Traffic Impact Analysis

Warrenton Village Center

Town of Warrenton, Virginia

June 30, 2023
Revised February 13, 2024

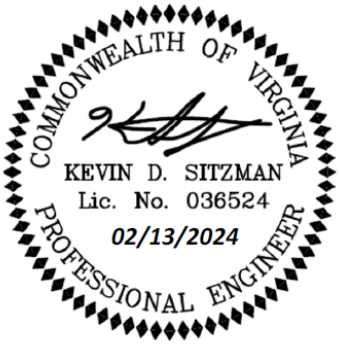

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Executive Summary

This report presents the findings of a Traffic Impact Analysis (TIA) conducted for the proposed Warrenton Village Center development (the Site / the Development / the Property) situated in the Town of Warrenton, Virginia.

This study was developed in accordance with the Virginia Department of Transportation (VDOT) and the Town of Warrenton (the Town) transportation impact analysis guidelines. The document was prepared in accordance with best professional practices and standards that assess the impact of a proposed development on the transportation system. Traffic operational analyses, as presented in this TIA, involve the evaluation of anticipated roadway conditions with and without the proposed development. The analysis assists public officials and developers to balance the interrelations between efficient traffic movements with necessary lane access. This revised TIA is based on review comments provided by VDOT and the Town.

Site Location and Study Area

The proposed development will be located primarily along the southern frontage of Oak Springs Drive (Town Route 3), east of Broadview Avenue (US Route 17 Business) and west of Branch Drive (Town Route 4) in the Town of Warrenton, Virginia. The vehicular study area includes ten existing intersections along Broadview Avenue, Lee Highway, Branch Drive, and Oak Springs Drive.

Description of Proposed Development

The development will be situated on a single parcel of vacant land (approximately 6.46 acres) and a portion of an adjacent developed parcel of land, which can be identified on Fauquier County Tax Maps with the following GPIN #s: 6985-20-7247-000, and 6984-29-6753-000, respectively. The property is currently zoned as C (Commercial District) with a Future Land Use of Mixed Use as part of the New Town Warrenton Character District (Lee Highway Urban Development Area [UDA]).

The Applicant is proposing to apply for a Special Use Permit (SUP) in order to construct approximately 386 multifamily residential dwelling units (320 multifamily apartments, 36 2-over-2 units, and 30 townhomes) and a parking deck. The site has an anticipated build-out date of 2027.

Access to the site will be provided via one full movement parking deck entry along Oak Springs Drive (Town Route 3) forming the fourth leg of the High School Driveway, one full movement driveway along Oak Springs Drive forming the fourth leg to the existing full-movement intersection of Hastings Lane, and via the existing shopping center accesses to the south.

This report analyzes the trips generated by the Warrenton Village Center Development and its impact on traffic operations on the surrounding road network.

Principal Findings and Conclusions

Discussions regarding the study assumptions and relevant background information were held with VDOT, County, and Town staff during January 2023. The scope details the study assumptions and relevant background information discussed. A copy of the scoping document is included in Appendix A.

The analysis contained herein presents the 2023 Existing Conditions, 2027 Future Conditions without Development, and 2027 Future Conditions with Development:

The analysis presented in this report supports the following assumptions and major findings:

Analysis Components

- 2023 existing volumes were derived via turning movement counts collected at intersections within the study area in February 2023.
- As determined based on review comments from VDOT and the Town, an inherent regional growth of 1.0% per year was applied to the Lee Highway mainline through movements at the intersection of Lee Highway at Broadview Avenue (US

Route 17 Business). The growth volumes were balanced along the road network by increasing the mainline through movements at subsequent study intersections along the road network where applicable for the period between 2023 and 2027 to account for 2027 conditions.

- The trip generation associated with the Site was based on the ITE Trip Generation Manual, 11th Edition publication. The Site in total is expected to generate approximately 154 new trips during the AM peak hour, 197 new trips during the PM peak hour, and 2,602 new daily trips on a typical weekday.
- Intersection capacity and queuing analyses were performed for all analysis scenarios at the study area intersections during the weekday morning (AM) and weekday afternoon (PM) peak hours. *Synchro*, version 11, was used to analyze the study intersections with results based on the Transportation Research Board's (TRB) Highway Capacity Manual (HCM) methodology and analysis guidelines provided in VDOT's Traffic Operations and Safety Analysis Manual (TOSAM) (version 2). The analysis herein includes level of service (LOS), delay, and queue length comparisons for the turning movements analyzed.
- The analysis also considers an assessment of historical crash data at all existing study intersections.
- The analysis also includes preliminary access management assessment and turn lane warrant assessments for the Site access points along Oak Springs Drive.

Analysis Results

2023 Existing Conditions

- Based on the capacity analysis of Existing Conditions, the two signalized study intersections operate at an overall level of service D or better during both the AM and PM peak hours.
- Based on the capacity analysis of Existing Conditions, three study intersections have at least one approach that operates at levels of service (LOS E or F) for at least one peak hour. The remaining intersection approaches operate at acceptable levels of service during both peak hours.
- Based on the analysis of the Synchro 95th percentile queue lengths, all turning movements have queue lengths that can be accommodated within the available storage length of the turn bays, except the southbound left turn movement at Study Intersection 1 (Broadview Avenue / Lee Highway at Winchester Street).

2027 Future Conditions without Development

- Based on the capacity analysis of 2027 Future Conditions with Development, the signalized study intersection would operate at an overall level of service D or better during both the AM and PM peak hours.
- The planned roundabout is expected to operate at an overall LOS B or better with all approaches operating at LOS D or better during the AM and PM peak hours.
- Based on the capacity analysis of 2027 Future Conditions without Development, two study intersections have at least one approach that would operate at levels of service (LOS E or F) for at least one peak hour. The remaining intersection approaches would operate at acceptable levels of service during both peak hours.
- Based on the analysis of the Synchro 95th percentile queue lengths, all turning movements have queue lengths that could be accommodated within the available storage length of the turn bays.

2027 Future Conditions with Development

- The Site is expected to generate approximately 154 new total trips during the AM peak hour, 197 new trips during the PM peak hour and 2,602 new trips during a typical weekday.

- Based on the capacity analysis of 2027 Future Conditions with Development, the signalized study intersection would operate at an overall level of service D or better during both the AM and PM peak hours.
- The planned roundabout is expected to operate at an overall LOS B with all approaches operating at LOS D or better during the AM and PM peak hours.
- Based on the capacity analysis of the 2027 Future Conditions with Development, two study intersections have at least one approach that would operate at levels of service (LOS E or F) for at least one peak hour (similar to 2027 Future Conditions without Development) during the AM and PM peak hours. The remaining intersection approaches would operate at acceptable levels of service during both peak hours.
- Based on the queuing analysis performed for the 2027 Future Conditions with Development, all turning movements have queue lengths that could be accommodated within the available storage length of the turn bays.

Overall Conclusion

Based on the capacity and queueing analysis results, the proposed Development will not have a substantial impact to the surrounding transportation and roadway network, assuming that the site is constructed as depicted on the concept plan. No improvements are warranted or recommend to accommodate the proposed Development.

Introduction

This report presents the findings of a Traffic Impact Analysis (TIA) conducted for the proposed Warrenton Village Center (the Site / the Development / the Property) along the southern frontage of Oak Springs Drive (Town Route 3), east of Broadview Avenue (US Route 17 Business) and west of Branch Drive (Town Route 4) in the Town of Warrenton, Virginia

The development will be situated on a single parcel of vacant land (approximately 6.46 acres) and a portion of an adjacent developed parcel of land, which can be identified on Fauquier County Tax Maps with the following GPIN #s: 6985-20-7247-000, and 6984-29-6753-000, respectively. The property is currently zoned as C (Commercial District) with a Future Land Use of Mixed Use as part of the New Town Warrenton Character District (Lee Highway Urban Development Area [UDA]).

The Applicant is proposing to apply for a Special Use Permit (SUP) in order to construct approximately 386 multifamily residential dwelling units (320 multifamily apartments, 36 2-over-2 units, and 30 townhomes) and a parking deck. The site has an anticipated build-out date of 2027.

Access to the site will be provided via one full movement parking deck entry along Oak Springs Drive (Town Route 3) forming the fourth leg of the High School Driveway, one full movement driveway along Oak Springs Drive forming the fourth leg to the existing full-movement intersection of Hastings Lane, and via the existing shopping center accesses to the south.

The following tasks were completed as part of this study effort:

- A scoping meeting was held on January 3, 2023 with the Virginia Department of Transportation (VDOT), Fauquier County (the County), and the Town of Warrenton (Town) staff to discuss the parameters of this study as well as any relevant background information. A copy of the scoping document is included in Appendix A.
- Review comments of the first TIA submission were provided and addressed in this study submission.
- Existing conditions were observed in the field to verify roadway geometry, pedestrian and bicycle infrastructure, and traffic flow characteristics.
- Signal timings were acquired from VDOT and are provided in Appendix E.
- In order to determine the weekday morning and afternoon peak hour turning movement traffic volumes, traffic counts were conducted in February 2023.
- The 2027 Future Conditions without Development scenario was projected based on the existing traffic volumes, an inherent growth to account for regional growth on the roadway network, two approved background developments, and roadway improvements.
- Proposed site traffic volumes were derived based on the methodology outlined in ITE's Trip Generation Manual, 11th Edition, publication and were assigned to the road network based on the agreed-upon direction of approach discussed during the aforementioned scoping meeting.
- The 2027 Future Conditions with Development scenario was projected based on the existing traffic volumes, regional growth, and the projected trips generated by the proposed development.
- Intersection capacity and queueing analyses were performed for the identified study intersections for the 2023 Existing Conditions, 2027 Future Conditions without Development, and 2027 Future Conditions with Development scenarios during the weekday morning (AM), and weekday afternoon (PM) peak hours.
- Intersection capacity and queuing analyses were performed using *Synchro*, version 11, with LOS and delay results based on the Transportation Research Board's (TRB) Highway Capacity Manual (HCM) 6 methodology and in following VDOT's Traffic Operations and Safety Manual (TOSAM) (version 2).
- The analysis also considers an assessment of historical crash data at all study intersections.

- The analysis also includes preliminary access management assessment and turn lane warrant assessments for the Site access points along Oak Springs Drive.
- The study also includes preliminary discussions on the pedestrian facilities in the study area.

Sources of data for this study include the Institute of Transportation Engineers (ITE), VDOT, the County, the Town and the office files and field reconnaissance efforts of Gorove Slade.

Background Information: Proposed Development (Site & Nearby)

Description of the Existing Site

Site Location

The proposed Development will be located primarily along the southern frontage of Oak Springs Drive (Town Route 3), east of Broadview Avenue (US Route 17 Business) and west of Branch Drive (Town Route 4) in the Town of Warrenton, Virginia. A description of the proposed Development is provided in the *Introduction* section of this report.

Location within Jurisdiction and Region

The Site is located generally on the northern portion of Warrenton approximately 0.5 miles from the north Town line an approximately 1 mile west of the US 17 and US 29 Business interchange. A regional aerial of the Site is provided in **Figure 1.**

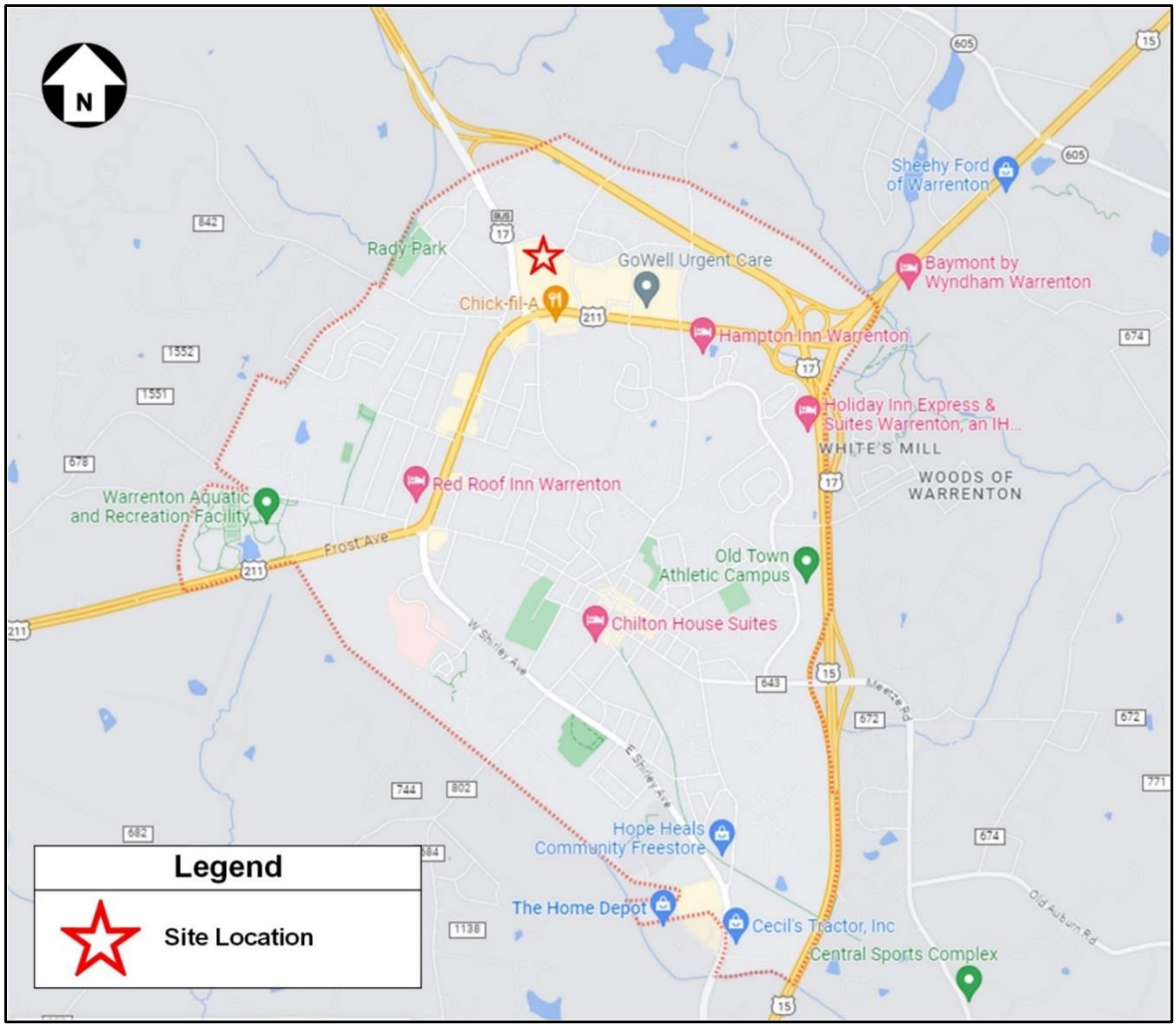


Figure 1: Regional Location

Description of the Parcel

The development will be situated on a single parcel of vacant land (approximately 6.46 acres) and a portion of an adjacent developed parcel of land, which can be identified on Fauquier County Tax Maps with the following GPIN #s: 6985-20-7247-000, and 6984-29-6753-000 as illustrated in **Figure 2.**

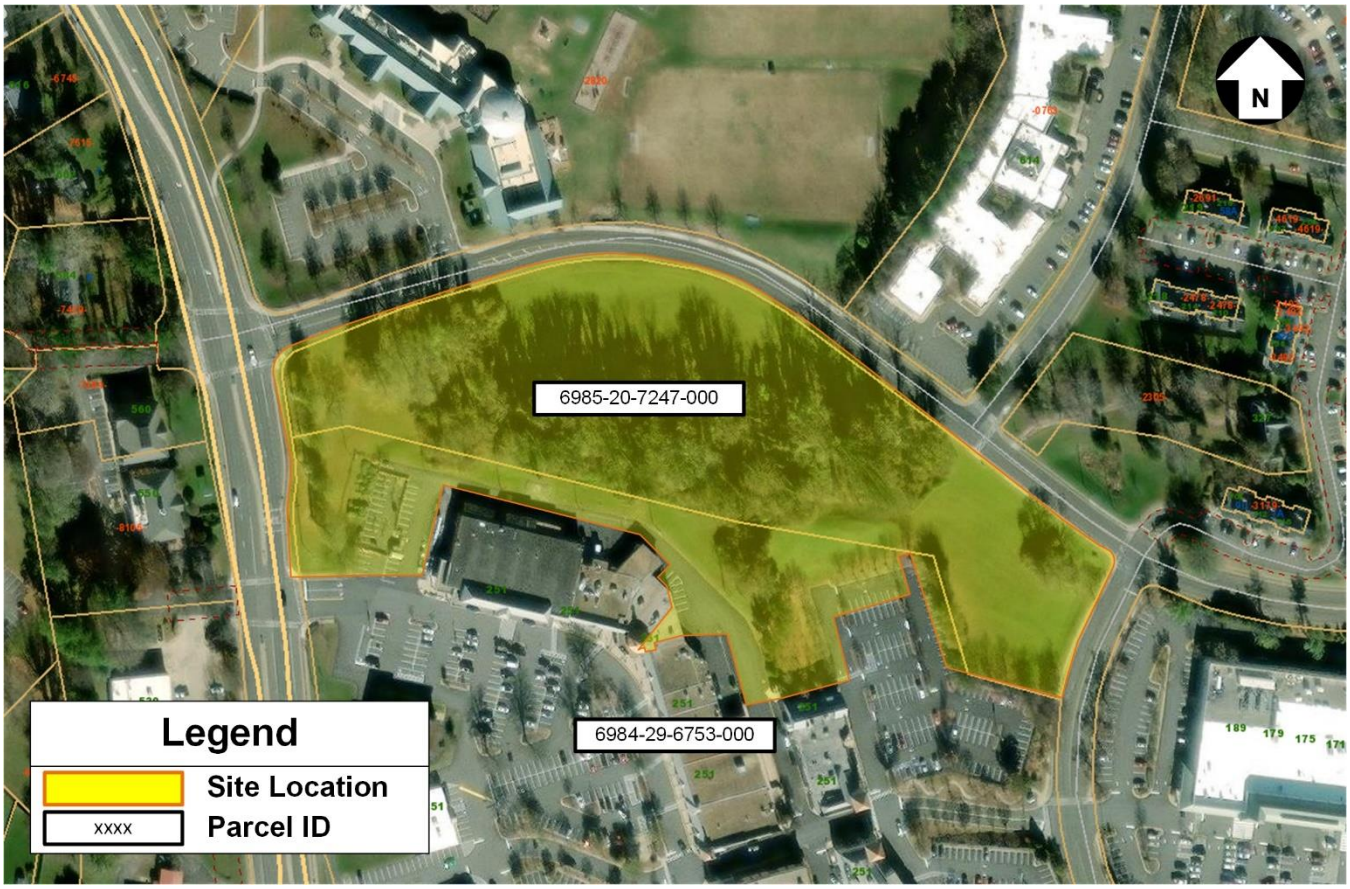


Figure 2: Parcel Map
(Source: https://fauquiergis.maps.arcgis.com/**)**

Existing Zoning and Future Land-Use

The property is currently zoned as C (Commercial District) with a Future Land Use of Mixed Use as part of the New Town Warrenton Character District (Lee Highway Urban Development Area [UDA]).

