0.95	0.95	1.00		0.98		0.62	1.00	1.00		0.46	1.00
Satd. Flow (perm)	1316	1316	1291		1015		1099	3409	1647		688	3103
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	171	0	84	2	0	4	205	514	11	2	9	204
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	7	0	0	0
Lane Group Flow (vph)	85	86	84	0	1	0	205	514	4	0	11	204
Heavy Vehicles (%)	27%	0%	22%	50%	0%	75%	10%	8%	0%	0%	29%	14%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	10.3	10.3	80.8		7.0		31.0	29.8	29.8		31.0	19.9
Effective Green, g (s)	10.3	10.3	80.8		7.0		31.0	29.8	29.8		31.0	19.9
Actuated g/C Ratio	0.13	0.13	1.00		0.09		0.38	0.37	0.37		0.38	0.25
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	167	167	1291		87		500	1257	607		274	764
v/s Ratio Prot	0.06	c0.07			0.00		c0.06	c0.15			0.00	0.07
v/s Ratio Perm			c0.07				0.10		0.00		0.01	
v/c Ratio	0.51	0.51	0.07		0.01		0.41	0.41	0.01		0.04	0.27
Uniform Delay, d1	32.9	32.9	0.0		33.7		17.5	19.0	16.1		15.5	24.6
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.4	2.7	0.1		0.0		0.5	0.2	0.0		0.1	0.2
Delay (s)	35.3	35.6	0.1		33.7		18.0	19.2	16.1		15.5	24.8
Level of Service	D	D	A		C		B	B	B		B	C
Approach Delay (s)		23.8			33.7			18.8				20.8
Approach LOS		C			C			B				C

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	80.8	Sum of lost time (s)	32.5
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	169
Future Volume (vph)	169
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1426
Flt Permitted	1.00
Satd. Flow (perm)	1426
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	184
RTOR Reduction (vph)	115
Lane Group Flow (vph)	69
Heavy Vehicles (%)	11%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	30.2
Effective Green, g (s)	30.2
Actuated g/C Ratio	0.37
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	532
v/s Ratio Prot	0.02
v/s Ratio Perm	0.03
v/c Ratio	0.13
Uniform Delay, d1	16.6
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	16.8
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	172	326	58	178	434	230	56	109
Average Queue (ft)	29	155	21	35	196	114	14	39
95th Queue (ft)	86	271	48	112	359	199	42	81
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	3		0	10			0
Queuing Penalty (veh)	0	1		0	3			0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	EB	EB	WB
Directions Served	T	R	L
Maximum Queue (ft)	8	13	65
Average Queue (ft)	0	0	16
95th Queue (ft)	5	7	50
Link Distance (ft)	3093		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		125	255
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	96	73
Average Queue (ft)	30	31
95th Queue (ft)	73	65
Link Distance (ft)	382	382
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	WB
Directions Served	R	L
Maximum Queue (ft)	6	35
Average Queue (ft)	0	7
95th Queue (ft)	6	30
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	140	160
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	SB
Directions Served	ULT	TR	T	L>
Maximum Queue (ft)	197	199	9	94
Average Queue (ft)	41	45	0	35
95th Queue (ft)	122	137	9	77
Link Distance (ft)	393	351	787	742
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	156	110	11	53	176	219	164	20	45	115	115	116
Average Queue (ft)	71	28	0	6	81	120	50	3	6	57	51	50
95th Queue (ft)	131	79	7	31	145	196	135	13	27	97	99	90
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0			0		
Queuing Penalty (veh)							0			0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	23	69	68	85	54
Average Queue (ft)	7	40	36	35	12
95th Queue (ft)	16	63	58	77	39
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 4

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	58	0	15	66	19	0	0	30	22	0	0
Future Vol, veh/h	0	58	0	15	66	19	0	0	30	22	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	57	0	18	0	0	7	0	0	0
Mvmt Flow	0	63	0	16	72	21	0	0	33	24	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.6	8.9	6.9	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	19%	0%	100%
Vol Thru, %	0%	100%	81%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	30	58	81	19	22
LT Vol	0	0	15	0	22
Through Vol	0	58	66	0	0
RT Vol	30	0	0	19	0
Lane Flow Rate	33	63	88	21	24
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.034	0.073	0.139	0.023	0.03
Departure Headway (Hd)	3.767	4.178	5.693	3.929	4.573
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	956	846	630	908	787
Service Time	1.768	2.261	3.432	1.667	2.574
HCM Lane V/C Ratio	0.035	0.074	0.14	0.023	0.03
HCM Control Delay	6.9	7.6	9.4	6.8	7.7
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0.2	0.5	0.1	0.1

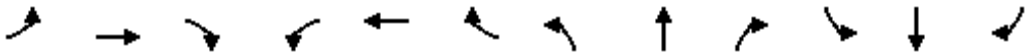
1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	43	607	165	36	578	202	39	156
v/c Ratio	0.29	0.87	0.24	0.25	0.70	0.70	0.15	0.60
Control Delay	52.5	45.1	5.6	51.4	31.9	52.9	40.5	48.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.5	45.1	5.6	51.4	31.9	52.9	40.5	48.9
Queue Length 50th (ft)	28	364	5	23	337	122	23	93
Queue Length 95th (ft)	67	#613	49	58	#561	209	55	163
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	147	755	733	145	826	348	340	350
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	0.29	0.80	0.23	0.25	0.70	0.58	0.11	0.45

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)	40	571	155	34	540	4	90	69	31	37	119	27
Future Volume (vph)	40	571	155	34	540	4	90	69	31	37	119	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1823	1863	1584	1796	1889			1774		1769	1781	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1823	1863	1584	1796	1889			1774		1769	1781	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	43	607	165	36	574	4	96	73	33	39	127	29
RTOR Reduction (vph)	0	0	94	0	0	0	0	7	0	0	8	0
Lane Group Flow (vph)	43	607	71	36	578	0	0	195	0	39	148	0
Heavy Vehicles (%)	0%	3%	3%	3%	3%	0%	2%	2%	4%	0%	2%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.5	40.1	40.1	8.1	43.7			15.9		14.2	14.2	
Effective Green, g (s)	4.5	40.1	40.1	8.1	43.7			15.9		14.2	14.2	
Actuated g/C Ratio	0.04	0.39	0.39	0.08	0.43			0.16		0.14	0.14	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	80	730	620	142	806			275		245	247	
v/s Ratio Prot	c0.02	c0.33		0.02	c0.31			c0.11		0.02	c0.08	
v/s Ratio Perm			0.05									
v/c Ratio	0.54	0.83	0.12	0.25	0.72			0.71		0.16	0.60	
Uniform Delay, d1	47.9	28.1	19.8	44.3	24.2			41.0		38.8	41.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	8.6	8.4	0.1	1.3	3.3			8.7		0.4	4.7	
Delay (s)	56.5	36.4	19.9	45.5	27.5			49.7		39.2	46.1	
Level of Service	E	D	B	D	C			D		D	D	
Approach Delay (s)		34.1			28.5			49.7			44.7	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	102.3	Sum of lost time (s)	24.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	604	4	6	544	0	0
Future Volume (Veh/h)	604	4	6	544	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	657	8	12	591	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			665		1272	657
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			665		1272	657
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	100
cM capacity (veh/h)			934		184	468

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	657	8	12	591
Volume Left	0	0	12	0
Volume Right	0	8	0	0
cSH	1700	1700	934	1700
Volume to Capacity	0.39	0.00	0.01	0.35
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.0	8.9	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.2	
Approach LOS				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	606	0	0	531	15	3
Future Volume (Veh/h)	606	0	0	531	15	3
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	659	0	0	577	30	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			659		1236	659
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			659		1236	659
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		85	99
cM capacity (veh/h)			939		197	467

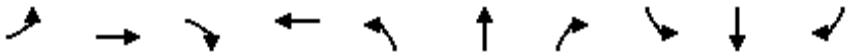
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	659	577	30	6
Volume Left	0	0	30	0
Volume Right	0	0	0	6
cSH	1700	1700	197	467
Volume to Capacity	0.39	0.34	0.15	0.01
Queue Length 95th (ft)	0	0	13	1
Control Delay (s)	0.0	0.0	26.6	12.8
Lane LOS			D	B
Approach Delay (s)	0.0	0.0	24.3	
Approach LOS			C	

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	594	13	22	534	0	0
Future Volume (Veh/h)	594	13	22	534	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	646	26	44	580	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			672		1314	646
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			672		1314	646
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			95		100	100
cM capacity (veh/h)			887		168	475

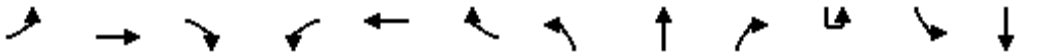
Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	646	26	44	580
Volume Left	0	0	44	0
Volume Right	0	26	0	0
cSH	1700	1700	887	1700
Volume to Capacity	0.38	0.02	0.05	0.34
Queue Length 95th (ft)	0	0	4	0
Control Delay (s)	0.0	0.0	9.3	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.7	
Approach LOS				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	34.6%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	162	163	229	18	216	325	1	18	461	152
v/c Ratio	0.61	0.62	0.15	0.05	0.53	0.24	0.00	0.05	0.67	0.23
Control Delay	43.0	43.2	0.2	0.2	19.8	19.9	0.0	13.5	35.2	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.0	43.2	0.2	0.2	19.8	19.9	0.0	13.5	35.2	1.7
Queue Length 50th (ft)	82	83	0	0	66	50	0	5	114	0
Queue Length 95th (ft)	154	155	0	0	119	111	0	17	174	12
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	349	349	1529	360	454	1359	471	372	873	740
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	0.47	0.15	0.05	0.48	0.24	0.00	0.05	0.53	0.21