The existing zoning is presented in Error! Reference source not found.; the Town of Warrenton 2040 Comp Plan future land use is presented in **Figure 4**.

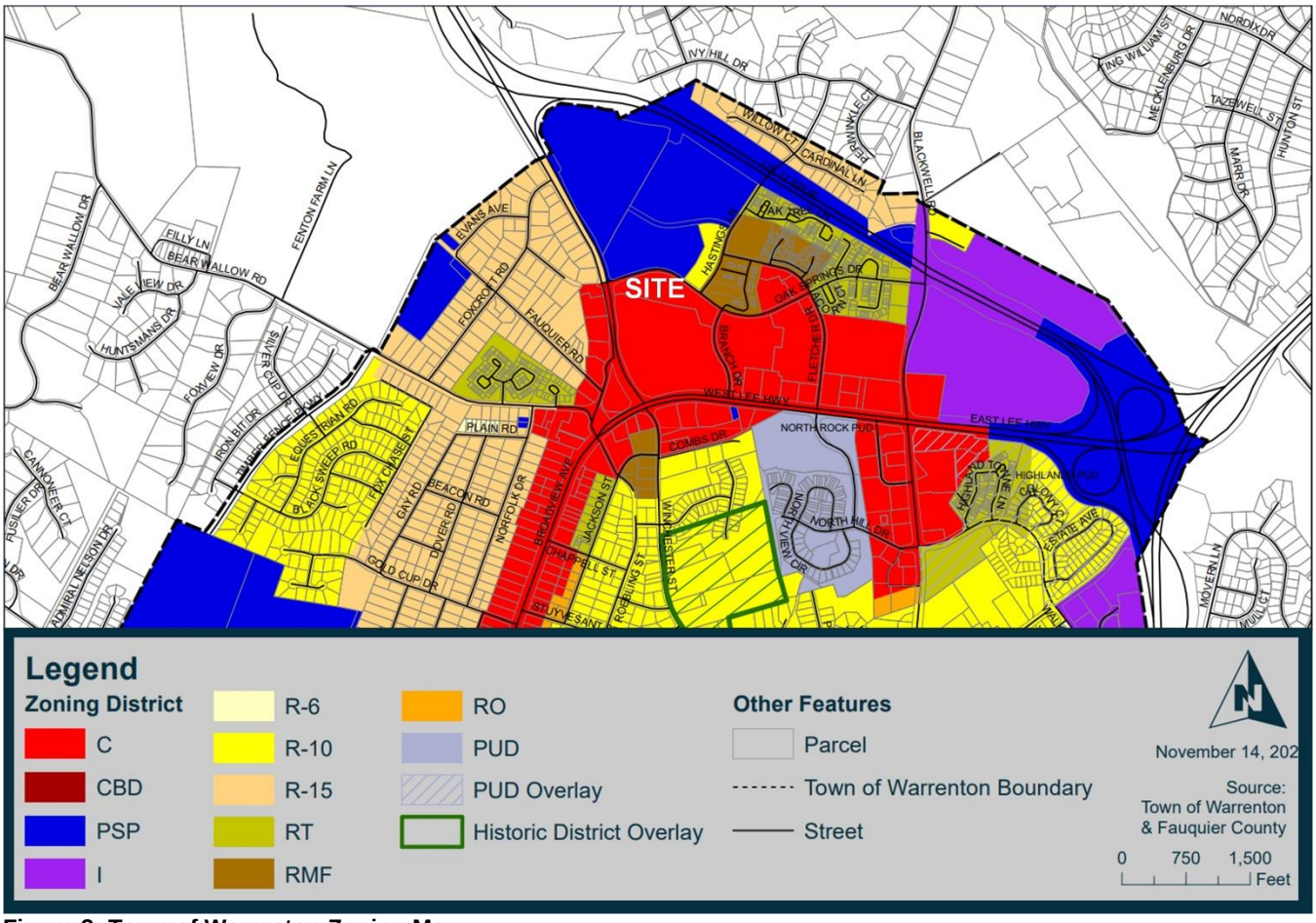


Figure 3: Town of Warrenton Zoning Map

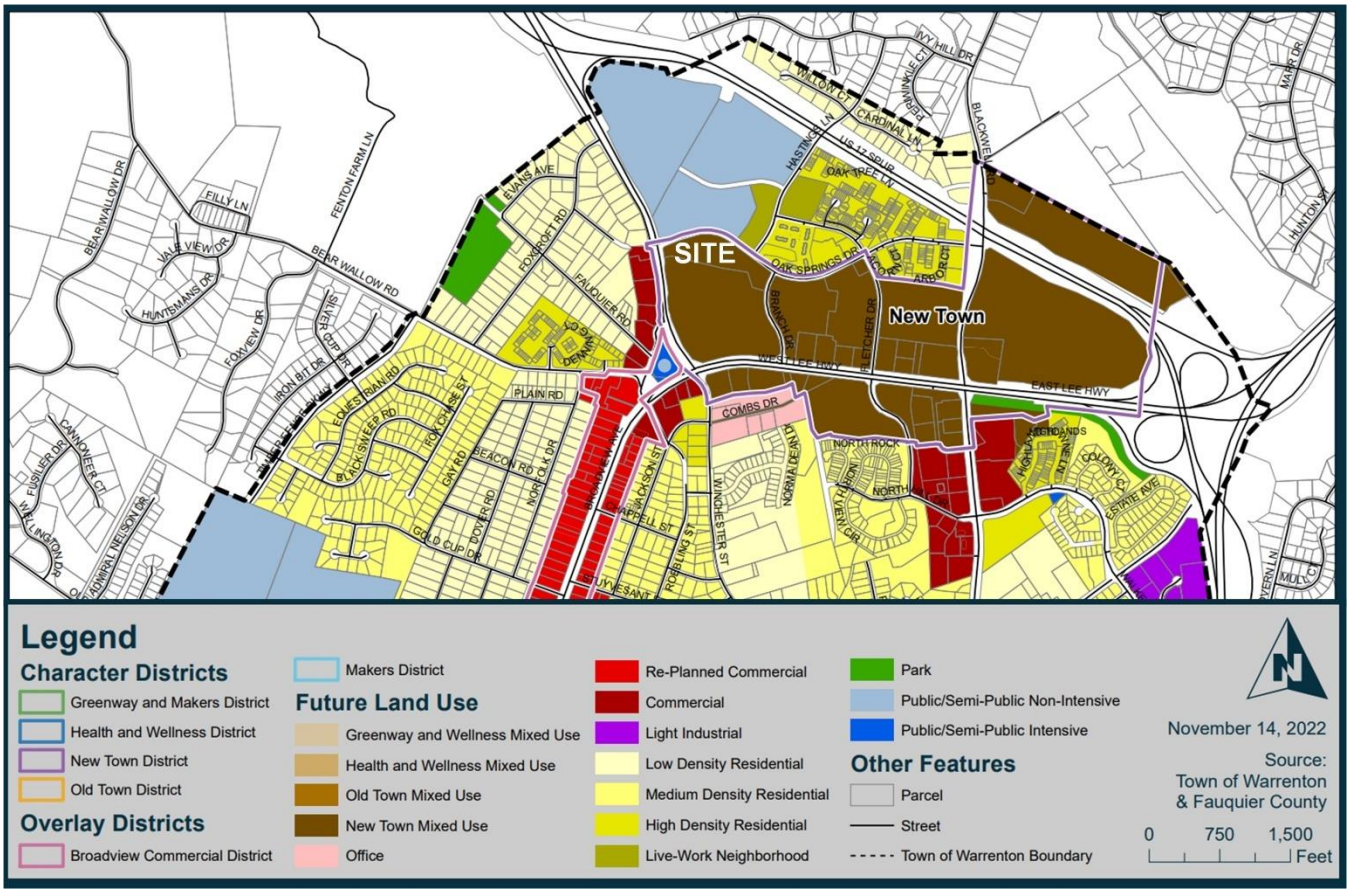


Figure 4: Town of Warrenton Future Land Use Map

Descriptions of Geographic Scope of Study and Limits of the Study Area

The geographic scope of the study area was developed in accordance with VDOT and County guidance. The vehicular study area includes ten existing study intersections. At build out of the Site, the proposed site driveways will form the fourth leg of two existing intersections.

The existing study intersections are as follows:

Intersection 1: Broadview Avenue (US Route 17) / Lee Highway at Broadview Avenue / Winchester Street [existing full-movement, signalized],

Intersection 2: Lee Highway (US Route 17) at Warrenton Village Center Driveway at Chick-fil-a Driveway [existing full-movement, unsignalized],

Intersection 3: Lee Highway (US Route 17) at Branch Drive (Town Route 4) [existing full-movement, signalized],

Intersection 4: Branch Drive (Town Route 4) at Warrenton Village Driveway / Safeway Driveway [existing full-movement, unsignalized],

Intersection 5: Oak Springs Drive (Town Route 3) at Branch Drive (Town Route 4) / Cedar Crest Drive [existing full-movement, unsignalized],

Intersection 6: Oak Springs Drive (Town Route 3) at Hastings Lane / Future Access [existing full-movement, unsignalized, future fourth leg],

Intersection 7: Oak Springs Drive (Town Route 3) at Highland School Driveway / Future Garage Access [existing full-movement, unsignalized, future fourth leg],

Intersection 8: Broadview Avenue (US Route 17 Business) at Oak Springs Drive (Town Route 3) [existing full-movement, unsignalized],

Intersection 9: Broadview Avenue (US Route 17 Business) at Warrenton Village Center South Driveway [existing full-movement, unsignalized],

Intersection 10: Broadview Avenue (US Route 17 Business) at Warrenton Village Center North Driveway [existing full-movement, unsignalized].

An aerial of the study intersections is provided in **Figure 5.**

Figure 5: Aerial of Study Boundaries (Study Intersections)

Existing Roadway Network

A description of the major roadways within the immediate vicinity of the Site is presented below in Error! Reference source not found..

Table 1: Summary of Existing Road Network

Roadway	RTE #	VDOT Classification	Legal/Design Speed Limit (mph)	Lanes	AADT (vpd)	Road Segment Between:		k-factor
Broadview Avenue	US 17 Bus	Other Principal Arterial	35	4 Div	11,000	Bus US 29 Lee Hwy	NCL Warrenton	9.7%
Oak Springs Drive	Town 3	Major Collector	25	2 Undiv	3,100	Broadview Ave	Branch Dr	10.3%
Branch Drive	Town 4	Major Collector	25	4 Undiv	4,300	Lee Highway	Oak Springs Drive	11.1%
Lee Highway	US 211/29 Bus	Other Principal Arterial	40	4 Div	26,000	US 17 Broadview	US 15 Blackwell	7.7%

Lee Highway (US Route 211/US Route 29 Business) is generally a four-lane divided Principal Arterial with a posted speed limit of 40 mph within the vicinity of the Site. The 2021 VDOT ADT on Lee Highway is 26,000 vehicles per day (vpd). For the purposes of this analysis, Lee Highway is assumed to be an east-west roadway.

Broadview Avenue (US 17 Business) is a four-lane divided Principal Arterial with a posted speed limit of 35 mph and a 2021 VDOT ADT of approximately 11,000 vpd. For the purposes of this study, Broadview Avenue is assumed to be a north-south roadway.

Branch Drive (Town Route 4) is a four-lane, undivided Major Collector with a posted speed limit of 25 mph and a 2021 VDOT ADT of approximately 4,300 vpd. For the purposes of this study, Branch Drive is assumed to be a north-south roadway.

Oak Springs Drive (Town Route 3) is a two-lane, undivided Major Collector with a posted speed limit of 25 mph and a 2021 VDOT ADT of approximately 3,100 vpd. For the purposes of this study, Oak Springs Drive is assumed to be an east-west roadway.

Analysis of 2023 Existing Conditions

Existing Roadway Safety Assessment

As agreed upon in the aforementioned scoping meeting, existing crash reports for all existing study intersections over a five-year period between May 2018 and May 2023 were provided by VDOT's Crash Analysis Tool. These reports are summarized in **Table 2** and **Table 3**.

During the five-year period, a total of 88 crashes were recorded at the ten existing study intersections as illustrated in Error! Reference source not found.. Of the 88 recorded crashes, 58 were classified as "Property Damage Only (PDO)," 30 were classified as "Injury Collision (IC), and zero fatalities occurred during the five-year period.

An aerial of the recorded crash locations is provided in **Figure 6**. The crash data by study intersection is provided in Appendix B.

The intersection crash rate was computed for the existing study intersections using the following formula and was calculated as crashes per one million entering vehicles (MEV). The approach average daily traffic volumes ($ADT_{approach}$) were derived from calculations based on the existing link ADTs.

$$Rate_{intersection} = \frac{1{,}000{,}000 * \#\ of\ Crashes}{\#\ of\ Years * 365\ \left(\frac{days}{year}\right) * ADT_{approach}}$$

It should be noted that according to the Institute of Transportation Engineers' (ITE) Transportation Impact Analysis for Site Development, a crash rate of 1.0 MEV or higher is an indication that further study may be required. A rate over 1.0 MEV does not necessarily mean there is a significant problem at an intersection, but rather it is a threshold used to identify which intersections may have an elevated crash rate due to operational, geometric, or other deficiencies. Based on the crash rates, none of the existing study intersections were considered high crash locations.

The following tables provide detailed reported crash data for all study intersections.

Table 2: Historical Crash Data Summary (May 2018 – May 2023)

	Intersection	Approximate ADT	PDO	IC	Fatality	Total	Crash Rate (Per MEV)
1	Lee Highway (US 211/US 29 BUS) at Broadview Avenue	29,125	28	12	0	40	0.75
2	Lee Highway (US 211/US 29 BUS) at Warrenton Village /	21,375	3	2	0	5	0.13
3	Lee Highway (US 211/US 29 BUS) at Branch Drive	23035	14	5	0	19	0.45
4	Branch Drive at Warrenton Village / Safeway	4485	1	1	0	2	0.24
5	Branch Drive at Oak Springs Drive	4000	2	0	0	2	0.27
6	Oak Springs Drive at Hastings Lane	No Crashes	0	0	0	0	0.00
7	Oak Springs Drive at Highland School Entrance	No Crashes	0	0	0	0	0.00
8	Broadview Avenue at Oak Springs Drive	12010	2	1	0	3	0.14
9	Broadview Avenue at Warrenton Village North	10425	2	2	0	4	0.21
10	Broadview Avenue at Warrenton Village South	13165	6	7	0	13	0.54
Total Reported Crashes Analyzed			**58**	**30**	**0**	**88**	-
Percentages			**65.9%**	**34.1%**	**0.0%**	**100.0%**	-

Based on the crash rates, none of the existing study intersections were considered high crash locations, however, Study Intersections 1 and 10 are on the Culpepper District top 100 PSI list. A pipeline study has been conducted and these locations have been identified for construction of roundabouts.