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	309	0	218	5	0	12	205	309	1	10	7	438
Future Volume (vph)	309	0	218	5	0	12	205	309	1	10	7	438
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.90		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1655	1529		1502		1721	3541	824		1337	3369
Flt Permitted	0.95	0.95	1.00		0.99		0.46	1.00	1.00		0.56	1.00
Satd. Flow (perm)	1655	1655	1529		1502		834	3541	824		782	3369
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	325	0	229	5	0	13	216	325	1	11	7	461
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	1	0	0	0
Lane Group Flow (vph)	162	163	229	0	1	0	216	325	0	0	18	461
Heavy Vehicles (%)	1%	0%	3%	20%	0%	9%	7%	4%	100%	0%	83%	5%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	12.9	12.9	85.8		7.1		33.3	30.8	30.8		33.3	22.2
Effective Green, g (s)	12.9	12.9	85.8		7.1		33.3	30.8	30.8		33.3	22.2
Actuated g/C Ratio	0.15	0.15	1.00		0.08		0.39	0.36	0.36		0.39	0.26
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	248	248	1529		124		438	1271	295		319	871
v/s Ratio Prot	0.10	c0.10			0.00		c0.06	c0.09			0.00	c0.14
v/s Ratio Perm			c0.15				0.13		0.00		0.02	
v/c Ratio	0.65	0.66	0.15		0.01		0.49	0.26	0.00		0.06	0.53
Uniform Delay, d1	34.3	34.4	0.0		36.1		18.4	19.4	17.6		16.3	27.3
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.1	6.2	0.2		0.0		0.9	0.1	0.0		0.1	0.6
Delay (s)	40.4	40.5	0.2		36.2		19.3	19.5	17.6		16.4	27.9
Level of Service	D	D	A		D		B	B	B		B	C
Approach Delay (s)		23.8			36.2			19.4				24.6
Approach LOS		C			D			B				C

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	85.8	Sum of lost time (s)	32.5
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	144
Future Volume (vph)	144
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1439
Flt Permitted	1.00
Satd. Flow (perm)	1439
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	152
RTOR Reduction (vph)	90
Lane Group Flow (vph)	62
Heavy Vehicles (%)	10%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	35.1
Effective Green, g (s)	35.1
Actuated g/C Ratio	0.41
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	588
v/s Ratio Prot	0.02
v/s Ratio Perm	0.03
v/c Ratio	0.11
Uniform Delay, d1	15.7
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	15.7
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	214	504	80	184	417	210	116	186
Average Queue (ft)	56	269	38	43	231	103	32	87
95th Queue (ft)	159	438	66	128	374	184	86	156
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	17		0	15		0	3
Queuing Penalty (veh)	0	7		0	5		0	1

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	EB	WB
Directions Served	R	L
Maximum Queue (ft)	2	21
Average Queue (ft)	0	2
95th Queue (ft)	2	15
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	125	255
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	46	32
Average Queue (ft)	11	3
95th Queue (ft)	37	19
Link Distance (ft)	382	382
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	54
Average Queue (ft)	8
95th Queue (ft)	33
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	160
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	SB
Directions Served	ULT	TR	T	L>
Maximum Queue (ft)	249	172	8	89
Average Queue (ft)	101	29	0	38
95th Queue (ft)	214	111	6	75
Link Distance (ft)	393	351	787	742
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	188	144	60	56	193	160	131	17	107	197	205	112
Average Queue (ft)	97	52	8	12	92	85	23	1	15	111	114	44
95th Queue (ft)	155	114	35	38	162	144	78	11	65	175	181	85
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0		0	1	0	0
Queuing Penalty (veh)							0		0	0	0	0

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	24	79	59	58	33
Average Queue (ft)	7	37	16	20	14
95th Queue (ft)	15	66	46	47	38
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 14

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	40	0	12	37	51	0	0	13	5	0	0
Future Vol, veh/h	0	40	0	12	37	51	0	0	13	5	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	13	0	55	2	7	0	0	35	0	0	0
Mvmt Flow	0	43	0	13	40	55	0	0	14	5	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.6	7.8	6.7	7.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	24%	0%	100%
Vol Thru, %	0%	100%	76%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	13	40	49	51	5
LT Vol	0	0	12	0	5
Through Vol	0	40	37	0	0
RT Vol	13	0	0	51	0
Lane Flow Rate	14	43	53	55	5
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.014	0.052	0.083	0.06	0.007
Departure Headway (Hd)	3.668	4.334	5.615	3.89	4.477
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	982	823	640	923	804
Service Time	1.668	2.377	3.328	1.604	2.477
HCM Lane V/C Ratio	0.014	0.052	0.083	0.06	0.006
HCM Control Delay	6.7	7.6	8.8	6.9	7.5
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0	0.2	0.3	0.2	0

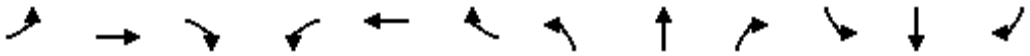
1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	42	615	107	42	610	215	29	96
v/c Ratio	0.30	0.84	0.15	0.28	0.71	0.71	0.15	0.44
Control Delay	51.1	39.4	1.9	50.3	30.5	50.9	42.5	40.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.1	39.4	1.9	50.3	30.5	50.9	42.5	40.0
Queue Length 50th (ft)	26	356	0	26	352	126	17	45
Queue Length 95th (ft)	64	#601	15	64	#597	#228	45	97
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	142	796	754	151	860	360	338	373
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	0.30	0.77	0.14	0.28	0.71	0.60	0.09	0.26

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)	39	566	98	39	547	14	83	82	33	27	57	31
Future Volume (vph)	39	566	98	39	547	14	83	82	33	27	57	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1642	1828	1539	1745	1816			1713		1638	1719	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1642	1828	1539	1745	1816			1713		1638	1719	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	615	107	42	595	15	90	89	36	29	62	34
RTOR Reduction (vph)	0	0	62	0	1	0	0	7	0	0	20	0
Lane Group Flow (vph)	42	615	45	42	609	0	0	208	0	29	76	0
Heavy Vehicles (%)	11%	5%	6%	6%	7%	0%	8%	4%	7%	8%	4%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.4	41.0	41.0	8.2	44.8			16.5		8.8	8.8	
Effective Green, g (s)	4.4	41.0	41.0	8.2	44.8			16.5		8.8	8.8	
Actuated g/C Ratio	0.04	0.42	0.42	0.08	0.45			0.17		0.09	0.09	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	73	760	640	145	825			286		146	153	
v/s Ratio Prot	c0.03	c0.34		0.02	c0.34			c0.12		0.02	c0.04	
v/s Ratio Perm			0.03									
v/c Ratio	0.58	0.81	0.07	0.29	0.74			0.73		0.20	0.50	
Uniform Delay, d1	46.1	25.3	17.3	42.4	22.0			38.9		41.6	42.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	12.5	6.7	0.1	1.5	3.7			9.5		0.9	3.4	
Delay (s)	58.6	32.0	17.3	43.9	25.8			48.4		42.5	46.2	
Level of Service	E	C	B	D	C			D		D	D	
Approach Delay (s)		31.4			26.9			48.4			45.3	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	32.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	98.5	Sum of lost time (s)	24.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	556	20	9	536	0	0
Future Volume (Veh/h)	556	20	9	536	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.93	0.50	0.50	0.93	0.93	0.93
Hourly flow rate (vph)	598	40	18	576	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			638		1210	598
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			638		1210	598
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	100
cM capacity (veh/h)			956		200	506

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	598	40	18	576
Volume Left	0	0	18	0
Volume Right	0	40	0	0
cSH	1700	1700	956	1700
Volume to Capacity	0.35	0.02	0.02	0.34
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.0	8.8	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.3	
Approach LOS				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	560	0	0	508	38	53
Future Volume (Veh/h)	560	0	0	508	38	53
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	609	0	0	552	76	106
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			609		1161	609
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			609		1161	609
tC, single (s)			4.1		6.5	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.5
p0 queue free %			100		63	77
cM capacity (veh/h)			979		206	469

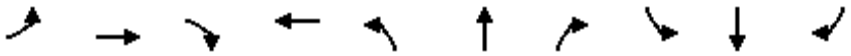
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	609	552	76	106
Volume Left	0	0	76	0
Volume Right	0	0	0	106
cSH	1700	1700	206	469
Volume to Capacity	0.36	0.32	0.37	0.23
Queue Length 95th (ft)	0	0	40	22
Control Delay (s)	0.0	0.0	32.4	14.9
Lane LOS			D	B
Approach Delay (s)	0.0	0.0	22.2	
Approach LOS			C	

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	597	16	15	511	0	0
Future Volume (Veh/h)	597	16	15	511	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	649	32	30	555	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			681		1264	649
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			681		1264	649
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		100	100
cM capacity (veh/h)			921		183	474

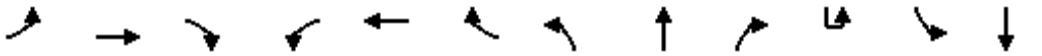
Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	649	32	30	555
Volume Left	0	0	30	0
Volume Right	0	32	0	0
cSH	1700	1700	921	1700
Volume to Capacity	0.38	0.02	0.03	0.33
Queue Length 95th (ft)	0	0	3	0
Control Delay (s)	0.0	0.0	9.0	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.5	
Approach LOS				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	160	163	201	22	185	281	12	20	399	177
v/c Ratio	0.59	0.60	0.14	0.17	0.46	0.22	0.02	0.04	0.61	0.25
Control Delay	40.6	40.9	0.2	28.1	18.8	20.5	0.1	13.8	33.7	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.6	40.9	0.2	28.1	18.8	20.5	0.1	13.8	33.7	2.1
Queue Length 50th (ft)	76	77	0	5	54	42	0	5	94	0
Queue Length 95th (ft)	151	153	0	29	105	99	0	19	150	16
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	378	380	1485	134	441	1292	608	468	902	786
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	0.42	0.43	0.14	0.16	0.42	0.22	0.02	0.04	0.44	0.23

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	311	2	195	7	3	12	179	273	12	12	8	387
Future Volume (vph)	311	2	195	7	3	12	179	273	12	12	8	387
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.93		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1661	1485		1329		1737	3474	1211		1675	3276
Flt Permitted	0.95	0.95	1.00		0.98		0.52	1.00	1.00		0.58	1.00
Satd. Flow (perm)	1655	1661	1485		1329		945	3474	1211		1021	3276
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	321	2	201	7	3	12	185	281	12	12	8	399
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	8	0	0	0
Lane Group Flow (vph)	160	163	201	0	11	0	185	281	4	0	20	399
Heavy Vehicles (%)	1%	0%	6%	33%	33%	27%	6%	6%	36%	0%	14%	8%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	12.8	12.8	83.5		7.1		31.1	28.6	28.6		31.1	21.2
Effective Green, g (s)	12.8	12.8	83.5		7.1		31.1	28.6	28.6		31.1	21.2
Actuated g/C Ratio	0.15	0.15	1.00		0.09		0.37	0.34	0.34		0.37	0.25
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	253	254	1485		113		445	1189	414		399	831
v/s Ratio Prot	0.10	c0.10			0.01		c0.05	c0.08			0.00	c0.12
v/s Ratio Perm			c0.14				0.11		0.00		0.02	
v/c Ratio	0.63	0.64	0.14		0.10		0.42	0.24	0.01		0.05	0.48
Uniform Delay, d1	33.1	33.2	0.0		35.2		18.4	19.6	18.1		16.6	26.5
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.1	5.5	0.2		0.4		0.6	0.1	0.0		0.1	0.4
Delay (s)	38.2	38.6	0.2		35.6		19.0	19.7	18.1		16.7	26.9
Level of Service	D	D	A		D		B	B	B		B	C
Approach Delay (s)		23.8			35.6			19.4				23.2
Approach LOS		C			D			B				C

Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	83.5	Sum of lost time (s)	32.5
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	172
Future Volume (vph)	172
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1507
Flt Permitted	1.00
Satd. Flow (perm)	1507
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	177
RTOR Reduction (vph)	105
Lane Group Flow (vph)	72
Heavy Vehicles (%)	5%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	34.0
Effective Green, g (s)	34.0
Actuated g/C Ratio	0.41
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	613
v/s Ratio Prot	0.02
v/s Ratio Perm	0.03
v/c Ratio	0.12
Uniform Delay, d1	15.4
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	15.5
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	204	486	76	184	479	235	87	144
Average Queue (ft)	51	260	31	45	228	113	24	53
95th Queue (ft)	146	431	60	132	402	199	61	103
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	14		0	14		0	1
Queuing Penalty (veh)	0	6		0	6		0	0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	34
Average Queue (ft)	3
95th Queue (ft)	18
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	255
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	EB	NB	NB
Directions Served	T	L	R
Maximum Queue (ft)	5	77	102
Average Queue (ft)	0	25	34
95th Queue (ft)	4	62	78
Link Distance (ft)	505	382	382
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	40
Average Queue (ft)	8
95th Queue (ft)	30
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	160
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	B17	SB
Directions Served	ULT	UTR	T		L>
Maximum Queue (ft)	288	189	7	5	102
Average Queue (ft)	105	33	0	0	35
95th Queue (ft)	234	120	5	5	78
Link Distance (ft)	393	351	787	787	742
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	178	130	77	70	176	159	128	43	68	182	186	96
Average Queue (ft)	95	53	7	17	83	76	21	6	12	96	99	44
95th Queue (ft)	150	111	40	50	149	137	73	25	44	153	156	80
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0		0	0		
Queuing Penalty (veh)							0		0	0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	47	72	58	60	31
Average Queue (ft)	10	32	26	13	5
95th Queue (ft)	31	62	51	45	22
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 12

MOVEMENT SUMMARY

Site: 101 [2032 Background - AM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.689	14.3	LOS B	7.7	209.4	0.39	0.18	0.39	23.2
6	T1	527	10.0	579	10.0	0.689	14.6	LOS B	7.7	209.4	0.39	0.18	0.39	22.2
16	R2	100	11.0	110	11.0	0.689	14.6	LOS B	7.7	209.4	0.39	0.18	0.39	21.7
Approach		628	10.1	690	10.1	0.689	14.6	LOS B	7.7	209.4	0.39	0.18	0.39	22.2
North: Falmouth Street														
7	L2	90	21.0	99	21.0	0.271	11.3	LOS B	1.7	49.2	0.77	0.70	0.77	22.7
14	R2	37	9.0	41	9.0	0.271	10.3	LOS B	1.7	49.2	0.77	0.70	0.77	21.8
Approach		127	17.5	140	17.5	0.271	11.0	LOS B	1.7	49.2	0.77	0.70	0.77	22.4
West: E Shirley Avenue														
5u	U	1	0.0	1	0.0	0.155	5.0	LOS A	0.9	25.1	0.38	0.21	0.38	25.3
5	L2	34	19.0	37	19.0	0.155	5.8	LOS A	0.9	25.1	0.38	0.21	0.38	24.6
2	T1	350	9.0	385	9.0	0.155	1.4	LOS A	0.9	25.1	0.10	0.06	0.10	25.5
Approach		385	9.9	423	9.9	0.155	1.9	LOS A	0.9	25.1	0.13	0.07	0.13	25.4
All Vehicles		1140	10.9	1253	10.9	0.689	9.9	LOS A	7.7	209.4	0.34	0.20	0.34	23.2

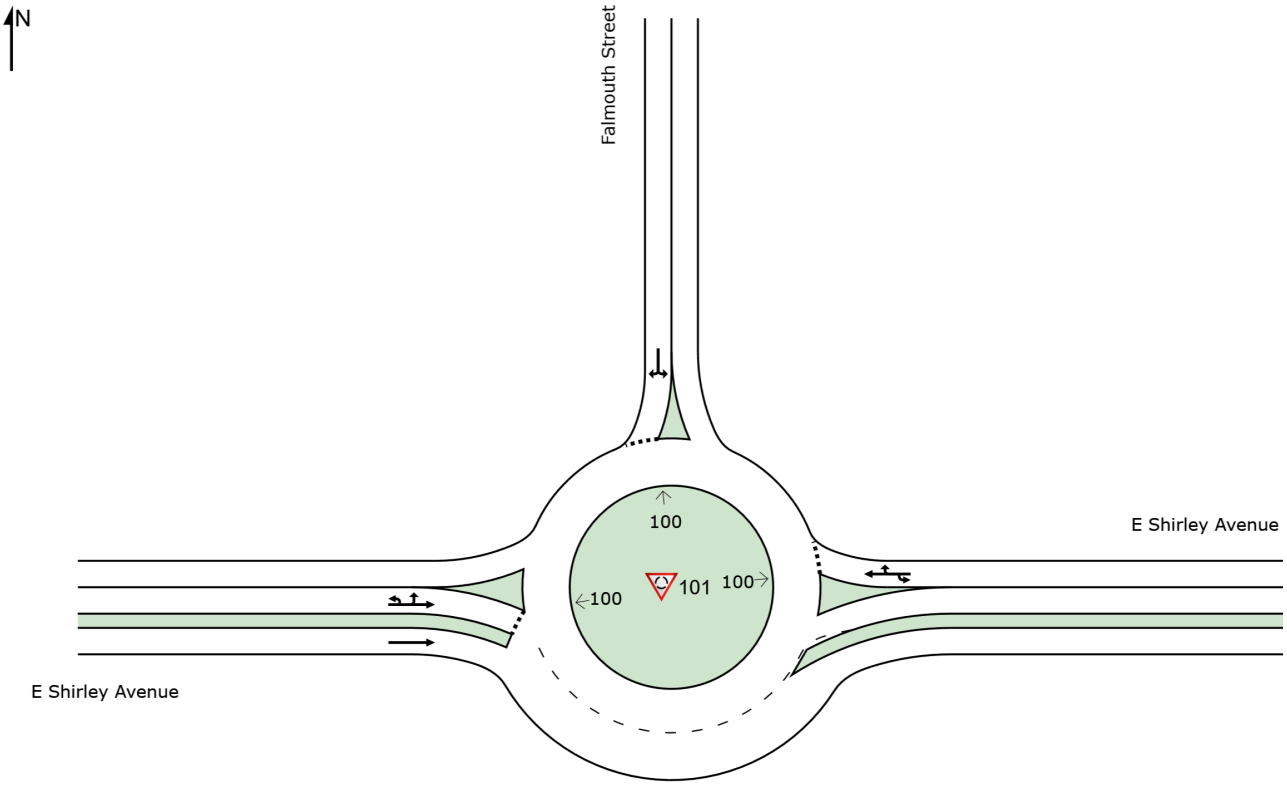
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [2032 Background - AM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [2032 Background - Commuter Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.765	18.0	LOS B	11.6	329.9	0.39	0.15	0.39	22.3
6	T1	505	21.0	555	21.0	0.765	18.7	LOS B	11.6	329.9	0.39	0.15	0.39	21.4
16	R2	166	4.0	182	4.0	0.765	18.1	LOS B	11.6	329.9	0.39	0.15	0.39	20.9
Approach		672	16.8	738	16.8	0.765	18.6	LOS B	11.6	329.9	0.39	0.15	0.39	21.3
North: Falmouth Street														
7	L2	145	1.0	159	1.0	0.329	10.4	LOS B	2.3	59.6	0.81	0.73	0.81	22.7
14	R2	35	9.0	38	9.0	0.329	11.1	LOS B	2.3	59.6	0.81	0.73	0.81	21.8
Approach		180	2.6	198	2.6	0.329	10.6	LOS B	2.3	59.6	0.81	0.73	0.81	22.5
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.239	6.2	LOS A	1.5	39.9	0.46	0.30	0.46	25.3
5	L2	20	11.0	22	11.0	0.239	6.7	LOS A	1.5	39.9	0.46	0.30	0.46	24.6
2	T1	586	5.0	644	5.0	0.239	1.9	LOS A	1.5	39.9	0.14	0.09	0.14	25.4
Approach		608	5.2	668	5.2	0.239	2.2	LOS A	1.5	39.9	0.15	0.10	0.15	25.3
All Vehicles		1460	10.2	1604	10.2	0.765	10.7	LOS B	11.6	329.9	0.34	0.20	0.34	23.0