Table 3: VDOT Crash Data Summary by Type of Collision (May 2018 – May 2023)

Intersection	Fixed Object/Single Vehicle	Head-on	Sideswipe (Same Direction)	Sideswipe (Opposite Direction)	Rear End	Angle	Backing	Pedestrian	Animal	Other	Total
1 Lee Highway (US 211/US 29 BUS) at Broadview Avenue	0	0	3	0	24	11	0	0	0	2	40
2 Lee Highway (US 211/US 29 BUS) at Warrenton Village /	2	0	0	0	1	2	0	0	0	0	5
3 Lee Highway (US 211/US 29 BUS) at Branch Drive	1	0	1	1	6	8	1	0	0	1	19
4 Branch Drive at Warrenton Village / Safeway	0	0	0	0	0	2	0	0	0	0	2
5 Branch Drive at Oak Springs Drive	0	0	0	0	0	2	0	0	0	0	2
6 Oak Springs Drive at Hastings Lane	0	0	0	0	0	0	0	0	0	0	0
7 Oak Springs Drive at Highland School Entrance	0	0	0	0	0	0	0	0	0	0	0
8 Broadview Avenue at Oak Springs Drive	0	0	0	0	0	3	0	0	0	0	3
9 Broadview Avenue at Warrenton Village North	0	0	0	0	0	3	0	0	1	0	4
10 Broadview Avenue at Warrenton Village South	0	3	1	0	1	7	0	0	0	1	13
Total Reported Crashes Analyzed	**3**	**3**	**5**	**1**	**32**	**38**	**1**	**0**	**1**	**4**	**88**
Percentages	**3.4%**	**3.4%**	**5.7%**	**1.1%**	**36.4%**	**43.2%**	**1.1%**	**0.0%**	**1.1%**	**4.5%**	**100.0%**

Approximately 43% of the crashes that occurred were classified as angle collisions and approximately 36% were classified as rear end collisions. Rear end and angle collisions are common at congested signalized intersections. Study Intersection 1 has been identified as a location for a potential roundabout.

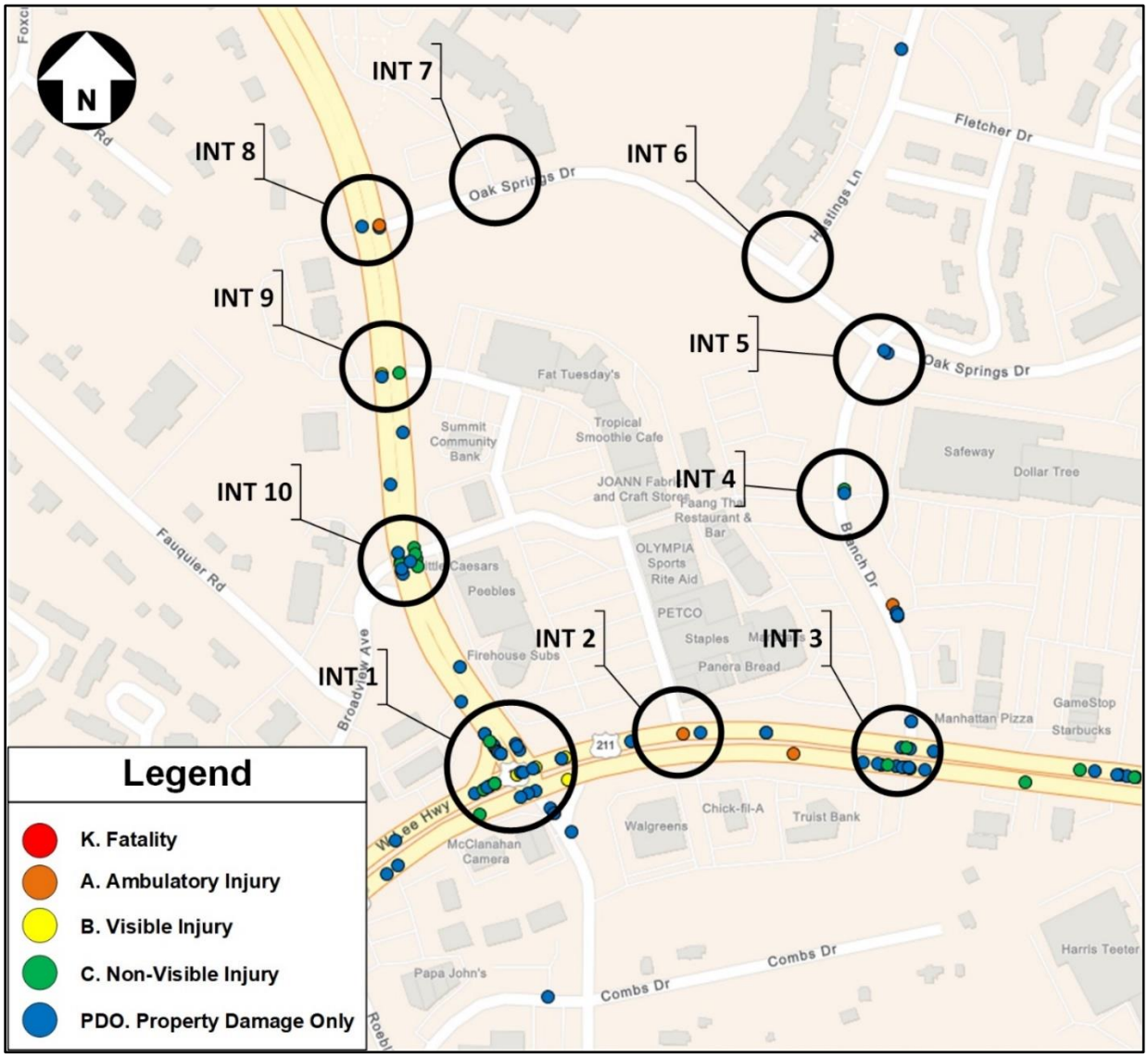


Figure 6: Recorded Crash Location Map

2023 Existing Traffic Volumes

In order to determine the weekday morning (AM) and weekday afternoon (PM) peak hour turning movement traffic volumes, turning movement counts (TMC) were collected at the study intersections in February 2023. The referenced weekday turning movement counts were collected from the hours of 6:00 AM to 9:00 AM and 4:00 PM to 7:00 PM:

  - Study Intersection 1: Lee Highway (US 211/US 29 BUS) at Broadview Avenue (US 17 BUS)
  - Study Intersection 2: Lee Highway (US 211/US 29 BUS) at Warrenton Village / Chick-fil-a Driveway
  - Study Intersection 3: Lee Highway (US 211/US 29 BUS) at Branch Drive
  - Study Intersection 4: Branch Drive at Warrenton Village / Safeway
  - Study Intersection 5: Branch Drive at Oak Springs Drive
  - Study Intersection 6: Oak Springs Drive at Hastings Lane
  - Study Intersection 7: Oak Springs Drive at Highland School Entrance
  - Study Intersection 8: Broadview Avenue at Oak Springs Drive
  - Study Intersection 9: Broadview Avenue at Warrenton Village North
  - Study Intersection 10: Broadview Avenue at Warrenton Village South

- From the turning movement counts, the following system peak hours were determined.
  - AM Peak Hour: 7:30 AM to 8:30 AM
  - PM Peak Hour: 4:00 PM to 5:00 PM

The 2023 existing road network configuration is presented in **Figure 7**. The existing AM and PM peak hour traffic volumes for the existing study intersections are shown in **Figure 8**. The ADT volumes, depicted in **Figure 8** and in subsequent volume graphics, were calculated based on VDOT published k-factors from 2021, if available, or assumed k-factors per approach of 0.10 and the PM peak hour volumes. The raw existing traffic count data is provided in Appendix C.

In addition to turning movement volumes, pedestrians crossing data was collected at all study intersections. The peak hour pedestrian crossing data is presented in **Figure 9**.

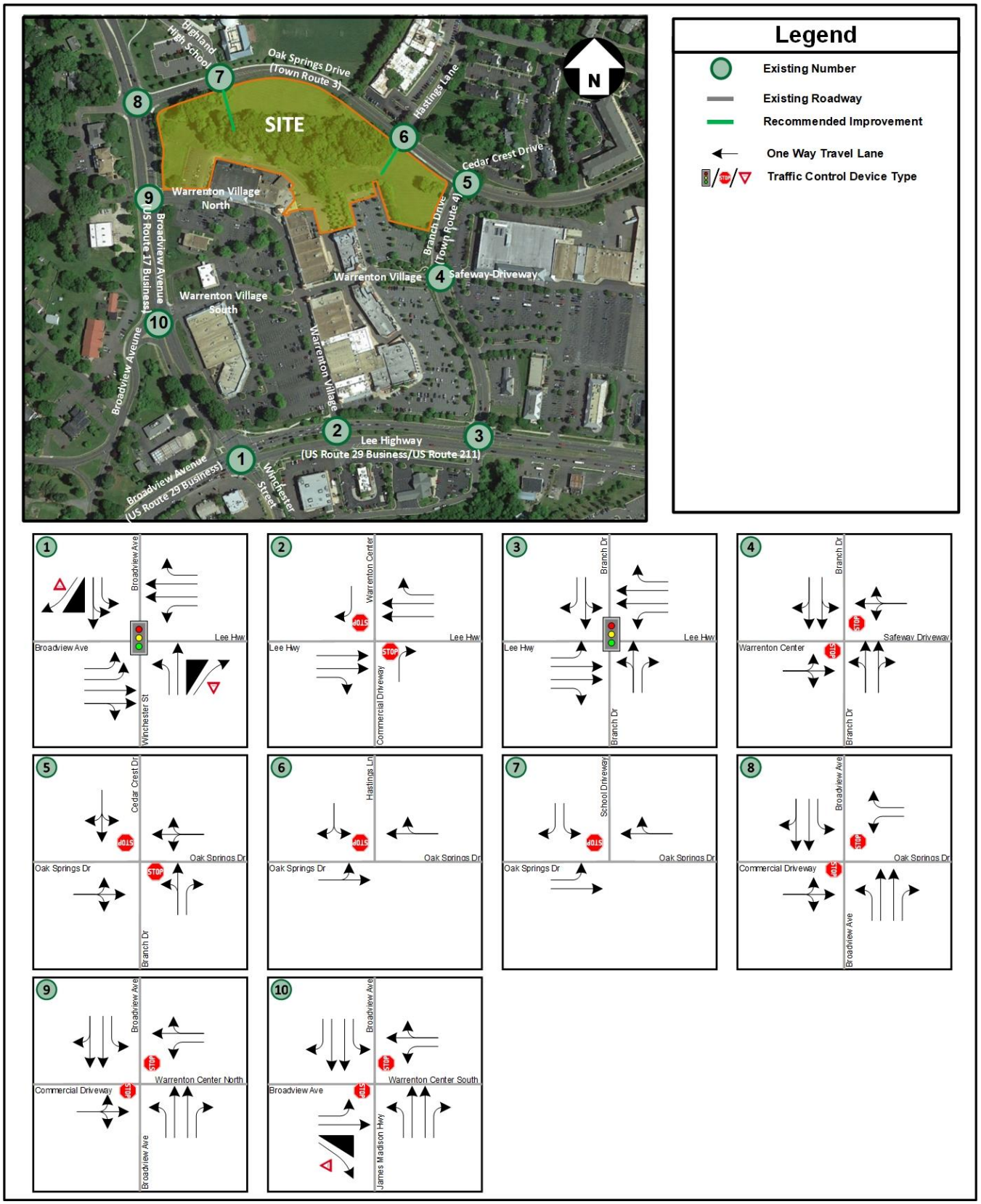


Figure 7: 2023 Existing Conditions – Roadway Network Geometric Configuration and Traffic Control Devices