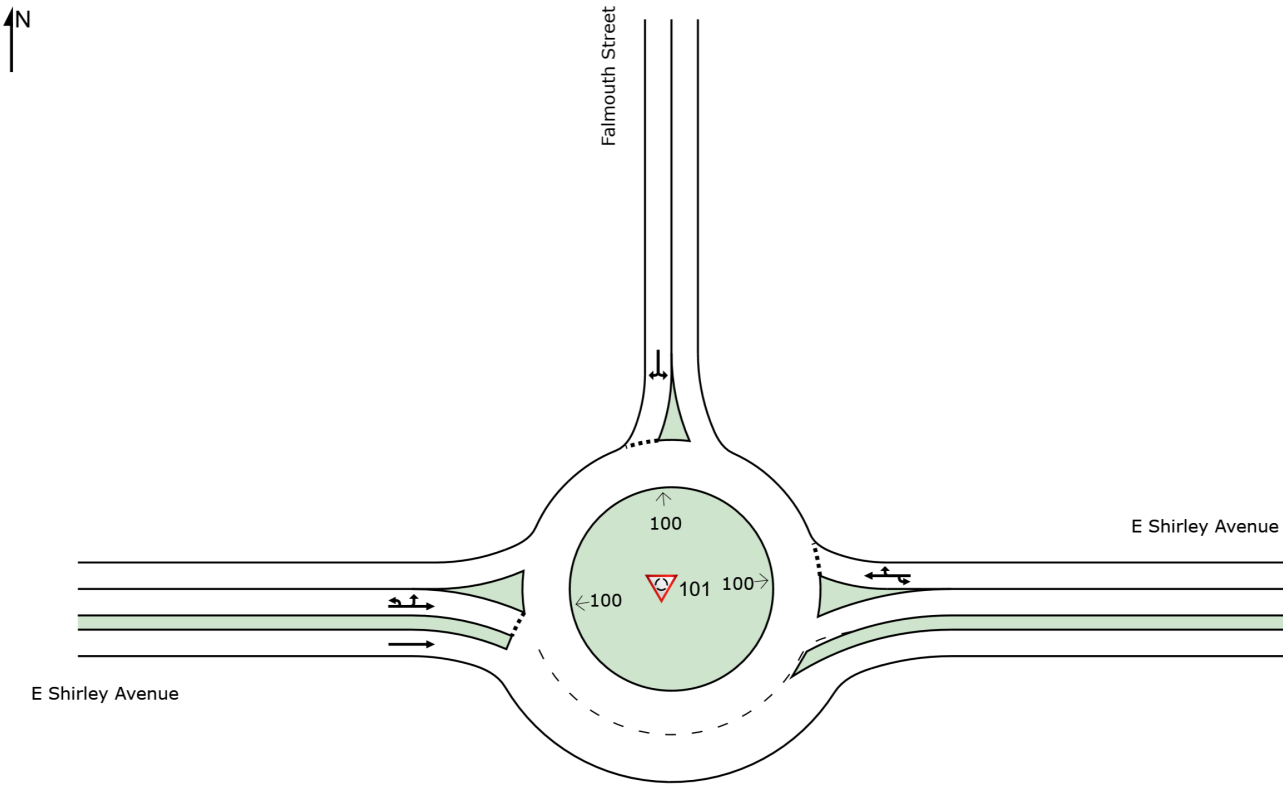
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [2032 Background - Commuter Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [2032 Background - School PM (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	2	0.0	2	0.0	0.602	11.2	LOS B	5.7	148.8	0.29	0.12	0.29	24.0
6	T1	484	4.0	489	4.0	0.602	11.3	LOS B	5.7	148.8	0.29	0.12	0.29	23.0
16	R2	152	6.0	154	6.0	0.602	11.4	LOS B	5.7	148.8	0.29	0.12	0.29	22.4
Approach		638	4.5	644	4.5	0.602	11.3	LOS B	5.7	148.8	0.29	0.12	0.29	22.8
North: Falmouth Street														
7	L2	144	7.0	145	7.0	0.250	8.4	LOS A	1.6	41.8	0.68	0.57	0.68	23.1
14	R2	25	0.0	25	0.0	0.250	7.9	LOS A	1.6	41.8	0.68	0.57	0.68	22.2
Approach		169	6.0	171	6.0	0.250	8.3	LOS A	1.6	41.8	0.68	0.57	0.68	23.0
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.225	6.0	LOS A	1.4	36.8	0.44	0.28	0.44	25.3
5	L2	28	23.0	28	23.0	0.225	7.0	LOS A	1.4	36.8	0.44	0.28	0.44	24.6
2	T1	590	5.0	596	5.0	0.225	1.8	LOS A	1.4	36.8	0.13	0.08	0.13	25.4
Approach		620	5.8	626	5.8	0.225	2.1	LOS A	1.4	36.8	0.14	0.09	0.14	25.4
All Vehicles		1427	5.2	1441	5.2	0.602	6.9	LOS A	5.7	148.8	0.27	0.16	0.27	23.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
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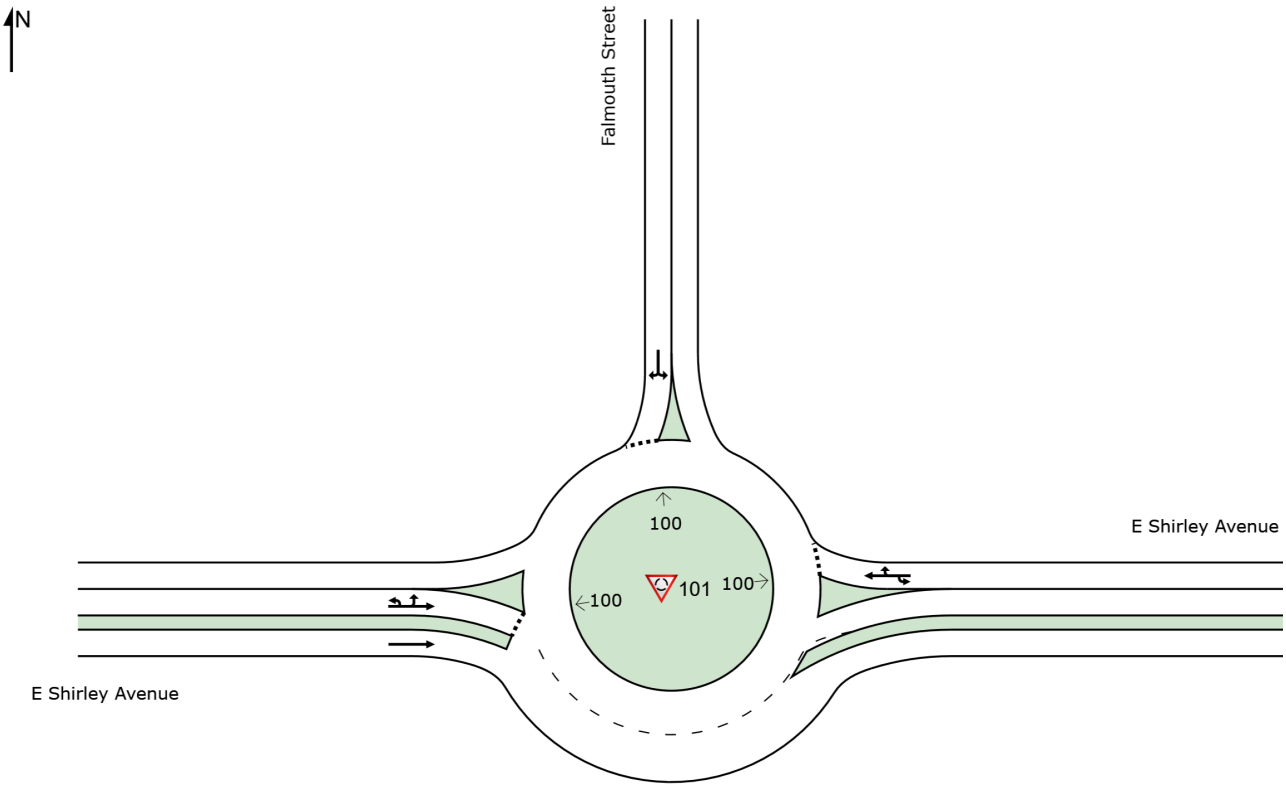
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [2032 Background - School PM (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Appendix H
2032 Future Analysis Worksheets

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	51	0	49	41	180	0	0	37	80	0	0
Future Vol, veh/h	0	51	0	49	41	180	0	0	37	80	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	24	0	7	0	0	65	8	0	0
Mvmt Flow	0	55	0	53	45	196	0	0	40	87	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	8	8.5	7.4	8.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	54%	0%	100%
Vol Thru, %	0%	100%	46%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	37	51	90	180	80
LT Vol	0	0	49	0	80
Through Vol	0	51	41	0	0
RT Vol	37	0	0	180	0
Lane Flow Rate	40	55	98	196	87
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.047	0.071	0.151	0.226	0.122
Departure Headway (Hd)	4.183	4.615	5.541	4.156	5.05
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	856	777	649	865	711
Service Time	2.208	2.639	3.259	1.874	3.072
HCM Lane V/C Ratio	0.047	0.071	0.151	0.227	0.122
HCM Control Delay	7.4	8	9.2	8.1	8.8
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0.2	0.5	0.9	0.4

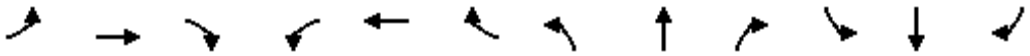
1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	34	433	78	34	584	249	17	60
v/c Ratio	0.21	0.62	0.11	0.23	0.72	0.75	0.09	0.31
Control Delay	46.8	28.4	0.3	47.6	30.4	50.6	42.4	33.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.8	28.4	0.3	47.6	30.4	50.6	42.4	33.3
Queue Length 50th (ft)	21	214	0	21	328	142	10	22
Queue Length 95th (ft)	53	335	0	53	#555	#264	31	62
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	163	788	771	149	807	379	376	377
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	0.21	0.55	0.10	0.23	0.72	0.66	0.05	0.16

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)	31	398	72	31	513	24	85	89	55	16	34	21
Future Volume (vph)	31	398	72	31	513	24	85	89	55	16	34	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99			0.97		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1823	1761	1539	1667	1721			1736		1769	1691	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1823	1761	1539	1667	1721			1736		1769	1691	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	34	433	78	34	558	26	92	97	60	17	37	23
RTOR Reduction (vph)	0	0	46	0	1	0	0	11	0	0	21	0
Lane Group Flow (vph)	34	433	32	34	583	0	0	238	0	17	39	0
Heavy Vehicles (%)	0%	9%	6%	11%	13%	0%	6%	2%	4%	0%	3%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.3	39.0	39.0	8.2	42.9			17.0		7.2	7.2	
Effective Green, g (s)	4.3	39.0	39.0	8.2	42.9			17.0		7.2	7.2	
Actuated g/C Ratio	0.05	0.41	0.41	0.09	0.45			0.18		0.08	0.08	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	82	719	629	143	773			309		133	127	
v/s Ratio Prot	0.02	0.25		c0.02	c0.34			c0.14		0.01	c0.02	
v/s Ratio Perm			0.02									
v/c Ratio	0.41	0.60	0.05	0.24	0.75			0.77		0.13	0.31	
Uniform Delay, d1	44.3	22.1	17.0	40.7	21.9			37.3		41.2	41.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	4.6	1.7	0.0	1.2	4.5			11.9		0.6	1.9	
Delay (s)	48.9	23.8	17.1	41.9	26.3			49.3		41.8	43.6	
Level of Service	D	C	B	D	C			D		D	D	
Approach Delay (s)		24.4			27.2			49.3			43.2	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	95.4	Sum of lost time (s)	24.0
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	411	12	19	559	0	0
Future Volume (Veh/h)	411	12	19	559	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	447	24	38	608	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			471		1131	447
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			471		1131	447
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			96		100	100
cM capacity (veh/h)			1036		219	616

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	447	24	38	608
Volume Left	0	0	38	0
Volume Right	0	24	0	0
cSH	1700	1700	1036	1700
Volume to Capacity	0.26	0.01	0.04	0.36
Queue Length 95th (ft)	0	0	3	0
Control Delay (s)	0.0	0.0	8.6	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.5	
Approach LOS				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	401	0	0	570	12	19
Future Volume (Veh/h)	401	0	0	570	12	19
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	436	0	0	620	24	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			436		1056	436
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			436		1056	436
tC, single (s)			4.1		6.6	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.4
p0 queue free %			100		90	94
cM capacity (veh/h)			1134		234	592

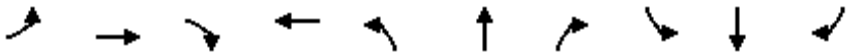
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	436	620	24	38
Volume Left	0	0	24	0
Volume Right	0	0	0	38
cSH	1700	1700	234	592
Volume to Capacity	0.26	0.36	0.10	0.06
Queue Length 95th (ft)	0	0	8	5
Control Delay (s)	0.0	0.0	22.1	11.5
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	15.6	
Approach LOS			C	

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	383	80	25	511	57	44
Future Volume (Veh/h)	383	80	25	511	57	44
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.95	0.50	0.50	0.95	0.95	0.95
Hourly flow rate (vph)	403	160	50	538	60	46
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			563		1041	403
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			563		1041	403
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		75	93
cM capacity (veh/h)			1019		245	652

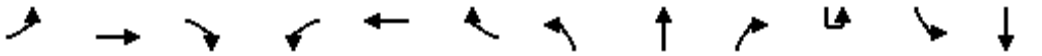
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	403	160	50	538	106
Volume Left	0	0	50	0	60
Volume Right	0	160	0	0	46
cSH	1700	1700	1019	1700	336
Volume to Capacity	0.24	0.09	0.05	0.32	0.32
Queue Length 95th (ft)	0	0	4	0	33
Control Delay (s)	0.0	0.0	8.7	0.0	20.6
Lane LOS			A		C
Approach Delay (s)	0.0		0.7		20.6
Approach LOS					C

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	39.4%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	85	86	155	6	297	474	11	11	172	184
v/c Ratio	0.48	0.48	0.12	0.01	0.60	0.33	0.01	0.03	0.35	0.28
Control Delay	41.0	41.2	0.2	0.0	20.3	17.3	0.0	12.3	32.5	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.0	41.2	0.2	0.0	20.3	17.3	0.0	12.3	32.5	1.2
Queue Length 50th (ft)	40	40	0	0	88	71	0	3	38	0
Queue Length 95th (ft)	90	91	0	0	160	157	0	12	75	3
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	253	253	1291	418	601	1468	852	386	663	720
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	0.34	0.34	0.12	0.01	0.49	0.32	0.01	0.03	0.26	0.26

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	157	0	143	2	0	4	273	436	10	2	8	158
Future Volume (vph)	157	0	143	2	0	4	273	436	10	2	8	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.91		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1316	1316	1291		1015		1674	3409	1647		1430	3103
Flt Permitted	0.95	0.95	1.00		0.98		0.64	1.00	1.00		0.48	1.00
Satd. Flow (perm)	1316	1316	1291		1015		1133	3409	1647		723	3103
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	171	0	155	2	0	4	297	474	11	2	9	172
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	7	0	0	0
Lane Group Flow (vph)	85	86	155	0	1	0	297	474	4	0	11	172
Heavy Vehicles (%)	27%	0%	22%	50%	0%	75%	10%	8%	0%	0%	29%	14%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	10.4	10.4	83.7		7.1		33.7	32.5	32.5		33.7	19.4
Effective Green, g (s)	10.4	10.4	83.7		7.1		33.7	32.5	32.5		33.7	19.4
Actuated g/C Ratio	0.12	0.12	1.00		0.08		0.40	0.39	0.39		0.40	0.23
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	163	163	1291		86		548	1323	639		301	719
v/s Ratio Prot	0.06	c0.07			0.00		c0.09	c0.14			0.00	0.06
v/s Ratio Perm			c0.12				c0.13		0.00		0.01	
v/c Ratio	0.52	0.53	0.12		0.01		0.54	0.36	0.01		0.04	0.24
Uniform Delay, d1	34.3	34.3	0.0		35.1		18.2	18.2	15.7		15.1	26.1
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.0	3.1	0.2		0.0		1.1	0.2	0.0		0.0	0.2
Delay (s)	37.3	37.4	0.2		35.1		19.3	18.4	15.7		15.1	26.3
Level of Service	D	D	A		D		B	B	B		B	C
Approach Delay (s)		19.7			35.1			18.7				22.0
Approach LOS		B			D			B				C

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	83.7	Sum of lost time (s)	32.5
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	169
Future Volume (vph)	169
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1426
Flt Permitted	1.00
Satd. Flow (perm)	1426
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	184
RTOR Reduction (vph)	118
Lane Group Flow (vph)	66
Heavy Vehicles (%)	11%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	29.8
Effective Green, g (s)	29.8
Actuated g/C Ratio	0.36
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	507
v/s Ratio Prot	0.02
v/s Ratio Perm	0.03
v/c Ratio	0.13
Uniform Delay, d1	18.2
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	18.3
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	164	325	61	170	444	251	47	86
Average Queue (ft)	31	155	23	34	212	119	15	34
95th Queue (ft)	91	266	51	106	384	210	42	69
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	3		0	12			0
Queuing Penalty (veh)	0	1		0	4			0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	EB	WB
Directions Served	R	L
Maximum Queue (ft)	6	44
Average Queue (ft)	0	6
95th Queue (ft)	5	29
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	125	255
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	EB	NB	NB
Directions Served	T	L	R
Maximum Queue (ft)	2	64	68
Average Queue (ft)	0	11	21
95th Queue (ft)	2	42	57
Link Distance (ft)	505	382	382
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	EB	WB	NB
Directions Served	T	R	L	LR
Maximum Queue (ft)	7	12	45	82
Average Queue (ft)	0	0	9	33
95th Queue (ft)	5	7	34	63
Link Distance (ft)	204			380
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		140	160	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	SB
Directions Served	ULT	TR	L>
Maximum Queue (ft)	128	215	97
Average Queue (ft)	27	50	32
95th Queue (ft)	86	150	76
Link Distance (ft)	393	351	742
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	175	129	36	60	219	203	168	23	65	119	118	122
Average Queue (ft)	69	31	1	8	107	106	40	3	7	53	47	52
95th Queue (ft)	137	84	14	36	183	177	114	14	36	97	95	93
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)					0		0		0	0		
Queuing Penalty (veh)					0		0		0	0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	20	80	79	74	65
Average Queue (ft)	7	41	45	34	33
95th Queue (ft)	16	70	69	74	59
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 5

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	58	0	15	66	37	0	0	30	31	0	0
Future Vol, veh/h	0	58	0	15	66	37	0	0	30	31	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	57	0	18	0	0	7	0	0	0
Mvmt Flow	0	63	0	16	72	40	0	0	33	34	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

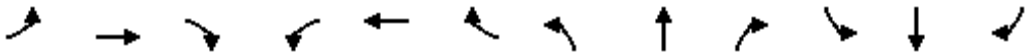
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.6	8.6	7	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	19%	0%	100%
Vol Thru, %	0%	100%	81%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	30	58	81	37	31
LT Vol	0	0	15	0	31
Through Vol	0	58	66	0	0
RT Vol	30	0	0	37	0
Lane Flow Rate	33	63	88	40	34
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.035	0.074	0.14	0.044	0.043
Departure Headway (Hd)	3.817	4.21	5.711	3.947	4.611
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	943	837	626	902	781
Service Time	1.818	2.305	3.46	1.695	2.613
HCM Lane V/C Ratio	0.035	0.075	0.141	0.044	0.044
HCM Control Delay	7	7.6	9.4	6.9	7.8
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0.2	0.5	0.1	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	43	620	165	36	584	202	39	156
v/c Ratio	0.29	0.89	0.24	0.25	0.71	0.70	0.16	0.60
Control Delay	52.6	46.7	5.9	51.6	32.1	53.1	40.6	49.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.6	46.7	5.9	51.6	32.1	53.1	40.6	49.0
Queue Length 50th (ft)	28	377	6	23	343	122	23	93
Queue Length 95th (ft)	67	#634	51	58	#569	209	55	163
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	147	752	729	144	828	346	339	348
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	0.29	0.82	0.23	0.25	0.71	0.58	0.12	0.45

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)	40	583	155	34	545	4	90	69	31	37	119	27
Future Volume (vph)	40	583	155	34	545	4	90	69	31	37	119	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1823	1863	1584	1796	1889			1774		1769	1781	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1823	1863	1584	1796	1889			1774		1769	1781	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	43	620	165	36	580	4	96	73	33	39	127	29
RTOR Reduction (vph)	0	0	92	0	0	0	0	7	0	0	8	0
Lane Group Flow (vph)	43	620	73	36	584	0	0	195	0	39	148	0
Heavy Vehicles (%)	0%	3%	3%	3%	3%	0%	2%	2%	4%	0%	2%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.5	40.4	40.4	8.1	44.0			16.0		14.3	14.3	
Effective Green, g (s)	4.5	40.4	40.4	8.1	44.0			16.0		14.3	14.3	
Actuated g/C Ratio	0.04	0.39	0.39	0.08	0.43			0.16		0.14	0.14	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	79	732	622	141	808			276		246	247	
v/s Ratio Prot	c0.02	c0.33		0.02	c0.31			c0.11		0.02	c0.08	
v/s Ratio Perm			0.05									
v/c Ratio	0.54	0.85	0.12	0.26	0.72			0.71		0.16	0.60	
Uniform Delay, d1	48.1	28.4	19.9	44.5	24.3			41.2		39.0	41.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	9.3	9.3	0.1	1.3	3.4			8.6		0.4	4.7	
Delay (s)	57.4	37.7	20.0	45.8	27.8			49.8		39.4	46.3	
Level of Service	E	D	B	D	C			D		D	D	
Approach Delay (s)		35.2			28.8			49.8			44.9	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	102.8	Sum of lost time (s)	24.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	620	0	0	549	0	0
Future Volume (Veh/h)	620	0	0	549	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	674	0	0	597	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			674		1271	674
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			674		1271	674
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			927		187	458