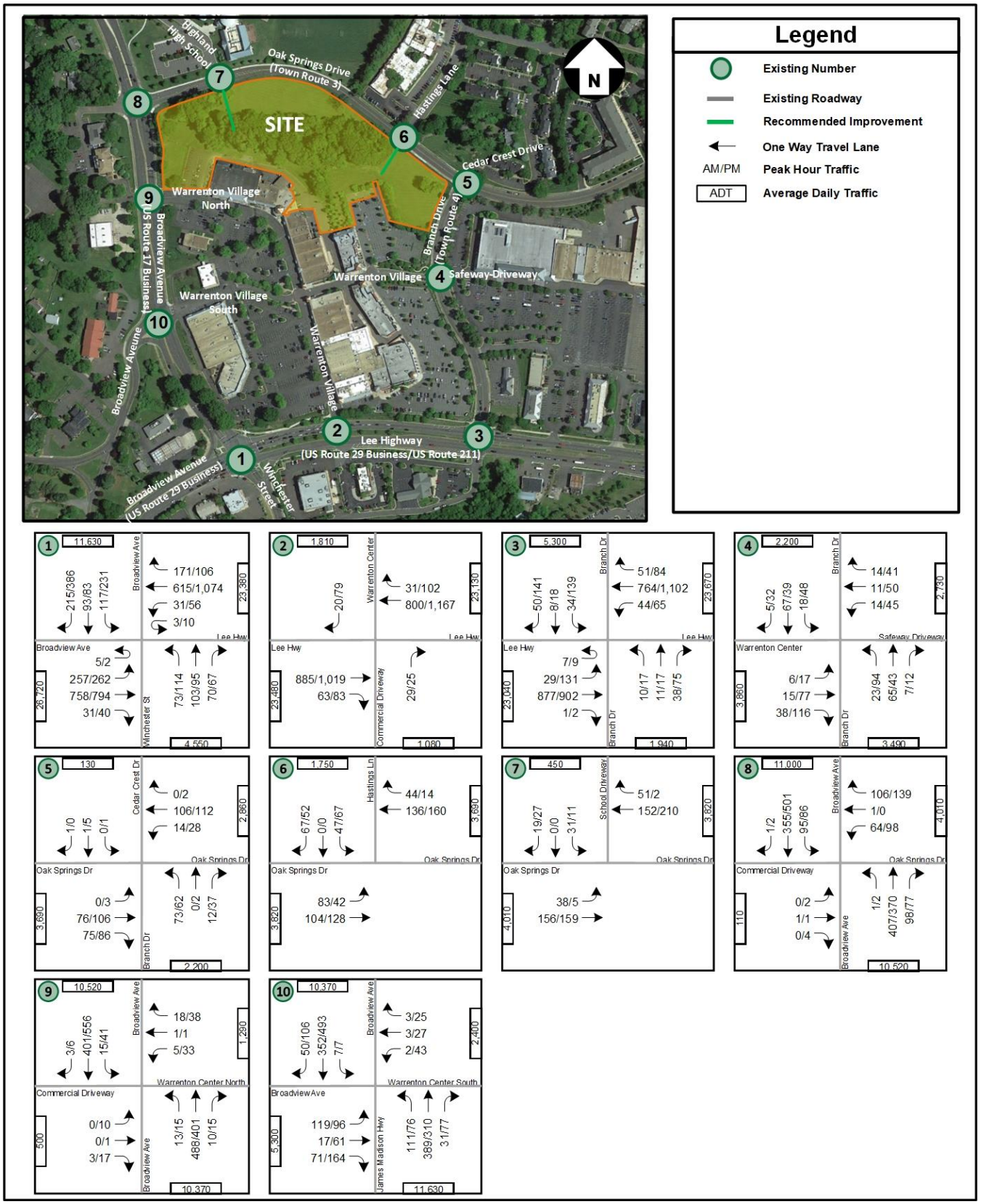


Figure 8: 2023 Existing Conditions – Vehicular Traffic Volumes

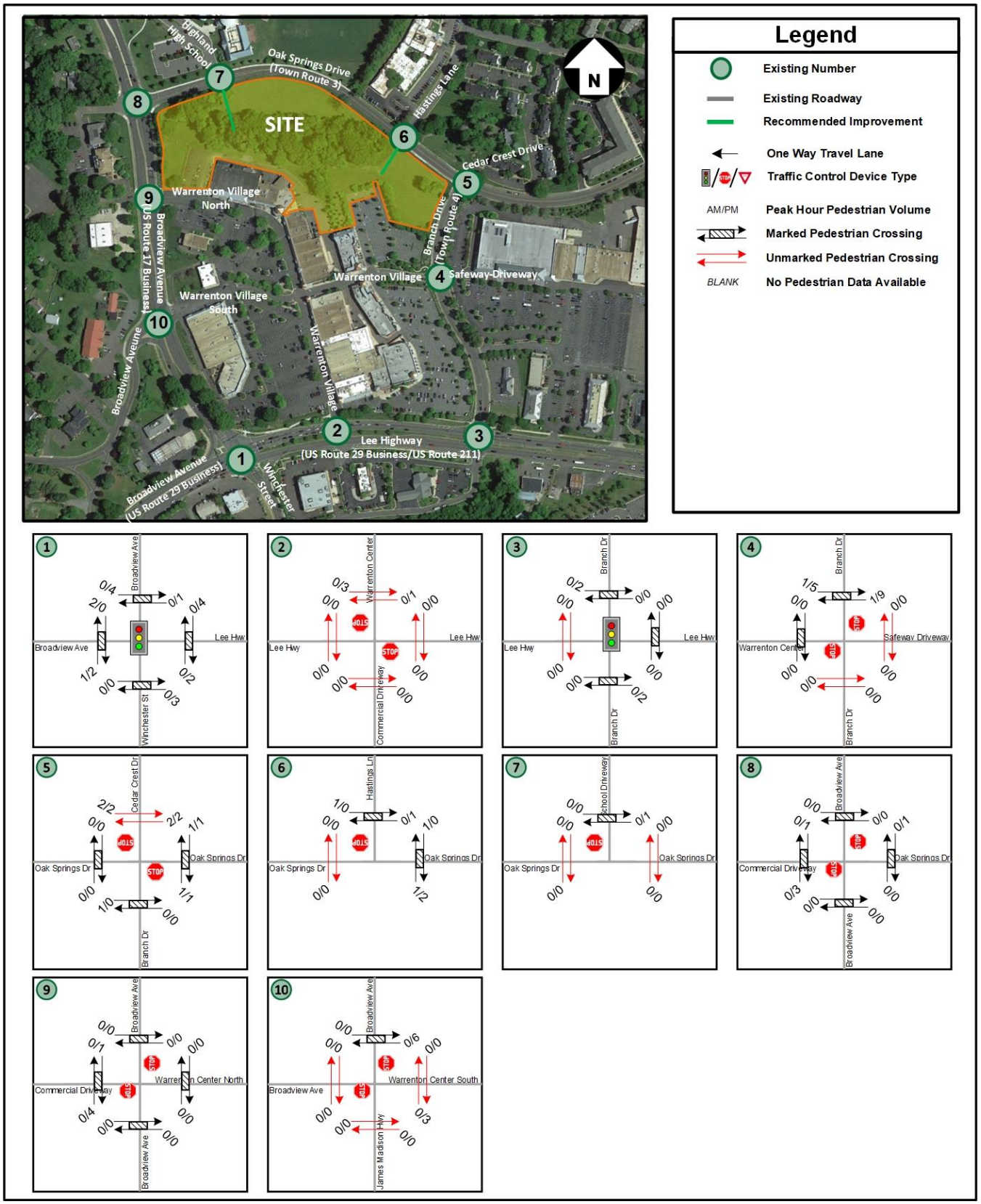


Figure 9: 2023 Existing Conditions – Pedestrian Volumes

Existing Intersection Capacity and Queueing Analysis

Intersection capacity and queuing analyses were performed for the 2023 Existing Conditions scenario at the study area intersections during AM and PM peak hours, in accordance with VDOT's *TOSAM* (version 2) guidelines. *Synchro,* version 11, was used to analyze the study intersections with results based on the Transportation Research Board's (TRB) Highway Capacity Manual (HCM) 6th edition methodology[1] and include level of service (LOS), delay, and queue length comparisons for the turning movements analyzed. Lane configurations at study intersections along the road network were field-verified, and the existing traffic volumes discussed in the aforementioned section as well as other relevant data were entered into the analysis models.

Signal timings were obtained from VDOT and were utilized as a base for the analysis models. Traffic operation conditions as well as lane configurations were field verified. The existing traffic volumes discussed in the aforementioned section as well as other relevant data were entered into the analysis models. For the purposes of this analysis, the existing peak hour factors (PHF) utilized in the analysis of existing conditions were based on the 2023 existing volumes and were modeled in the *Synchro* network on a by-intersection basis. PHF in the range of 0.85 to 1.00 were used for the existing scenario, as agreed to in the scoping document. The heavy vehicle percentages (HV%) utilized per movement were based on the existing traffic counts collected. Pedestrian crossing data utilized per crossing were based on the existing traffic counts collected. Based on *Synchro* guidance and pedestrian count data, all pedestrian calls at both signalized intersections were set to five calls per hour. Note that for analysis purposes, all turning movement counts were coded with a minimum volume of one vehicle in *Synchro*.

Per the scoping meeting with VDOT and Town staff, it would be considered acceptable and/or desirable to achieve an approach LOS D or better for traffic operations using HCM methodology. The results of the intersection capacity and queuing analyses from *Synchro* are presented in **Table 4** and graphically in **Figure 10**. The results are expressed in LOS and delay (seconds per vehicle) for overall signalized/all-way stop control intersections and per approach and lane group for all study intersections. Any overall signalized intersection or approach that operates at LOS E or F is displayed in red.

The queue lengths were reported as the 95th percentile queues from *Synchro* and are expressed in feet. The lane groups where the queue lengths exceeded the available effective storage capacity of existing turn lanes are displayed in red.

The description of different LOS and delay are included in Appendix D. The signal timing data provided by VDOT is included in Appendix E. The detailed analysis worksheets of 2023 Existing Conditions are contained in Appendix F.

[1] It should be noted that HCM 2000 methodology was used in lieu of HCM 6th if the HCM 6th methodology was not applicable. HCM 6th could not be applicable in such cases as nonstandard National Electrical Manufacturers Association (NEMA) configurations, shared lane configurations, placement of loop detectors, U-turns, etc.

Table 4: 2023 Existing Conditions – Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.)	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh)	95th % Queue (ft.) [2]	LOS	Delay (sec/veh)	95th % Queue [2]
			Synchro			Synchro		
1	**Broadview Ave (E/W) at Winchester St (N/S)**							
	Overall Intersection (Signalized)		**D**	**36.4**		**D**	**39.4**	
	Eastbound Approach		***C***	***34.2***		***D***	***40.6***	
	Eastbound Left	250	E	64.9	186	E	72.0	193
	Eastbound Thru/Right		C	24.0	428	C	30.6	428
	Westbound Approach		***C***	***25.5***		***C***	***25.9***	
	Westbound Left	130	F	89.7	78	F	93.8	m119
	Westbound Thru		B	19.8	143	C	22.7	192
	Westbound Right	200	C	33.6	46	B	16.8	m15
	Northbound Approach		***E***	***60.3***		***E***	***66.6***	
	Northbound Left	250	E	61.7	126	E	74.8	188
	Northbound Thru		E	66.5	166	E	67.3	160
	Northbound Right	125	D	49.9	0	D	51.7	17
	Southbound Approach		***D***	***49.2***		***D***	***50.9***	
	Southbound Left	215	E	63.1	167	E	59.2	251
	Southbound Left/Thru		E	62.0	171	E	59.0	257
	Southbound Right		D	36.1	95	D	44.2	417
2	**Broadview Ave (E/W) at Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy (N/S)**							
	Overall Intersection (TWSC)							
	Northbound Approach		***B***	***12.6***		***B***	***13.4***	
	Northbound Right		B	12.6	5	B	13.4	5
	Southbound Approach		***B***	***10.7***		***B***	***13.3***	
	Southbound Right		B	10.7	3	B	13.3	15
3	**Broadview Ave (E/W) at Branch Dr (N/S)**							
	Overall Intersection (Signalized)		**B**	**16.2**		**C**	**31.6**	
	Eastbound Approach		***A***	***9.0***		***C***	***20.9***	
	Eastbound Left	240	F	81.5	m80	F	80.8	225
	Eastbound Thru		A	6.0	133	B	11.6	226
	Eastbound Right	330	A	9.9	m0	B	13.4	m0
	Westbound Approach		***B***	***15.8***		***C***	***28.5***	
	Westbound Left	150	E	67.4	88	E	78.5	123
	Westbound Thru		B	13.2	394	C	26.4	610
	Westbound Right	150	A	9.8	0	B	17.3	0
	Northbound Approach		***E***	***60.3***		***E***	***67.0***	
	Northbound Left/Thru		E	61.0	43	E	68.6	73
	Northbound Right	60	E	59.9	0	E	66.2	0
	Southbound Approach		***E***	***64.7***		***E***	***69.4***	
	Southbound Left/Thru		E	67.2	86	E	78.8	249
	Southbound Right		E	62.7	0	E	59.0	53
4	**Warrenton Village Center Dwy/Shopping Center Dwy (E/W) at Branch Dr (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach		***A***	***9.4***		***B***	***11.8***	
	Eastbound Left/Thru/Right		A	9.4	8	B	11.8	30
	Westbound Approach		***B***	***10.1***		***B***	***14.2***	
	Westbound Left/Thru/Right		B	10.1	5	B	14.2	28
	Northbound Approach							
	Northbound Left		A	7.4	3	A	7.5	5
	Southbound Approach							
	Southbound Left		A	7.4	0	A	7.4	3
5	**Oak Springs Dr (E/W) at Branch Dr (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach							
	Eastbound Left		A	7.5	0	A	7.5	0
	Westbound Approach							
	Westbound Left		A	7.7	0	A	7.7	3
	Northbound Approach		***B***	***11.2***		***B***	***11.4***	
	Northbound Left/Thru		B	11.6	13	B	12.6	13
	Northbound Right		A	9.0	0	A	9.4	5
	Southbound Approach		***B***	***10.0***		***B***	***10.9***	
	Southbound Left/Thru/Right		B	10.0	0	B	10.9	0

Table 4 (Continued): 2023 Existing Conditions – Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.)	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh)	95th % Queue (ft.) [2]	LOS	Delay (sec/veh)	95th % Queue [2]
			Synchro			Synchro		
6	**Oak Springs Dr (E/W) at Hastings Ln / Future Access (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach							
	Eastbound Left		A	7.9	5	A	7.7	3
	Southbound Approach		***B***	***11.5***		***B***	***11.3***	
	Southbound Left/Thru/Right		B	11.5	18	B	11.3	18
7	**Oak Springs Dr (E/W) at Highland School Dwy / Future Garage Access (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach							
	Eastbound Left	75	A	7.8	3	A	7.7	0
	Southbound Approach		***B***	***11.2***		***B***	***10.2***	
	Southbound Left/Thru		B	12.3	5	B	11.5	3
	Southbound Right		A	9.4	3	A	9.7	3
8	**Oak Springs Dr (E/W) at Broadview Ave (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach		***D***	***25.2***		***C***	***16.8***	
	Eastbound Left/Thru/Right		D	25.2	0	C	16.8	3
	Westbound Approach		***C***	***23.0***		***D***	***27.5***	
	Westbound Left/Thru	125	E	42.8	53	F	51.1	83
	Westbound Right		B	10.8	15	B	10.8	18
	Northbound Approach							
	Northbound Left	90	A	8.1	0	A	8.6	0
	Southbound Approach							
	Southbound Left	225	A	9.3	10	A	8.7	8
9	**Warrenton Village North Dwy (E/W) at Broadview Ave (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach		***A***	***9.9***		***C***	***20.3***	
	Eastbound Left/Thru/Right		A	9.9	0	C	20.3	10
	Westbound Approach		***B***	***13.8***		***C***	***18.5***	
	Westbound Left		C	22.9	3	D	27.8	18
	Westbound Thru/Right		B	11.4	3	B	10.6	5
	Northbound Approach							
	Northbound Left	150	A	8.3	0	A	8.8	3
	Southbound Approach							
	Southbound Left	110	A	8.7	3	A	8.4	3
10	**Warrenton Village South Dwy/Broadview Ave (E/W) at Broadview Ave/Winchester St (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach		***E***	***38.8***		***D***	***28.4***	
	Eastbound Left		F	57.3	110	F	52.1	83
	Eastbound Thru		D	29.6	10	E	36.7	40
	Eastbound Right		B	10.1	8	B	11.5	25
	Westbound Approach		***C***	***21.4***		***D***	***33.0***	
	Westbound Left		D	28.0	0	E	47.2	38
	Westbound Thru/Right		C	19.2	3	C	21.3	20
	Northbound Approach							
	Northbound Left	160	A	8.7	10	A	9.2	8
	Southbound Approach							
	Southbound Left	160	A	8.4	0	A	8.2	0

NOTES:

[1] Effective storage length is based on the storage length plus one-half of the taper length per TOSAM guidelines.

[2] m: 95th percentile volume and queues (reported from Synchro) are metered by upstream signal.

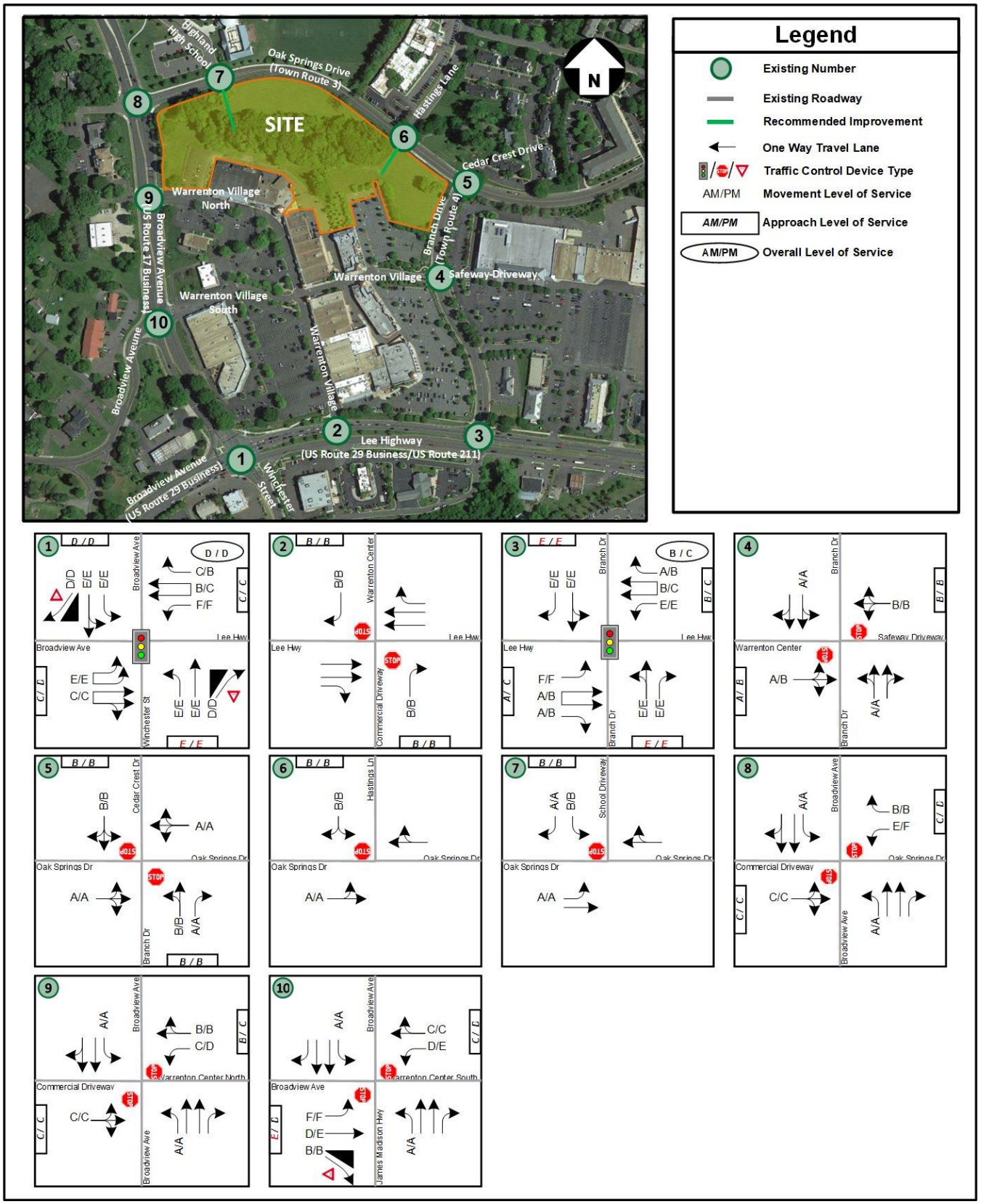


Figure 10: 2023 Existing Conditions – Level of Service Results

Based on the capacity analysis of existing conditions, the two signalized study intersections operate at overall levels of service of D or better during both the AM and PM peak hours.

Based on the capacity analysis of existing conditions, the approaches of all study intersections operate at approach levels of service of D or better during both the AM and PM peak hours, except for the following study intersections that have at least one approach that operates at levels of service E or F during at least one peak hour:

- Study Intersection 1: Lee Highway (US 211/US 29 BUS) at Broadview Avenue / Winchester Street
- Study Intersection 3: Lee Highway (US 211/US 29 BUS) at Branch Drive
- Study Intersection 10: Broadview Avenue at Warrenton Village South

Based on the queuing analysis performed for existing conditions, all turning movements at the study intersections have maximum queue lengths that are accommodated within the available storage lengths of the turn bays except for the southbound left turn movement at Study Intersection 1 (Lee Highway at Broadview Avenue / Winchester Street).

Analysis of 2027 Future Conditions Without Development

For the purposes of this study, the Development is anticipated to be constructed by 2027; this scenario analyzes the future without development conditions for the year 2027.

Future without Development Traffic Volumes

The derivation of future without development traffic volumes was based on assumptions and parameters discussed with VDOT and the County during the scoping process for this study. The future conditions include anticipated inherent regional growth, the inclusion of any potential background developments in the pipeline around the vicinity of the Site, and any anticipated roadway improvements.