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	674	0	0	597
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.40	0.01	0.00	0.35
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				
Approach Delay (s)	0.0		0.0	
Approach LOS				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	622	0	0	545	0	0
Future Volume (Veh/h)	622	0	0	545	0	0
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	676	0	0	592	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			676		1268	676
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			676		1268	676
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			925		188	457

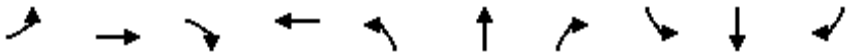
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	676	592	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.40	0.35	0.12	0.08
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS			A	

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	594	29	28	528	20	4
Future Volume (Veh/h)	594	29	28	528	20	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	646	58	56	574	22	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			704		1332	646
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			704		1332	646
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			94		86	99
cM capacity (veh/h)			862		161	475

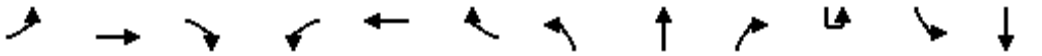
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	646	58	56	574	26
Volume Left	0	0	56	0	22
Volume Right	0	58	0	0	4
cSH	1700	1700	862	1700	179
Volume to Capacity	0.38	0.03	0.06	0.34	0.15
Queue Length 95th (ft)	0	0	5	0	12
Control Delay (s)	0.0	0.0	9.5	0.0	28.5
Lane LOS			A		D
Approach Delay (s)	0.0		0.8		28.5
Approach LOS					D

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	162	163	239	18	235	322	1	18	458	152
v/c Ratio	0.62	0.63	0.16	0.05	0.56	0.24	0.00	0.05	0.66	0.23
Control Delay	44.0	44.2	0.2	0.2	20.4	19.6	0.0	13.2	35.3	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.0	44.2	0.2	0.2	20.4	19.6	0.0	13.2	35.3	1.7
Queue Length 50th (ft)	83	84	0	0	72	49	0	5	115	0
Queue Length 95th (ft)	155	156	0	0	128	109	0	17	173	13
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	338	338	1529	360	463	1375	474	375	873	730
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	0.48	0.48	0.16	0.05	0.51	0.23	0.00	0.05	0.52	0.21

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	309	0	227	5	0	12	223	306	1	10	7	435
Future Volume (vph)	309	0	227	5	0	12	223	306	1	10	7	435
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.90		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1655	1529		1502		1721	3541	824		1337	3369
Flt Permitted	0.95	0.95	1.00		0.99		0.46	1.00	1.00		0.56	1.00
Satd. Flow (perm)	1655	1655	1529		1502		838	3541	824		784	3369
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	325	0	239	5	0	13	235	322	1	11	7	458
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	1	0	0	0
Lane Group Flow (vph)	162	163	239	0	1	0	235	322	0	0	18	458
Heavy Vehicles (%)	1%	0%	3%	20%	0%	9%	7%	4%	100%	0%	83%	5%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	12.7	12.7	86.0		7.1		33.7	31.2	31.2		33.7	22.2
Effective Green, g (s)	12.7	12.7	86.0		7.1		33.7	31.2	31.2		33.7	22.2
Actuated g/C Ratio	0.15	0.15	1.00		0.08		0.39	0.36	0.36		0.39	0.26
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	244	244	1529		124		446	1284	298		323	869
v/s Ratio Prot	0.10	c0.10			0.00		c0.07	c0.09			0.00	c0.14
v/s Ratio Perm			c0.16				0.14		0.00		0.02	
v/c Ratio	0.66	0.67	0.16		0.01		0.53	0.25	0.00		0.06	0.53
Uniform Delay, d1	34.6	34.7	0.0		36.2		18.4	19.2	17.5		16.1	27.4
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.6	6.8	0.2		0.0		1.1	0.1	0.0		0.1	0.6
Delay (s)	41.3	41.4	0.2		36.3		19.6	19.3	17.5		16.2	28.0
Level of Service	D	D	A		D		B	B	B		B	C
Approach Delay (s)		23.9			36.3			19.4				24.7
Approach LOS		C			D			B				C

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	32.5
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	144
Future Volume (vph)	144
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1439
Flt Permitted	1.00
Satd. Flow (perm)	1439
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	152
RTOR Reduction (vph)	90
Lane Group Flow (vph)	62
Heavy Vehicles (%)	10%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	34.9
Effective Green, g (s)	34.9
Actuated g/C Ratio	0.41
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	583
v/s Ratio Prot	0.02
v/s Ratio Perm	0.03
v/c Ratio	0.11
Uniform Delay, d1	15.9
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	15.9
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	214	548	111	184	467	246	114	199
Average Queue (ft)	61	295	42	38	220	111	31	87
95th Queue (ft)	170	513	79	113	391	198	81	161
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	19		0	13		0	3
Queuing Penalty (veh)	0	8		0	5		0	1

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	52	50
Average Queue (ft)	10	13
95th Queue (ft)	36	35
Link Distance (ft)		380
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	160	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	SB
Directions Served	ULT	TR	T	L>
Maximum Queue (ft)	252	189	13	86
Average Queue (ft)	96	27	0	34
95th Queue (ft)	208	111	8	69
Link Distance (ft)	393	351	787	742
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	161	124	63	52	185	178	124	31	68	176	189	99
Average Queue (ft)	95	54	8	12	94	79	23	2	13	103	107	42
95th Queue (ft)	149	110	40	38	158	144	74	17	45	160	167	80
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0			1		
Queuing Penalty (veh)							0			0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	23	77	66	61	41
Average Queue (ft)	7	37	26	20	18
95th Queue (ft)	15	65	57	48	42
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 14

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	40	0	12	37	79	0	0	13	72	0	0
Future Vol, veh/h	0	40	0	12	37	79	0	0	13	72	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	13	0	55	2	7	0	0	35	0	0	0
Mvmt Flow	0	43	0	13	40	86	0	0	14	78	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.9	7.9	6.9	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	24%	0%	100%
Vol Thru, %	0%	100%	76%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	13	40	49	79	72
LT Vol	0	0	12	0	72
Through Vol	0	40	37	0	0
RT Vol	13	0	0	79	0
Lane Flow Rate	14	43	53	86	78
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.015	0.055	0.085	0.096	0.099
Departure Headway (Hd)	3.821	4.589	5.746	4.019	4.547
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	941	784	619	882	792
Service Time	1.826	2.597	3.518	1.79	2.55
HCM Lane V/C Ratio	0.015	0.055	0.086	0.098	0.098
HCM Control Delay	6.9	7.9	9.1	7.2	8
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0	0.2	0.3	0.3	0.3

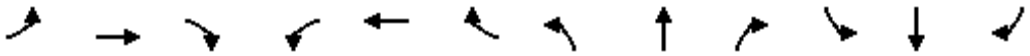
1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	42	637	107	42	640	215	29	96
v/c Ratio	0.30	0.86	0.15	0.28	0.74	0.71	0.15	0.44
Control Delay	51.2	41.7	1.9	50.4	31.9	51.1	42.6	40.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.2	41.7	1.9	50.4	31.9	51.1	42.6	40.1
Queue Length 50th (ft)	26	375	0	26	379	126	17	45
Queue Length 95th (ft)	64	#636	15	64	#645	#228	45	97
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	142	792	752	151	862	359	337	371
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	0.30	0.80	0.14	0.28	0.74	0.60	0.09	0.26

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)	39	586	98	39	575	14	83	82	33	27	57	31
Future Volume (vph)	39	586	98	39	575	14	83	82	33	27	57	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1642	1828	1539	1745	1816			1713		1638	1719	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1642	1828	1539	1745	1816			1713		1638	1719	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	637	107	42	625	15	90	89	36	29	62	34
RTOR Reduction (vph)	0	0	62	0	1	0	0	7	0	0	20	0
Lane Group Flow (vph)	42	637	45	42	639	0	0	208	0	29	76	0
Heavy Vehicles (%)	11%	5%	6%	6%	7%	0%	8%	4%	7%	8%	4%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.4	41.3	41.3	8.2	45.1			16.5		8.8	8.8	
Effective Green, g (s)	4.4	41.3	41.3	8.2	45.1			16.5		8.8	8.8	
Actuated g/C Ratio	0.04	0.42	0.42	0.08	0.46			0.17		0.09	0.09	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	73	764	643	144	828			286		145	153	
v/s Ratio Prot	c0.03	c0.35		0.02	c0.35			c0.12		0.02	c0.04	
v/s Ratio Perm			0.03									
v/c Ratio	0.58	0.83	0.07	0.29	0.77			0.73		0.20	0.50	
Uniform Delay, d1	46.3	25.7	17.2	42.6	22.5			39.0		41.7	42.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	12.5	8.1	0.1	1.5	4.8			9.5		0.9	3.4	
Delay (s)	58.8	33.8	17.3	44.1	27.3			48.5		42.7	46.3	
Level of Service	E	C	B	D	C			D		D	D	
Approach Delay (s)		32.9			28.3			48.5			45.5	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	33.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	98.8	Sum of lost time (s)	24.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	584	12	19	564	0	0
Future Volume (Veh/h)	584	12	19	564	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.93	0.50	0.50	0.93	0.93	0.93
Hourly flow rate (vph)	628	24	38	606	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			652		1310	628
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			652		1310	628
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		100	100
cM capacity (veh/h)			944		170	487

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	628	24	38	606
Volume Left	0	0	38	0
Volume Right	0	24	0	0
cSH	1700	1700	944	1700
Volume to Capacity	0.37	0.01	0.04	0.36
Queue Length 95th (ft)	0	0	3	0
Control Delay (s)	0.0	0.0	9.0	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.5	
Approach LOS				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	588	0	0	472	12	19
Future Volume (Veh/h)	588	0	0	472	12	19
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	639	0	0	513	24	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			639		1152	639
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			639		1152	639
tC, single (s)			4.1		6.5	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.5
p0 queue free %			100		88	92
cM capacity (veh/h)			955		208	450

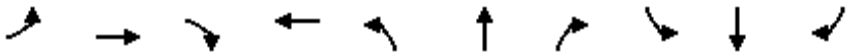
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	639	513	24	38
Volume Left	0	0	24	0
Volume Right	0	0	0	38
cSH	1700	1700	208	450
Volume to Capacity	0.38	0.30	0.12	0.08
Queue Length 95th (ft)	0	0	10	7
Control Delay (s)	0.0	0.0	24.5	13.7
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	17.9	
Approach LOS			C	

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	603	44	7	521	54	46
Future Volume (Veh/h)	603	44	7	521	54	46
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	655	88	14	566	59	50
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			743		1249	655
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			743		1249	655
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		69	89
cM capacity (veh/h)			873		190	470

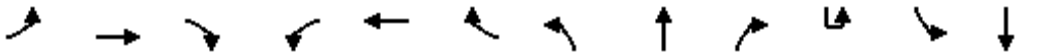
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	655	88	14	566	109
Volume Left	0	0	14	0	59
Volume Right	0	88	0	0	50
cSH	1700	1700	873	1700	262
Volume to Capacity	0.39	0.05	0.02	0.33	0.42
Queue Length 95th (ft)	0	0	1	0	49
Control Delay (s)	0.0	0.0	9.2	0.0	28.2
Lane LOS			A		D
Approach Delay (s)	0.0		0.2		28.2
Approach LOS					D

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	160	163	270	22	213	278	12	20	367	177
v/c Ratio	0.59	0.60	0.18	0.17	0.50	0.22	0.02	0.04	0.60	0.26
Control Delay	40.7	41.1	0.3	28.2	19.5	20.4	0.1	13.8	34.7	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.7	41.1	0.3	28.2	19.5	20.4	0.1	13.8	34.7	2.3
Queue Length 50th (ft)	76	77	0	5	64	41	0	5	87	0
Queue Length 95th (ft)	151	153	0	29	120	98	0	19	142	18
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	377	378	1485	134	478	1297	610	471	814	768
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	0.42	0.43	0.18	0.16	0.45	0.21	0.02	0.04	0.45	0.23

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	311	2	262	7	3	12	207	270	12	12	8	356
Future Volume (vph)	311	2	262	7	3	12	207	270	12	12	8	356
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.93		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1661	1485		1329		1737	3474	1211		1675	3276
Flt Permitted	0.95	0.95	1.00		0.98		0.53	1.00	1.00		0.58	1.00
Satd. Flow (perm)	1655	1661	1485		1329		975	3474	1211		1024	3276
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	321	2	270	7	3	12	213	278	12	12	8	367
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	8	0	0	0
Lane Group Flow (vph)	160	163	270	0	11	0	213	278	4	0	20	367
Heavy Vehicles (%)	1%	0%	6%	33%	33%	27%	6%	6%	36%	0%	14%	8%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	12.9	12.9	83.9		7.1		31.4	28.9	28.9		31.4	20.3
Effective Green, g (s)	12.9	12.9	83.9		7.1		31.4	28.9	28.9		31.4	20.3
Actuated g/C Ratio	0.15	0.15	1.00		0.08		0.37	0.34	0.34		0.37	0.24
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	254	255	1485		112		465	1196	417		402	792
v/s Ratio Prot	0.10	c0.10			0.01		c0.06	0.08			0.00	c0.11
v/s Ratio Perm			c0.18				0.11		0.00		0.02	
v/c Ratio	0.63	0.64	0.18		0.10		0.46	0.23	0.01		0.05	0.46
Uniform Delay, d1	33.3	33.3	0.0		35.4		18.7	19.6	18.1		16.6	27.1
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.8	5.2	0.3		0.4		0.7	0.1	0.0		0.1	0.4
Delay (s)	38.1	38.5	0.3		35.8		19.4	19.7	18.1		16.7	27.6
Level of Service	D	D	A		D		B	B	B		B	C
Approach Delay (s)		21.0			35.8			19.5				23.6
Approach LOS		C			D			B				C

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	83.9	Sum of lost time (s)	32.5
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	172
Future Volume (vph)	172
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1507
Flt Permitted	1.00
Satd. Flow (perm)	1507
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	177
RTOR Reduction (vph)	107
Lane Group Flow (vph)	70
Heavy Vehicles (%)	5%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	33.2
Effective Green, g (s)	33.2
Actuated g/C Ratio	0.40
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	596
v/s Ratio Prot	0.02
v/s Ratio Perm	0.03
v/c Ratio	0.12
Uniform Delay, d1	16.1
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	16.2
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	214	551	77	177	578	248	82	147
Average Queue (ft)	53	282	30	42	269	115	21	59
95th Queue (ft)	157	480	63	122	480	205	58	115
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	17		0	18		0	1
Queuing Penalty (veh)	0	7		0	7		0	0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	44
Average Queue (ft)	8
95th Queue (ft)	32
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	255
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	50	65
Average Queue (ft)	10	19
95th Queue (ft)	38	53
Link Distance (ft)	382	382
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	WB	NB
Directions Served	R	L	LR
Maximum Queue (ft)	6	33	100
Average Queue (ft)	0	3	37
95th Queue (ft)	4	18	77
Link Distance (ft)			380
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	140	160	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	SB
Directions Served	ULT	UTR	T	L>
Maximum Queue (ft)	272	201	7	91
Average Queue (ft)	103	42	0	39
95th Queue (ft)	233	135	5	76
Link Distance (ft)	393	351	787	742
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		0		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	173	141	84	78	196	165	128	50	56	166	175	100
Average Queue (ft)	100	59	11	19	92	77	25	6	11	93	95	47
95th Queue (ft)	157	119	45	55	160	142	83	28	38	149	156	82
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0			0		
Queuing Penalty (veh)							0			0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	42	73	72	64	59
Average Queue (ft)	10	31	35	13	29
95th Queue (ft)	27	61	61	47	48
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 14

MOVEMENT SUMMARY

Site: 101 [2032 Future - AM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.656	13.2	LOS B	6.6	179.4	0.39	0.19	0.39	23.5
6	T1	490	10.0	538	10.0	0.656	13.6	LOS B	6.6	179.4	0.39	0.19	0.39	22.5
16	R2	100	11.0	110	11.0	0.656	13.6	LOS B	6.6	179.4	0.39	0.19	0.39	22.0
Approach		591	10.2	649	10.2	0.656	13.6	LOS B	6.6	179.4	0.39	0.19	0.39	22.4
North: Falmouth Street														
7	L2	90	21.0	99	21.0	0.277	11.0	LOS B	1.7	49.5	0.75	0.68	0.75	22.8
14	R2	46	9.0	51	9.0	0.277	10.0	LOS A	1.7	49.5	0.75	0.68	0.75	21.9
Approach		136	16.9	149	16.9	0.277	10.6	LOS B	1.7	49.5	0.75	0.68	0.75	22.5
West: E Shirley Avenue														
5u	U	1	0.0	1	0.0	0.146	4.9	LOS A	0.9	23.5	0.37	0.21	0.37	25.2
5	L2	41	19.0	45	19.0	0.146	5.7	LOS A	0.9	23.5	0.37	0.21	0.37	24.5
2	T1	320	9.0	352	9.0	0.146	1.3	LOS A	0.9	23.5	0.09	0.05	0.09	25.5
Approach		362	10.1	398	10.1	0.146	1.8	LOS A	0.9	23.5	0.12	0.07	0.12	25.4
All Vehicles		1089	11.0	1197	11.0	0.656	9.3	LOS A	6.6	179.4	0.35	0.21	0.35	23.3

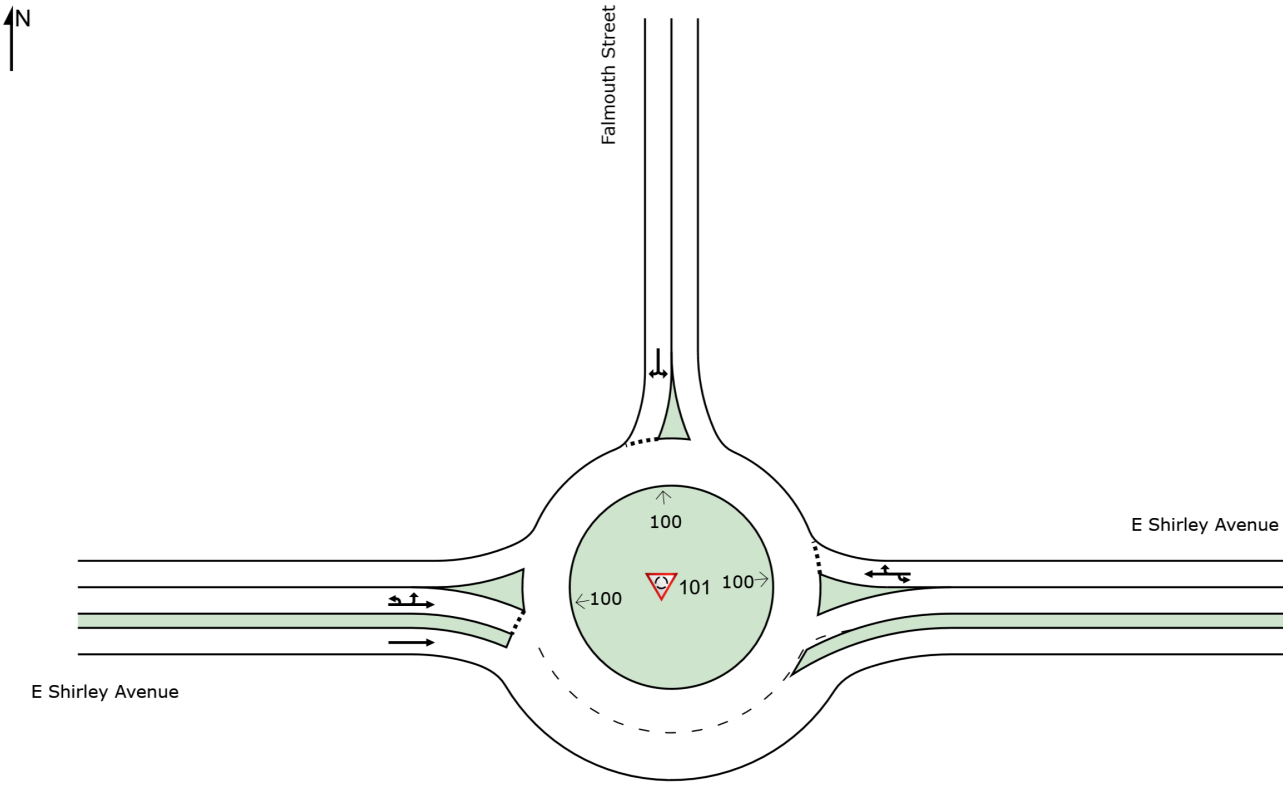
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [2032 Future - AM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [2032 Future - Commuter Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.763	17.9	LOS B	11.4	324.5	0.40	0.16	0.40	22.3
6	T1	502	21.0	552	21.0	0.763	18.6	LOS B	11.4	324.5	0.40	0.16	0.40	21.4
16	R2	166	4.0	182	4.0	0.763	18.0	LOS B	11.4	324.5	0.40	0.16	0.40	20.9
Approach		669	16.8	735	16.8	0.763	18.4	LOS B	11.4	324.5	0.40	0.16	0.40	21.3
North: Falmouth Street														
7	L2	145	1.0	159	1.0	0.334	10.5	LOS B	2.4	60.6	0.81	0.73	0.81	22.7
14	R2	38	9.0	42	9.0	0.334	11.2	LOS B	2.4	60.6	0.81	0.73	0.81	21.7
Approach		183	2.7	201	2.7	0.334	10.7	LOS B	2.4	60.6	0.81	0.73	0.81	22.5
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.238	6.2	LOS A	1.5	39.8	0.46	0.30	0.46	25.3
5	L2	21	11.0	23	11.0	0.238	6.6	LOS A	1.5	39.8	0.46	0.30	0.46	24.6
2	T1	583	5.0	641	5.0	0.238	1.9	LOS A	1.5	39.8	0.14	0.09	0.14	25.4
Approach		606	5.2	666	5.2	0.238	2.2	LOS A	1.5	39.8	0.15	0.10	0.15	25.3
All Vehicles		1458	10.2	1602	10.2	0.763	10.7	LOS B	11.4	324.5	0.35	0.20	0.35	23.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
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Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [2032 Future - Commuter Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