Inherent Regional Growth

The Development is anticipated to be complete in 2027. In order to account for increased demand on the traffic network between 2023 and 2027, an inherent growth rate was applied to the future scenarios. This “inherent” growth was anticipated to account for regional development within the at-large area, which would ultimately result in increased roadway demand. Furthermore, the inherent growth was anticipated to account for any potential background developments unaccounted for within the vicinity of the study area.

To account for 2027 future conditions, an inherent growth rate of 1.0%, (compounded annually) over a four-year period, between 2023 to 2027 (and totaling 4.06% growth of the existing volumes) was applied to the Lee Highway mainline through movements at the intersection of Lee Highway at Broadview Avenue / Winchester Street. The growth volumes were balanced along the road network by increasing the mainline through movements at subsequent study intersections along the road network where applicable.

The inherent regional growth volumes (for the period between 2023 and 2027) are illustrated in **Figure 11.**

Potential Background Development(s)

In addition to the applied inherent regional growth reflecting increased regional traffic demand, a total of two “background” developments within the vicinity of the Site, with their locations depicted in **Figure 12**, were identified in the meeting with VDOT and Town staff for inclusion in this study. The background developments included are as follows:

1. Waterloo Junction
    - Located in the southeast quadrant of Bear Wallow Road and Norfolk Drive, the Waterloo Junction development is anticipated to include 47 townhomes, 6 apartments, and 3,600 square feet of retail space.
2. Patrick Ryan Way Homes
    - Located along Winchester Street at Patrick Ryan Way, this development is expected to consist of 60 single family homes. This development was partially built out at the time the turning movement counts were collected. For the purposes of this study, it was assumed that 40 of the 60 homes are built and occupied.

The assignment of the total combined background trips to the road network is depicted in **Figure 13**. Additional information, including the trips generated and the assignment of trips for each individual background development are included in Appendix G.

Potential Roadway Improvement(s)

As discussed during the scoping meeting, there is one roadway improvement within the vicinity of the site that is either fully funded or would be completely constructed by 2027.

- Smartscale project to construct a roundabout at the intersection of Lee Highway at Winchester Street / Broadview Avenue (Study Intersection 1)

There is one roadway improvement within the vicinity of the site that was previously identified for construction but was not selected for funding and therefore not included in the analysis:

- Smartscale project to construct a six-leg roundabout at the intersection of Broadview Avenue at Warrenton Village South (Study Intersection 10)

Relevant Smartscale excerpts and information are included in Appendix G.

The anticipated 2027 future road network (without the development) is illustrated in **Figure 14.**

Future without Development Traffic Volumes

In order to forecast future roadway traffic volumes for the year 2027, the 2023 existing traffic volumes were combined with the inherent regional growth traffic volumes and the combined background development trips. The 2027 future conditions without Development traffic volumes are illustrated in **Figure 15**.

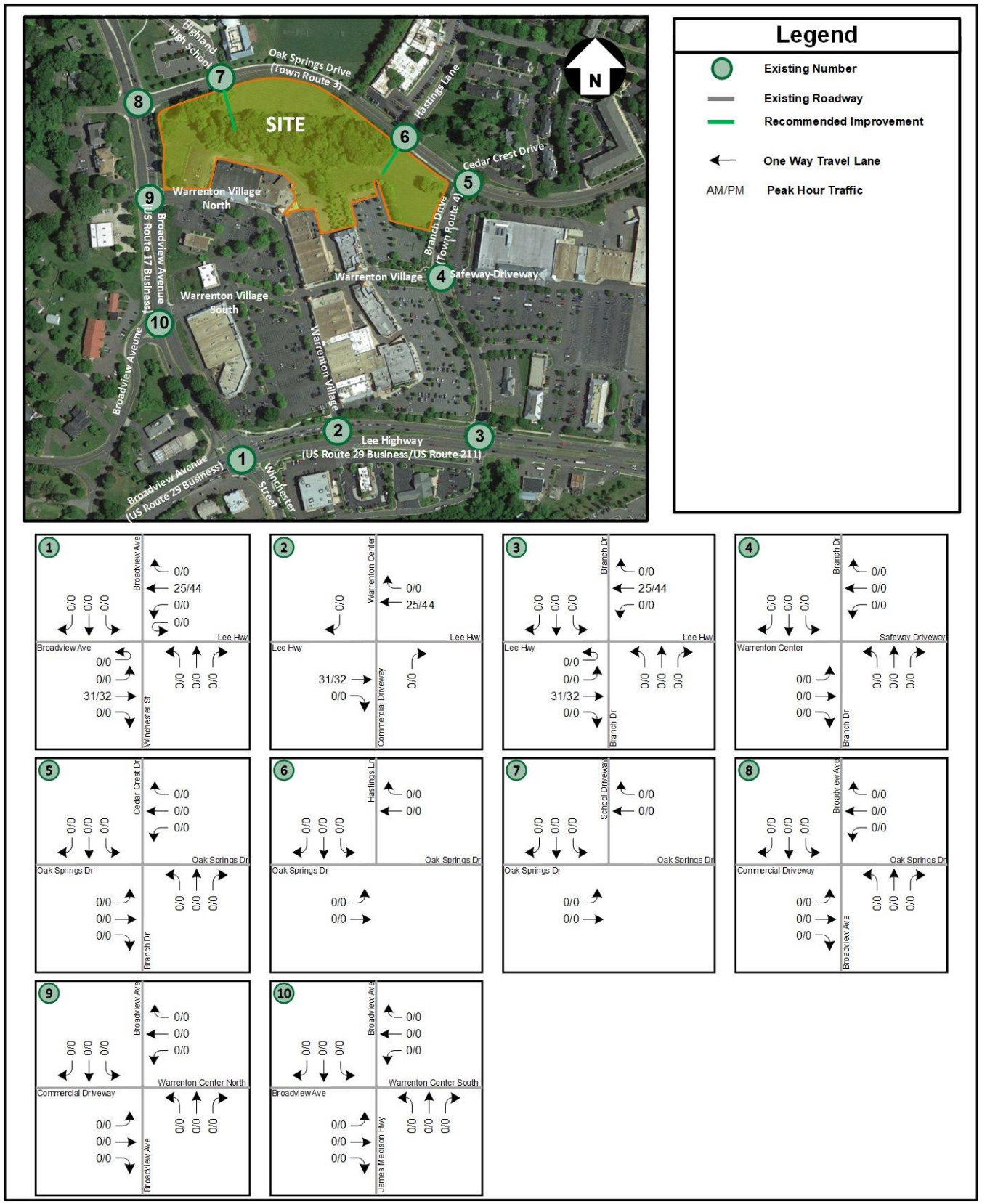


Figure 11: Projected Inherent Regional Growth Traffic Volumes (2023 to 2027)

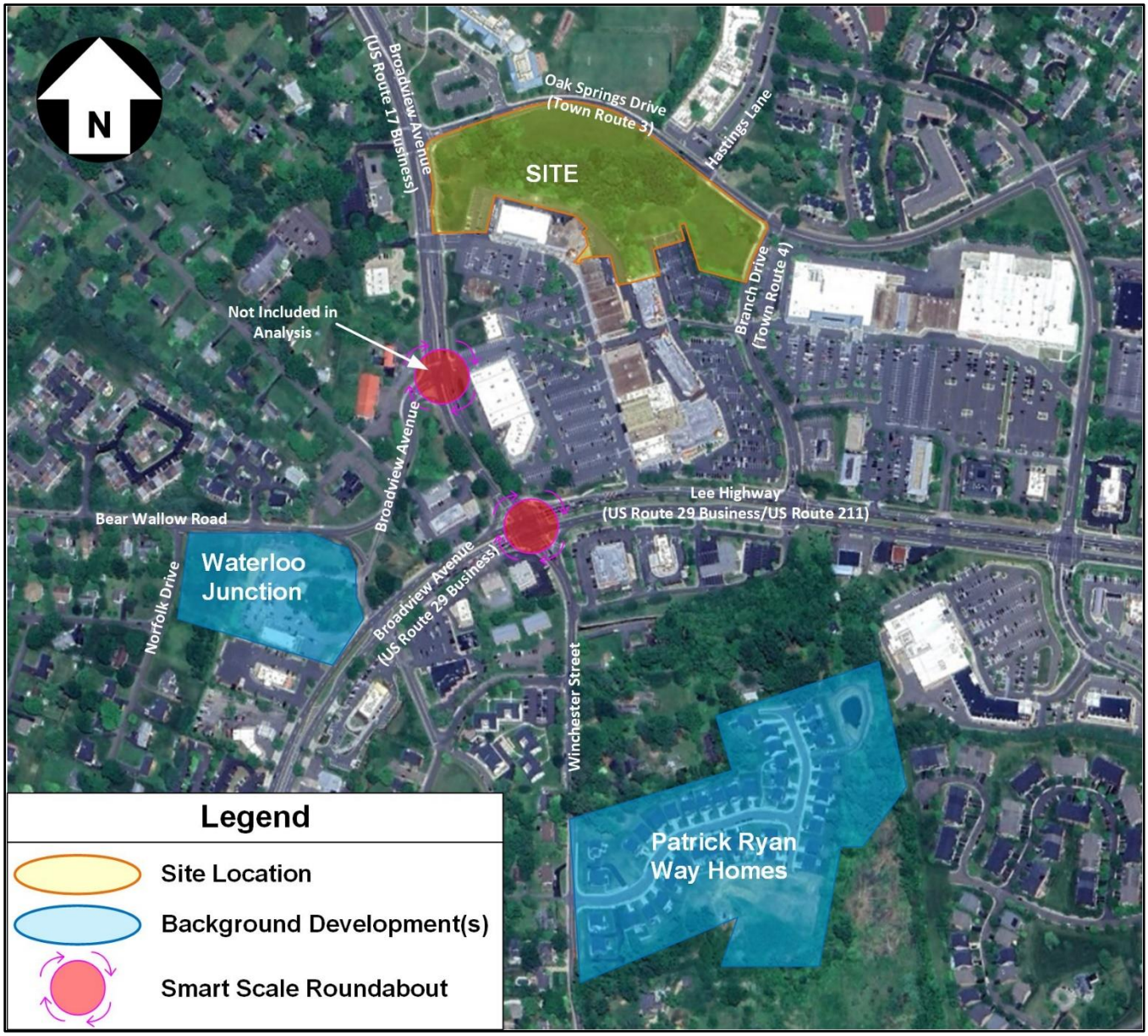


Figure 12: Background Development and Roadway Improvement Map

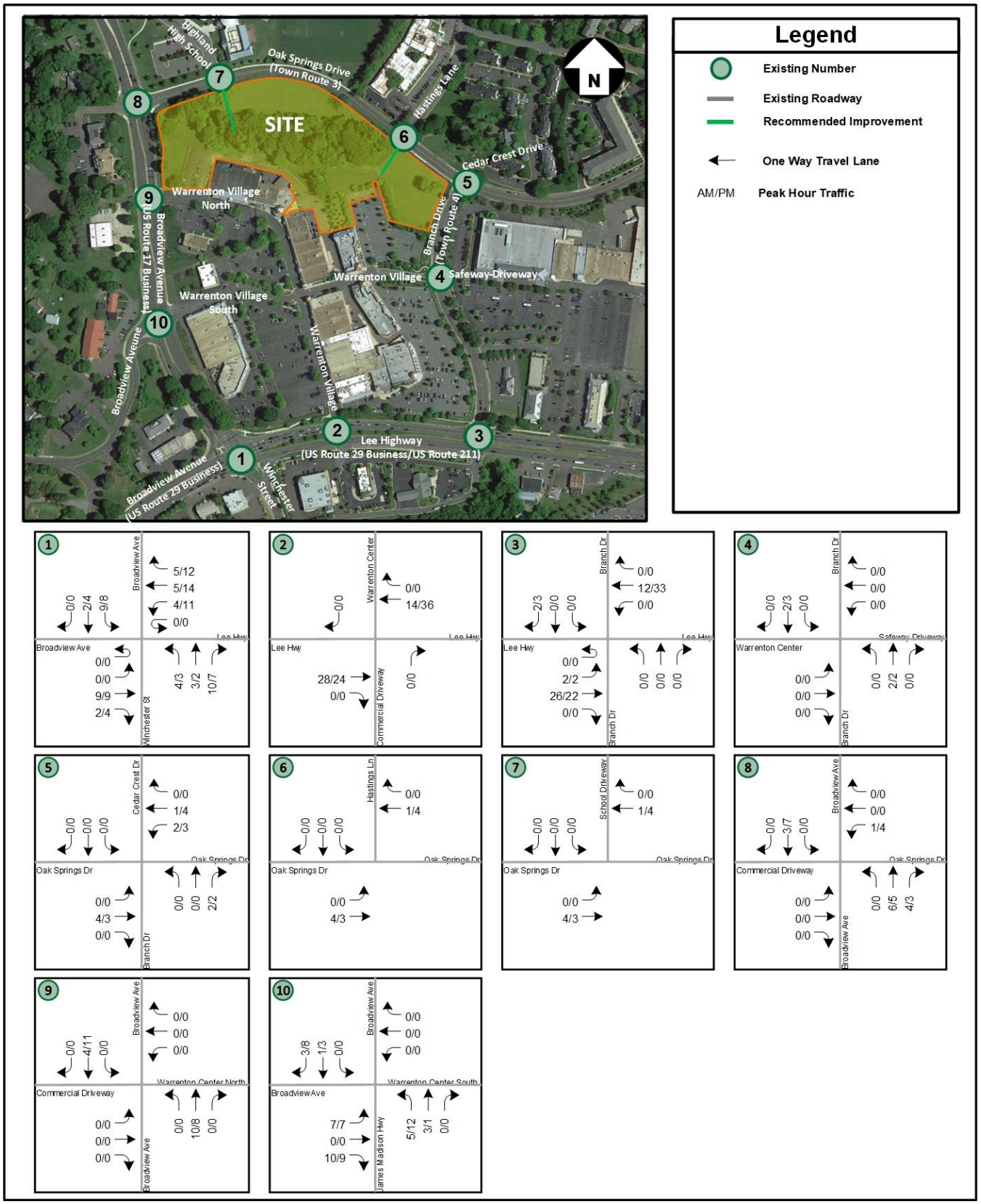


Figure 13: Total Combined Background Development Trips

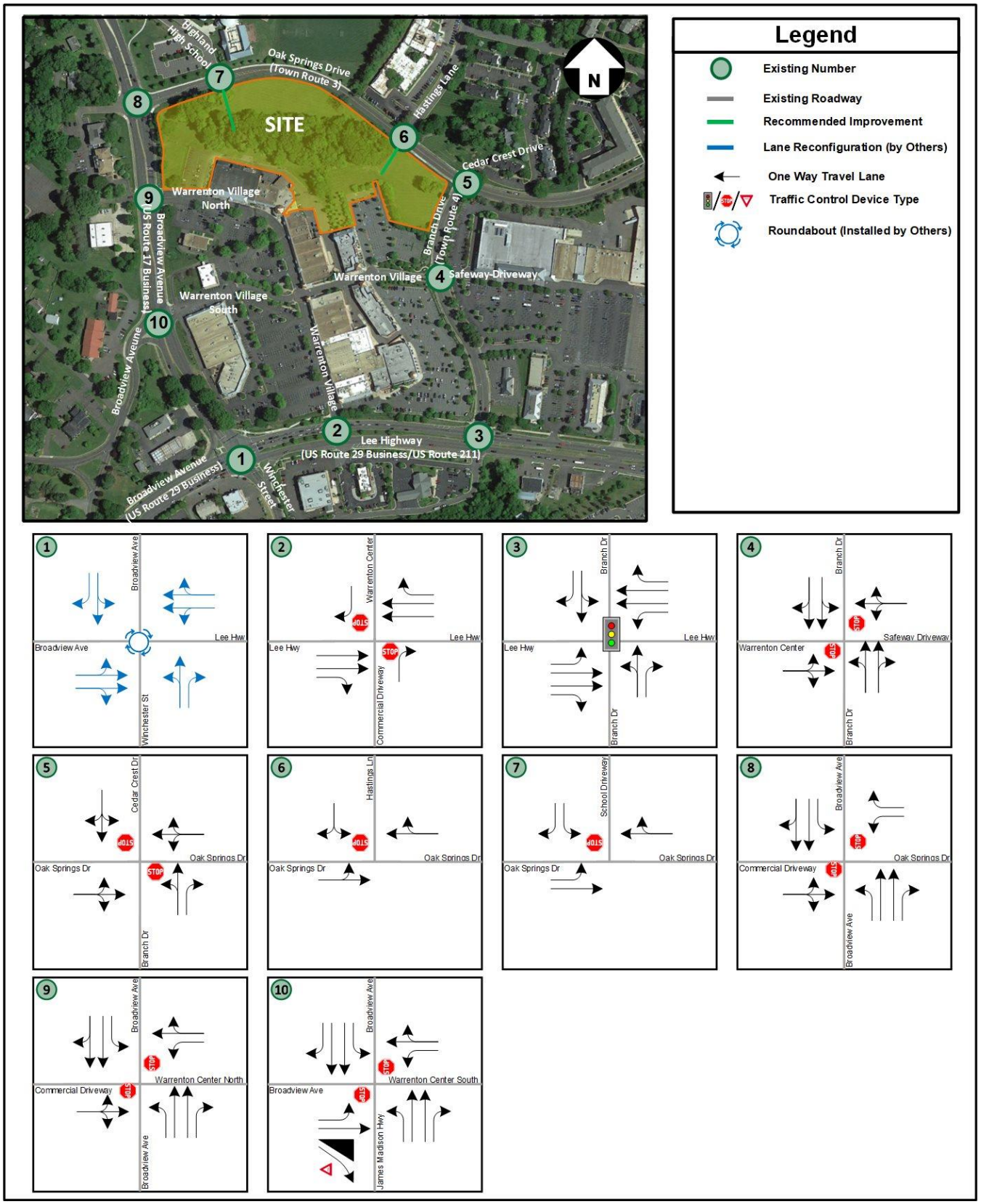


Figure 14: 2027 Future Conditions without Development – Roadway Network Geometric Configuration and Traffic Control Devices