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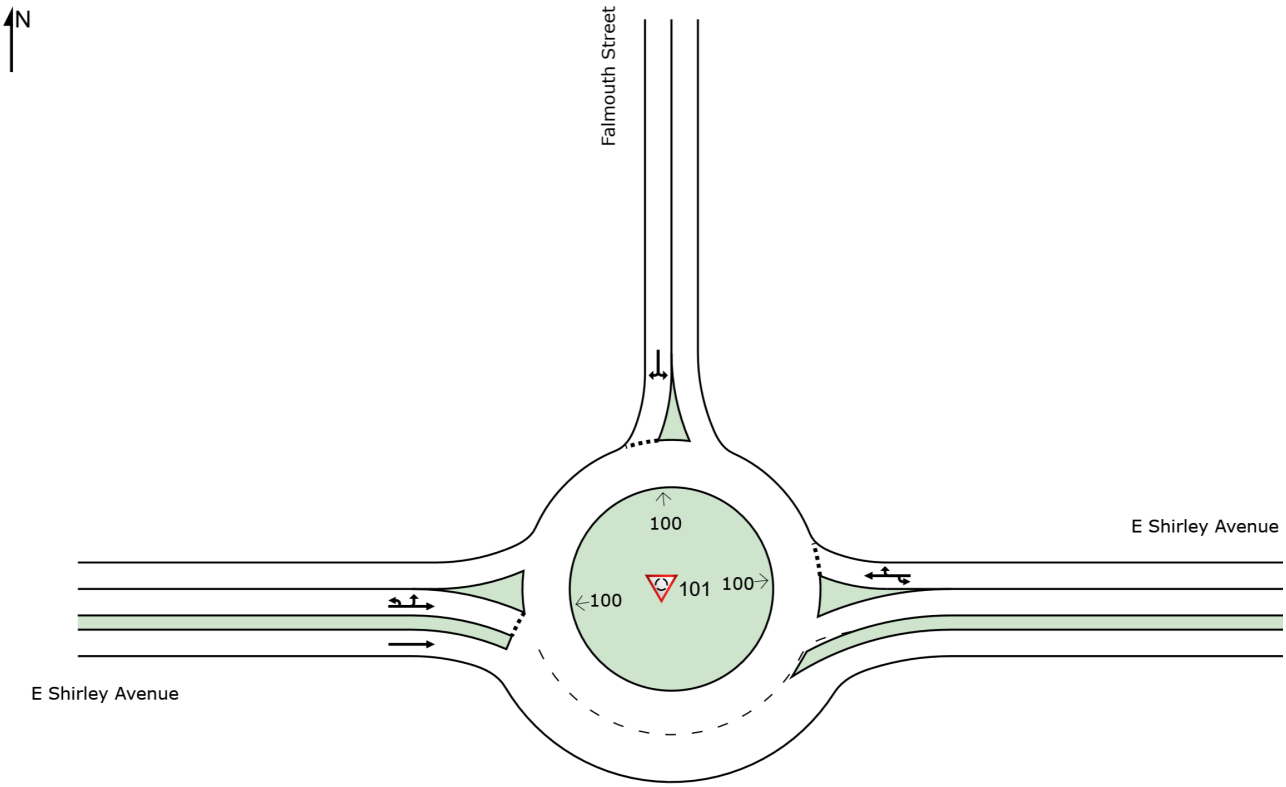

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MOVEMENT SUMMARY

Site: 101 [2032 Future - School PM (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	2	0.0	2	0.0	0.606	11.4	LOS B	5.7	148.2	0.32	0.14	0.32	24.0
6	T1	481	4.0	486	4.0	0.606	11.5	LOS B	5.7	148.2	0.32	0.14	0.32	22.9
16	R2	152	6.0	154	6.0	0.606	11.6	LOS B	5.7	148.2	0.32	0.14	0.32	22.4
Approach		635	4.5	641	4.5	0.606	11.5	LOS B	5.7	148.2	0.32	0.14	0.32	22.8
North: Falmouth Street														
7	L2	144	7.0	145	7.0	0.258	8.5	LOS A	1.7	43.2	0.69	0.58	0.69	23.1
14	R2	30	0.0	30	0.0	0.258	8.0	LOS A	1.7	43.2	0.69	0.58	0.69	22.2
Approach		174	5.8	176	5.8	0.258	8.4	LOS A	1.7	43.2	0.69	0.58	0.69	23.0
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.217	5.9	LOS A	1.3	35.4	0.44	0.28	0.44	25.2
5	L2	35	23.0	35	23.0	0.217	7.0	LOS A	1.3	35.4	0.44	0.28	0.44	24.5
2	T1	559	5.0	565	5.0	0.217	1.7	LOS A	1.3	35.4	0.12	0.08	0.12	25.4
Approach		596	6.0	602	6.0	0.217	2.1	LOS A	1.3	35.4	0.14	0.09	0.14	25.3
All Vehicles		1405	5.3	1419	5.3	0.606	7.1	LOS A	5.7	148.2	0.29	0.17	0.29	23.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [2032 Future - School PM (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

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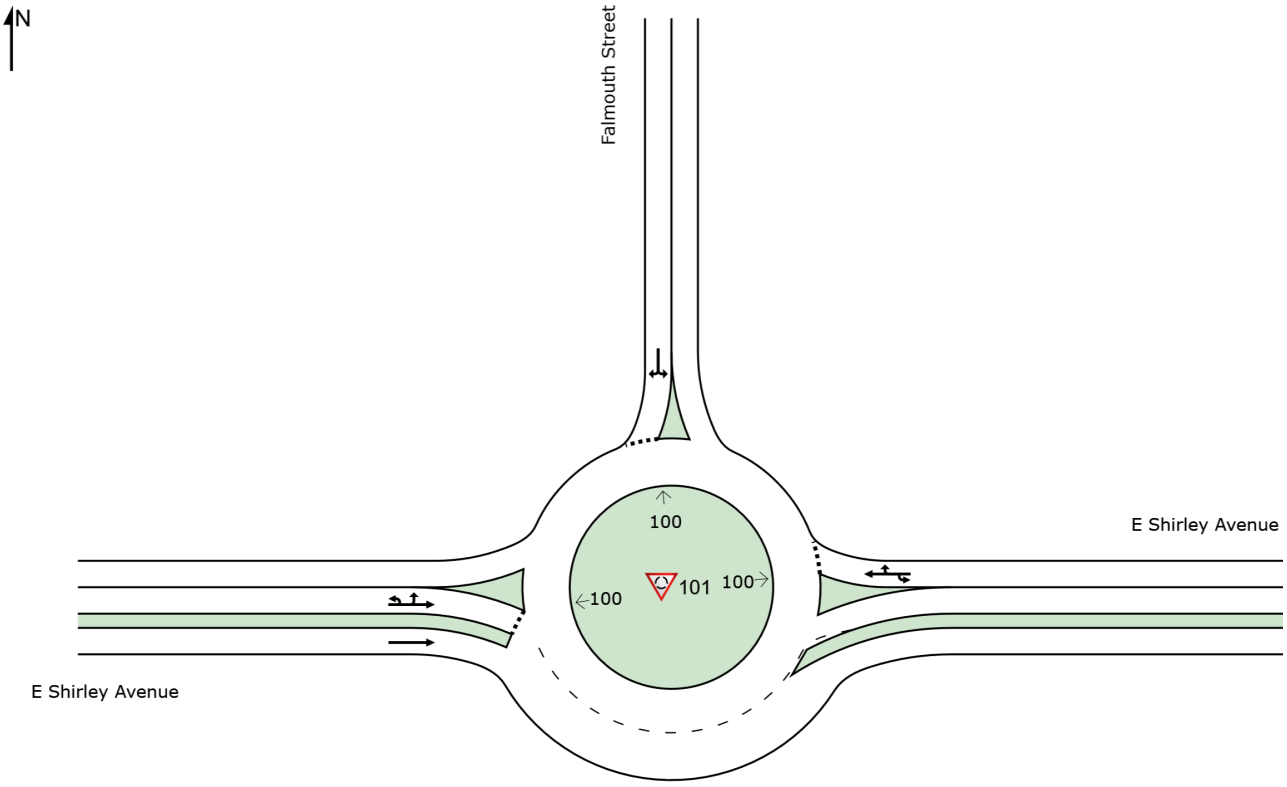

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