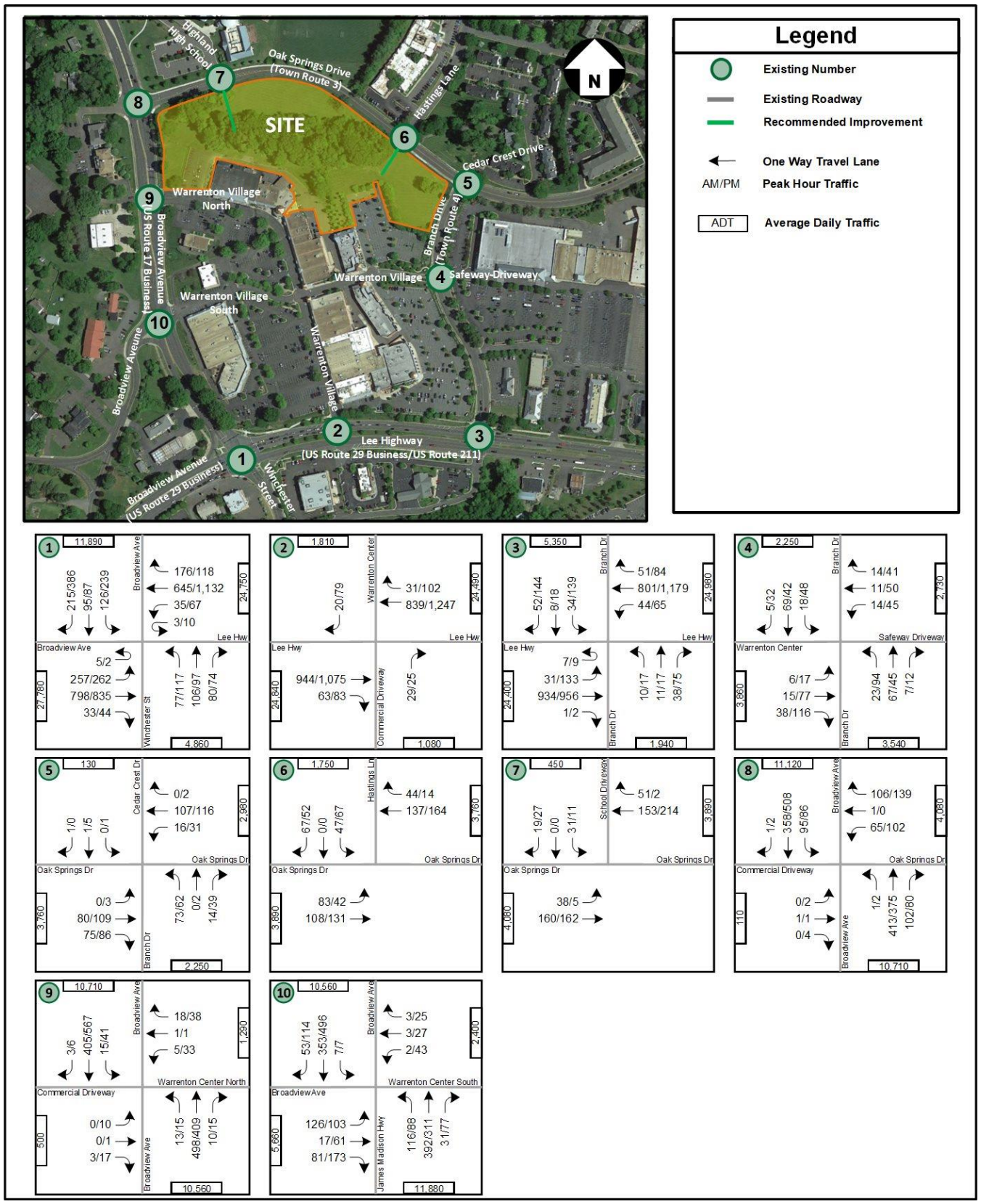


Figure 15: 2027 Future Conditions without Development – Vehicular Traffic Volumes

Future without Development Intersection Capacity and Queuing Analysis

Intersection capacity and queueing analyses were performed for the 2027 Future Conditions without Development scenario at the study area intersections during the AM and PM peak hours, in accordance with VDOT's *TOSAM* (version 2) guidelines. *Synchro,* version 11, was used to analyze the study intersections with results based on TRB's HCM 6th methodology and include LOS, delay, and queue length comparisons for the turning movements analyzed. The roundabout was analyzed using *Sidra*, version 9.

For the purposes of this analysis, the intersection PHF utilized in the analysis of future conditions was determined based on the existing traffic counts, with a minimum of 0.92 as agreed to in the scoping document. The HV% were based on the existing conditions scenario. Note that for analysis purposes, all turning movement counts were coded with a minimum volume of one vehicle in *Synchro*.

Per the scoping meeting with VDOT and County staff, it would be considered acceptable and/or desirable to achieve an approach LOS D or better for traffic operations using HCM methodology. The results of the intersection capacity and queuing analyses from *Synchro* are presented in **Table 5** and graphically in **Figure 16.** The results are expressed in LOS and delay (seconds per vehicle) for overall signalized intersections and per approach and lane group for all study intersections. Any overall signalized intersection or approach that operates at LOS E or F is displayed in red.

The queue lengths were reported as the 95th percentile queues determined from *Synchro* and are expressed in feet. The lane groups where the queue lengths exceeded the available effective storage capacity of existing turn lanes are displayed in red.

The detailed analysis worksheets of the 2027 Future Conditions without Development are contained in Appendix H.

Table 5: 2027 Future Conditions without Development – Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.)	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh)	95th % Queue (ft.)	LOS	Delay (sec/veh)	95th % Queue
			Synchro			Synchro		
1	**Broadview Ave (E/W) at Winchester St (N/S)**							
	Overall Intersection (Roundabout)		**A**	**8.1**		**B**	**17.6**	
	Eastbound Approach		***A***	***7.6***		***B***	***11.1***	
	Eastbound Left/Thru		A	8.0	80	B	11.9	158
	Eastbound Thru/Right		A	7.2	83	B	10.4	158
	Westbound Approach		***A***	***7.6***		***B***	***15.0***	
	Westbound Left/Thru		A	8.0	78	B	16.2	252
	Westbound Thru/Right		A	7.2	81	B	14.0	268
	Northbound Approach		***A***	***9.5***		***B***	***12.4***	
	Northbound Left/Thru		A	9.2	36	B	12.2	56
	Northbound Right		B	10.2	19	B	13.0	22
	Southbound Approach		***A***	***9.1***		***C***	***34.7***	
	Southbound Left/Thru		A	8.6	39	D	35.1	161
	Southbound Right		A	9.7	43	C	34.4	191
2	**Broadview Ave (E/W) at Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy (N/S)**							
	Overall Intersection (TWSC)							
	Northbound Approach		***B***	***13.0***		***B***	***13.9***	
	Northbound Right		B	13.0	5	B	13.9	5
	Southbound Approach		***B***	***10.8***		***B***	***13.9***	
	Southbound Right		B	10.8	3	B	13.9	15
3	**Broadview Ave (E/W) at Branch Dr (N/S)**							
	Overall Intersection (Signalized)		**B**	**19.7**		**C**	**34.0**	
	Eastbound Approach		***B***	***16.4***		***C***	***26.4***	
	Eastbound Left	240	E	67.0	80	E	75.4	224
	Eastbound Thru		B	14.3	485	B	19.1	441
	Eastbound Right	330	A	9.7	0	B	13.4	0
	Westbound Approach		***B***	***15.7***		***C***	***29.6***	
	Westbound Left	150	E	67.4	88	E	78.5	123
	Westbound Thru		B	13.3	400	C	27.8	675
	Westbound Right	150	A	9.7	0	B	17.3	0
	Northbound Approach		***E***	***60.8***		***E***	***67.0***	
	Northbound Left/Thru		E	61.5	44	E	68.6	73
	Northbound Right	60	E	60.4	0	E	66.2	0
	Southbound Approach		***E***	***64.7***		***E***	***69.3***	
	Southbound Left/Thru		E	67.2	86	E	78.8	249
	Southbound Right		E	62.7	0	E	59.1	58
4	**Warrenton Village Center Dwy/Shopping Center Dwy (E/W) at Branch Dr (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach		***A***	***9.3***		***B***	***11.8***	
	Eastbound Left/Thru/Right		A	9.3	5	B	11.8	30
	Westbound Approach		***B***	***10.0***		***B***	***14.3***	
	Westbound Left/Thru/Right		B	10.0	5	B	14.3	28
	Northbound Approach							
	Northbound Left		A	7.4	3	A	7.5	5
	Southbound Approach							
	Southbound Left		A	7.4	0	A	7.4	3
5	**Oak Springs Dr (E/W) at Branch Dr (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach							
	Eastbound Left		A	7.4	0	A	7.5	0
	Westbound Approach							
	Westbound Left		A	7.6	0	A	7.7	3
	Northbound Approach		***B***	***11.0***		***B***	***11.4***	
	Northbound Left/Thru		B	11.4	10	B	12.6	10
	Northbound Right		A	9.0	3	A	9.4	5
	Southbound Approach		***A***	***9.9***		***B***	***11.0***	
	Southbound Left/Thru/Right		A	9.9	0	B	11.0	0

Table 5 (Continued): 2027 Future Conditions without Development – Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.)	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh)	95th % Queue (ft.)	LOS	Delay (sec/veh)	95th % Queue
			Synchro			Synchro		
6	**Oak Springs Dr (E/W) at Hastings Ln / Future Access (N/S)** **Overall Intersection (TWSC)**							
	Eastbound Approach							
	Eastbound Left		A	7.9	5	A	7.7	3
	Southbound Approach		***B***	***11.1***		***B***	***11.0***	
	Southbound Left/Right		B	11.1	15	B	11.0	15
7	**Oak Springs Dr (E/W) at Highland School Dwy / Future Garage Access (N/S)** **Overall Intersection (TWSC)**							
	Eastbound Approach							
	Eastbound Left	75	A	7.7	3	A	7.7	0
	Southbound Approach		***B***	***10.9***		***B***	***10.1***	
	Southbound Left		B	11.9	5	B	11.2	3
	Southbound Right		A	9.3	3	A	9.6	3
8	**Oak Springs Dr (E/W) at Broadview Ave (N/S)** **Overall Intersection (TWSC)**							
	Eastbound Approach		***C***	***17.8***		***C***	***16.6***	
	Eastbound Left/Thru/Right		C	17.8	0	C	16.6	3
	Westbound Approach		***C***	***19.7***		***D***	***27.9***	
	Westbound Left/Thru	125	D	34.3	40	F	51.0	85
	Westbound Right		B	10.6	13	B	10.7	18
	Northbound Approach							
	Northbound Left	90	A	8.1	0	A	8.5	0
	Southbound Approach							
	Southbound Left	225	A	9.1	8	A	8.7	8
9	**Warrenton Village North Dwy (E/W) at Broadview Ave (N/S)** **Overall Intersection (TWSC)**							
	Eastbound Approach		***C***	***15.6***		***C***	***20.0***	
	Eastbound Left/Thru/Right		C	15.6	0	C	20.0	10
	Westbound Approach		***B***	***13.2***		***C***	***18.3***	
	Westbound Left		C	21.2	3	D	27.3	15
	Westbound Thru/Right		B	11.1	3	B	10.6	5
	Northbound Approach							
	Northbound Left	150	A	8.2	0	A	8.8	3
	Southbound Approach							
	Southbound Left	110	A	8.6	0	A	8.4	3
10	**Warrenton Village South Dwy/Broadview Ave (E/W) at Broadview Ave/Winchester St (N/S)** **Overall Intersection (TWSC)**							
	Eastbound Approach		***D***	***30.7***		***D***	***31.9***	
	Eastbound Left		E	44.6	90	F	62.0	98
	Eastbound Thru		D	26.5	8	E	38.5	43
	Eastbound Right		B	10.0	10	B	11.6	25
	Westbound Approach		***C***	***19.7***		***E***	***35.5***	
	Westbound Left		D	25.4	0	F	51.8	40
	Westbound Thru/Right		C	17.8	3	C	22.1	20
	Northbound Approach							
	Northbound Left	160	A	8.6	10	A	9.3	8
	Southbound Approach							
	Southbound Left	160	A	8.3	0	A	8.2	0

NOTES:

[1] Effective storage length is based on the storage length plus one-half of the taper length per TOSAM guidelines.

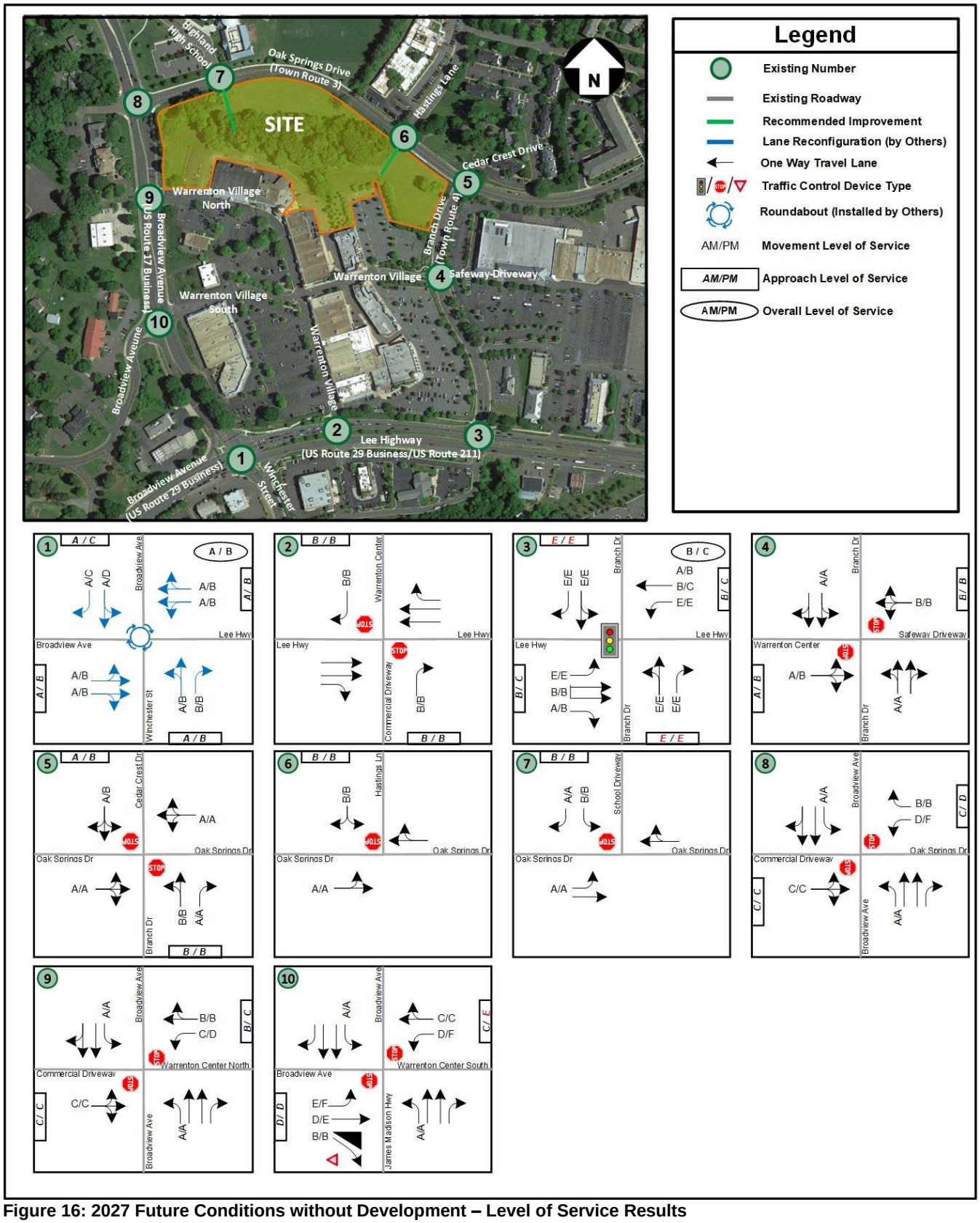


Figure 16: 2027 Future Conditions without Development – Level of Service Results

Study Intersection 1 (Lee Highway at Winchester Street / Broadview Avenue) was approved for a roundabout and received SmartScale funding. As such, this intersection was converted from a signalized intersection to a roundabout in all future conditions.

Based on the capacity analysis of 2027 Future Conditions without Development, the planned roundabout is expected to operate at overall levels of service of B or better during both the AM and PM peak hours.

Based on the capacity analysis of 2027 Future Conditions without Development, the signalized study intersection is expected to operate at overall levels of service of C or better during both the AM and PM peak hours.

Based on the capacity analysis of 2027 Future Conditions without Development, the approaches of all study intersections continue to operate at approach levels of service of D or better during both the AM and PM peak hours, except for the following study intersections that have at least one approach that would operates at level of service E of F during at least one peak hour:

- Study Intersection 3: Lee Highway (US 211/US 29 BUS) at Branch Drive
- Study Intersection 10: Broadview Avenue at Warrenton Village South

Based on the queuing analysis performed for 2027 Future Conditions without Development, all turning movements at the study intersections have maximum queue lengths that are accommodated within the available storage lengths of the turn bays.

Analysis of 2027 Future Conditions with Development

For the purposes of this study, the Development is anticipated to be constructed by 2027; this scenario analyzes the future with development conditions for the year 2027.

Site Description

The development will be situated on a single parcel of vacant land (approximately 6.46 acres) and a portion of an adjacent developed parcel of land, which can be identified on Fauquier County Tax Maps with the following GPIN #s: 6985-20-7247-000, and 6984-29-6753-000, respectively. The property is currently zoned as C (Commercial District) with a Future Land Use of Mixed Use as part of the New Town Warrenton Character District (Lee Highway Urban Development Area [UDA]).

The Applicant is proposing to apply for a Special Use Permit (SUP) in order to construct approximately 386 multifamily residential dwelling units (320 multifamily apartments, 36 2-over-2 units, and 30 townhomes) and a parking deck. The site has an anticipated build-out date of 2027.

A conceptual plan for the Site is illustrated in **Figure 17**

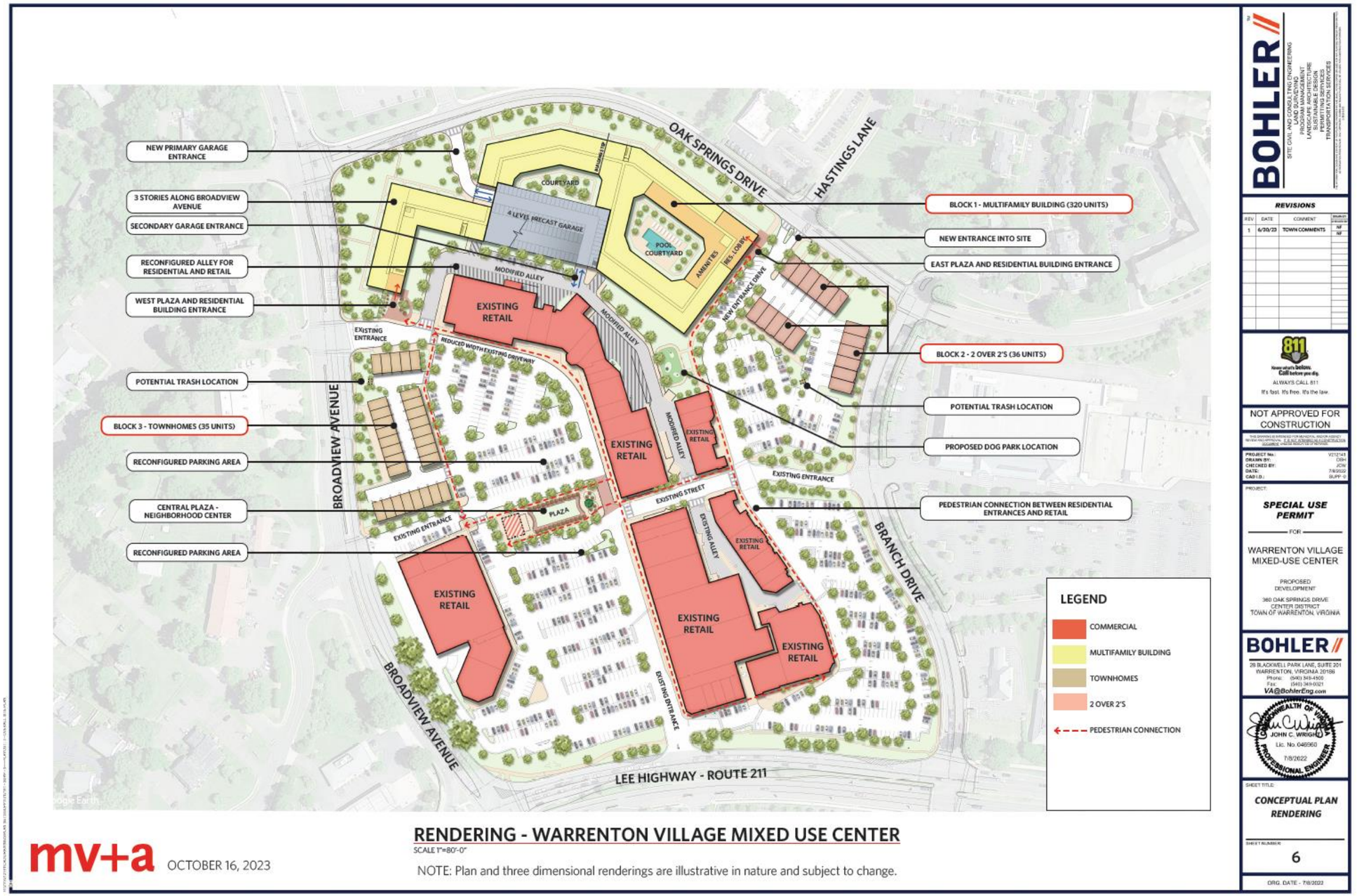


Figure 17: Conceptual Development Plan
Note: Plan provided by Bohler and is for conceptual purposes only.

Proposed Site Access

Access to the site will be provided via one full movement parking deck entry along Oak Springs Drive (Town Route 3) forming the fourth leg of the High School Driveway, one full movement driveway along Oak Springs Drive forming the fourth leg to the existing full-movement intersection of Hastings Lane, and via the existing shopping center accesses to the south.

Projected Site Trip Generation

In order to calculate the trips generated by the proposed Development, the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition, publication was used to determine the total trips going into and out of the subject study site during the AM and PM peak hours as well as the typical number of weekday daily trips. The projected trip generation for the proposed Development is depicted in **Table 6**Table 6. Of note, as agreed to in the scoping document, no internal capture or pass-by trip reductions were assumed with respect to the proposed Development, and therefore are not assumed within the table.

Table 6: Site Trip Generation (Peak Hour of the Adjacent Street; ITE 11th Ed.)

Land Use	ITE Code	Size	------ Weekday ------						
			AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	Total
Multifamily Housing	220	386 DU	37	117	154	124	73	197	2,602

As illustrated in the table above, the Site is expected to generate approximately 154 new trips during the AM peak hour, 197 new trips during the PM peak hour, and 2,602 new daily trips on a typical weekday.

Distribution and Assignment of Site Traffic

The distribution and assignment of the site generated trips were based on the existing traffic patterns, engineering judgement, the nature of the proposed Development, and with the guidance and input from the VDOT and the Town staff. The site direction of approach and trip distribution are illustrated in **Figure 18**.

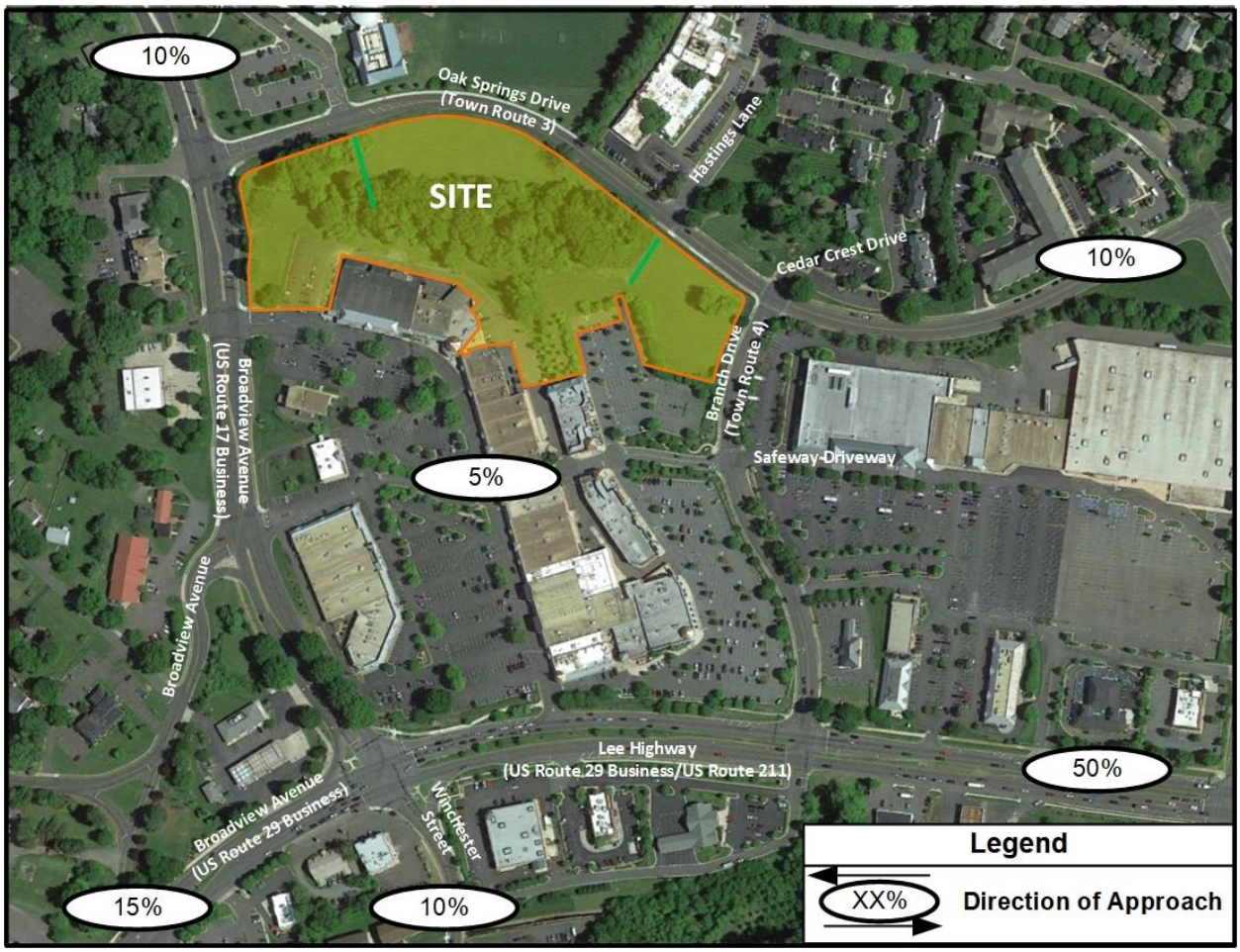


Figure 18: Global Vehicular Direction of Approach (Site Trip Distribution)

Future with Development Traffic Volumes

In order to project future traffic volumes on the roadways in the vicinity of the Development, trips generated from the Development were assigned to the road network based on the previously mentioned direction of approach. The site traffic assignment is illustrated for the AM and PM peak hours in **Figure 19.**

The future with development traffic volumes for were determined by adding the assigned site generated traffic volumes to the 2027 Future Conditions without Development traffic volumes. The 2027 Future Conditions with Development traffic volumes are depicted in **Figure 20.**

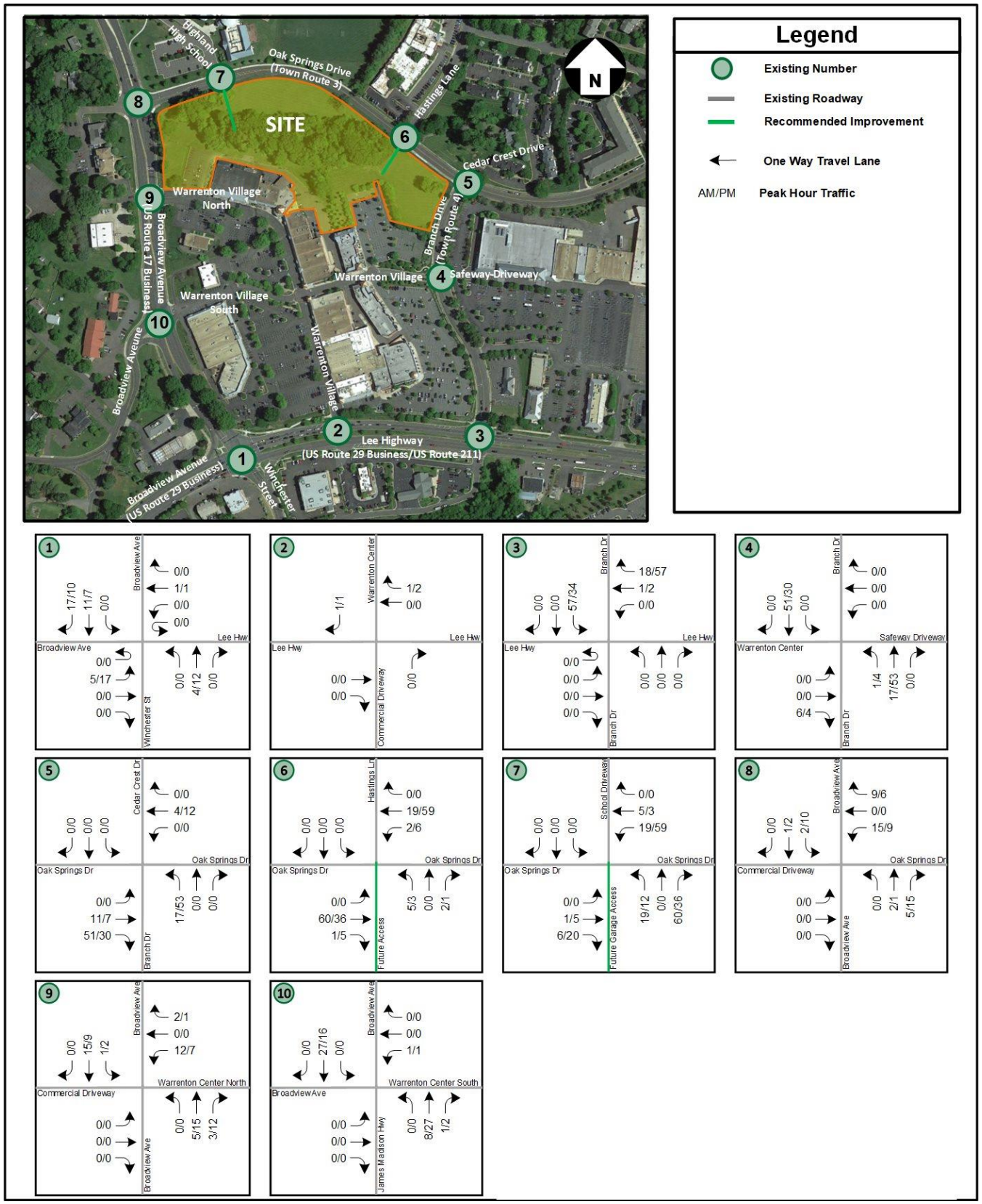


Figure 19: Site Generated Trip Assignment

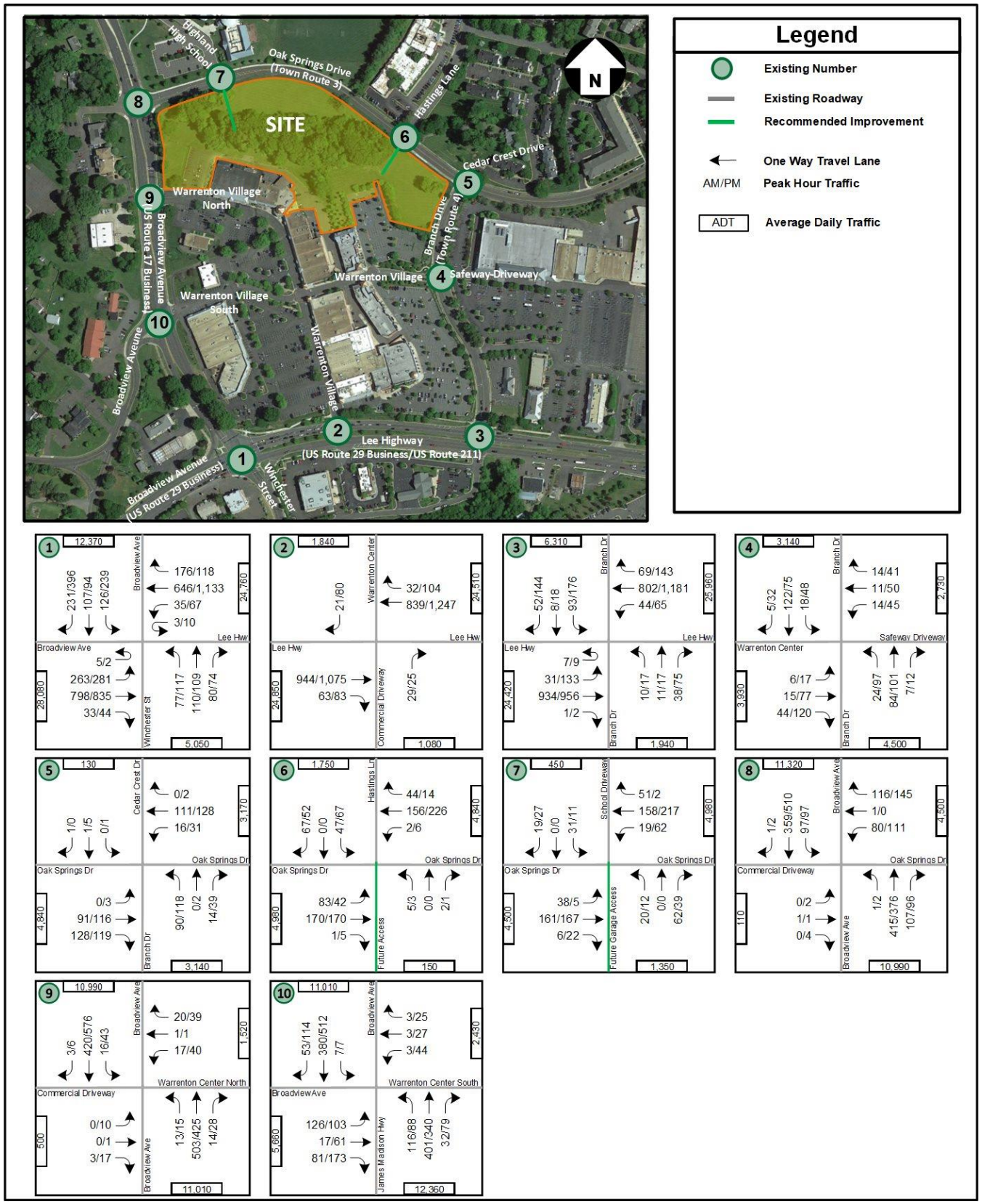


Figure 20: 2027 Future Conditions with Development

Future with Development Intersection Capacity and Queuing Analysis

Intersection capacity and queueing analyses were performed for the 2027 Future Conditions without Development scenario at the study area intersections during the AM and PM peak hours, in accordance with VDOT's *TOSAM* (version 2) guidelines. *Synchro,* version 11, was used to analyze the study intersections with results based on TRB's HCM 6th methodology and include LOS, delay, and queue length comparisons for the turning movements analyzed. Roundabouts were analyzed using *Sidra*, version 9.

For the purposes of this analysis, the intersection PHF utilized in the analysis of future conditions was determined based on the existing traffic counts, with a minimum of 0.92 as agreed to in the scoping document. The HV% were based on the existing conditions scenario, with any new approaches utilizing a default *Synchro* value of 2.0% per movement. Note that for analysis purposes, all turning movement counts were coded with a minimum volume of one vehicle in *Synchro*.

Per the scoping meeting with VDOT and the Town staff, it would be considered acceptable and/or desirable to achieve an approach LOS of D or better for traffic operations using the HCM methodology. The results of the intersection capacity and queuing analyses from *Synchro* are presented in **Table 7** and graphically in **Figure 21.** The results are expressed in LOS and delay (seconds per vehicle) for overall signalized intersections and per approach and lane group for all study intersections. The overall signalized intersections and any approaches that operate at LOS E or F are displayed in red.

The queue lengths were reported as the 95th percentile queues determined from *Synchro* and are expressed in feet. The lane groups where the queue lengths exceeded the available effective storage capacity of existing turn lanes are displayed in red.

The detailed analysis worksheets of the 2027 Future Conditions with Development scenario are contained in Appendix I.

Table 7: 2027 Future Conditions without Development – Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.)	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh)	95th % Queue (ft.) [2]	LOS	Delay (sec/veh)	95th % Queue [2]
			Synchro			Synchro		
1	**Broadview Ave (E/W) at Winchester St (N/S)**							
	Overall Intersection (Roundabout)		**B**	**10.1**		**B**	**19.3**	
	Eastbound Approach		***A***	***9.4***		***B***	***11.5***	
	Eastbound Left/Thru		A	10.0	111	B	12.4	170
	Eastbound Thru/Right		A	8.9	116	B	10.8	172
	Westbound Approach		***B***	***10.5***		***B***	***16.3***	
	Westbound Left/Thru		A	11.4	116	B	17.7	272
	Westbound Thru/Right		B	9.8	117	B	15.3	291
	Northbound Approach		***B***	***11.9***		***B***	***13.3***	
	Northbound Left/Thru		B	11.5	47	B	13.2	62
	Northbound Right		B	12.7	23	B	13.7	23
	Southbound Approach		***B***	***10.1***		***D***	***39.6***	
	Southbound Left/Thru		A	9.5	47	D	39.5	170
	Southbound Right		B	10.8	53	D	39.7	172
2	**Broadview Ave (E/W) at Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy (N/S)**							
	Overall Intersection (TWSC)							
	Northbound Approach		***B***	***13.0***		***B***	***13.9***	
	Northbound Right		B	13.0	5	B	13.9	5
	Southbound Approach		***B***	***10.8***		***B***	***13.9***	
	Southbound Right		B	10.8	3	B	13.9	15
3	**Broadview Ave (E/W) at Branch Dr (N/S)**							
	Overall Intersection (Signalized)		**C**	**23.0**		**D**	**35.8**	
	Eastbound Approach		***B***	***19.0***		***C***	***28.1***	
	Eastbound Left	240	E	67.0	80	E	75.4	224
	Eastbound Thru		B	17.0	485	C	21.1	441
	Eastbound Right	330	B	11.6	0	B	14.7	0
	Westbound Approach		***B***	***18.0***		***C***	***31.6***	
	Westbound Left	150	E	67.4	88	E	78.5	123
	Westbound Thru		B	15.8	400	C	30.4	675
	Westbound Right	150	B	11.6	0	B	19.3	26
	Northbound Approach		***E***	***62.1***		***E***	***67.0***	
	Northbound Left/Thru		E	63.0	47	E	68.6	73
	Northbound Right	60	E	61.6	0	E	66.2	0
	Southbound Approach		***E***	***63.4***		***E***	***68.7***	
	Southbound Left/Thru		E	66.7	162	E	78.1	#338
	Southbound Right		E	57.2	0	E	56.4	58
4	**Warrenton Village Center Dwy/Shopping Center Dwy (E/W) at Branch Dr (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach		***A***	***9.5***		***B***	***12.5***	
	Eastbound Left/Thru/Right		A	9.5	8	B	12.5	35
	Westbound Approach		***B***	***10.4***		***C***	***16.0***	
	Westbound Left/Thru/Right		B	10.4	5	C	16.0	33
	Northbound Approach							
	Northbound Left		A	7.5	3	A	7.6	5
	Southbound Approach							
	Southbound Left		A	7.4	0	A	7.5	3
5	**Oak Springs Dr (E/W) at Branch Dr (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach							
	Eastbound Left		A	0.0	0	A	7.5	0
	Westbound Approach							
	Westbound Left		A	7.8	0	A	7.8	3
	Northbound Approach		***B***	***11.8***		***B***	***13.1***	
	Northbound Left/Thru		B	12.2	15	B	14.3	25
	Northbound Right		A	9.2	3	A	9.5	5
	Southbound Approach		***B***	***10.1***		***B***	***11.3***	
	Southbound Left/Thru/Right		B	10.1	0	B	11.3	0

Table 7 (Continued): 2027 Future Conditions without Development – Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.)	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh)	95th % Queue (ft.) [2]	LOS	Delay (sec/veh)	95th % Queue [2]
			Synchro			Synchro		
6	**Oak Springs Dr (E/W) at Hastings Ln / Future Access (N/S) Overall Intersection (TWSC)**							
	Eastbound Approach							
	Eastbound Left		A	7.9	5	A	7.9	3
	Westbound Approach							
	Westbound Left		A	7.6	0	A	7.6	0
	Northbound Approach		***B***	***13.6***		***B***	***13.1***	
	Northbound Left/Thru/Right		B	13.6	3	B	13.1	0
	Southbound Approach		***B***	***12.1***		***B***	***12.5***	
	Southbound Left/Thru/Right		B	12.1	18	B	12.5	20
7	**Oak Springs Dr (E/W) at Highland School Dwy / Future Garage Access (N/S) Overall Intersection (TWSC)**							
	Eastbound Approach							
	Eastbound Left	75	A	7.7	3	A	7.7	0
	Westbound Approach							
	Westbound Left		A	7.6	0	A	7.8	3
	Northbound Approach		***B***	***10.8***		***B***	***11.0***	
	Northbound Left/Thru/Right		B	10.8	10	B	11.0	8
	Southbound Approach		***B***	***12.6***		***B***	***11.1***	
	Southbound Left/Thru		B	14.6	8	B	14.7	3
	Southbound Right		A	9.4	3	A	9.6	3
8	**Oak Springs Dr (E/W) at Broadview Ave (N/S) Overall Intersection (TWSC)**							
	Eastbound Approach		***C***	***18.1***		***C***	***17.1***	
	Eastbound Left/Thru/Right		C	18.1	0	C	17.1	3
	Westbound Approach		***C***	***22.4***		***D***	***32.9***	
	Westbound Left/Thru	125	E	39.0	55	F	61.8	103
	Westbound Right		B	10.7	15	B	10.8	20
	Northbound Approach							
	Northbound Left	90	A	8.1	0	A	8.5	0
	Southbound Approach							
	Southbound Left	225	A	9.1	10	A	8.8	8
9	**Warrenton Village North Dwy (E/W) at Broadview Ave (N/S) Overall Intersection (TWSC)**							
	Eastbound Approach		***C***	***16.0***		***C***	***20.7***	
	Eastbound Left/Thru/Right		C	16.0	3	C	20.7	10
	Westbound Approach		***C***	***16.3***		***C***	***20.3***	
	Westbound Left		C	22.8	8	D	30.0	23
	Westbound Thru/Right		B	11.1	3	B	10.7	5
	Northbound Approach							
	Northbound Left	150	A	8.3	0	A	8.8	3
	Southbound Approach							
	Southbound Left	110	A	8.6	3	A	8.5	3
10	**Warrenton Village South Dwy/Broadview Ave (E/W) at Broadview Ave/Winchester St (N/S) Overall Intersection (TWSC)**							
	Eastbound Approach		***D***	***34.4***		***E***	***35.6***	
	Eastbound Left		F	51.0	100	F	71.7	108
	Eastbound Thru		D	27.8	8	E	42.2	45
	Eastbound Right		B	10.1	10	B	11.7	25
	Westbound Approach		***C***	***21.2***		***E***	***40.2***	
	Westbound Left		D	26.6	3	F	60.0	45
	Westbound Thru/Right		C	18.5	3	C	23.5	20
	Northbound Approach							
	Northbound Left	160	A	8.7	10	A	9.4	8
	Southbound Approach							
	Southbound Left	160	A	8.3	0	A	8.3	0

NOTES:

[1] Effective storage length is based on the storage length plus one-half of the taper length per TOSAM guidelines.

[2] #: 95th percentile queues (reported from Synchro) exceed capacity; actual queues may be longer. Queues shown are based on the maximum after two cycles.

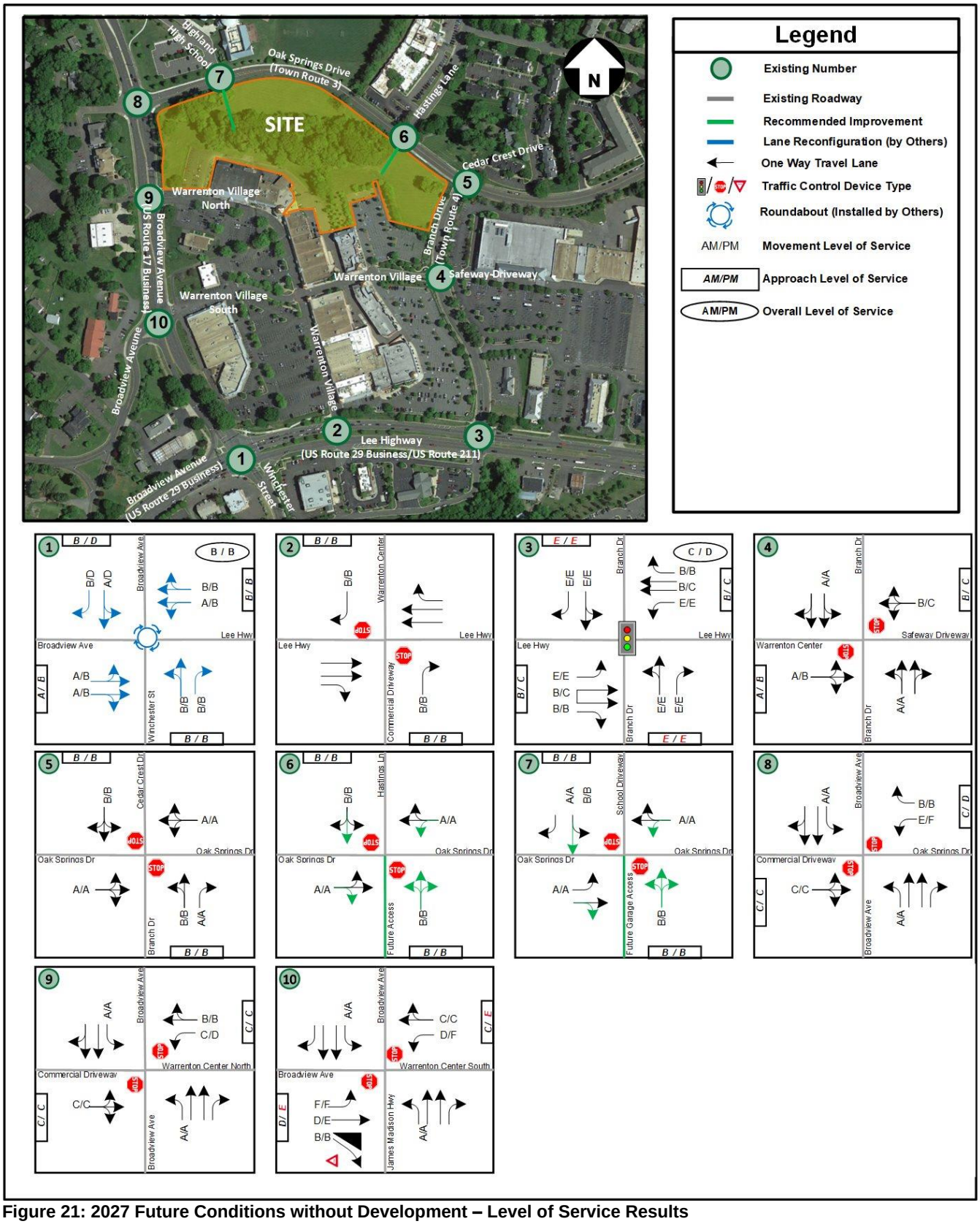


Figure 21: 2027 Future Conditions without Development – Level of Service Results

As mentioned previously, per the agreed upon scoping document, it would be considered desirable to achieve an approach LOS D or better for traffic operations using HCM methodology. Furthermore, if an overall intersection or approach was operating at an unacceptable LOS under future without development conditions, it was assumed acceptable to achieve non-degradation.

The planned roundabout is expected to operate at an overall LOS B with all approaches operating at LOS D or better during the AM and PM peak hours.

Based on the capacity analysis of 2027 Future Conditions without Development, the signalized study intersection is expected to continue to operate at overall levels of service of D or better during both the AM and PM peak hours.

Based on the capacity analysis of 2027 Future Conditions without Development, the approaches of all study intersections continue to operate at approach levels of service of D or better during both the AM and PM peak hours, except for the following study intersections that have at least one approach that would operate at level of service E of F (similar to 2027 Future Conditions without Development) during at least one peak hour:

- Study Intersection 3: Lee Highway (US 211/US 29 BUS) at Branch Drive
- Study Intersection 10: Broadview Avenue at Warrenton Village South

Based on the queuing analysis performed for 2027 Future Conditions without Development, all turning movements at the study intersections have maximum queue lengths that are accommodated within the available storage lengths of the turn bays.

Note that Study Intersection 10 (Broadview Avenue at Warrenton Village South) was previously identified by the Town for construction of a roundabout but was not selected for funding and therefore not included in the analysis. Therefore, no improvements are recommended for construction by the proposed Development.

In general, the signalized intersection would operate with longer vehicular delays for the side-streets and mainline left turning movements. These delays are a result of VDOT prioritization of through traffic on the mainline, as is typical along commuter corridors, to accommodate the largest possible volume of through traffic in the area along the mainlines and therefore have a better overall traffic operation than if all movements were prioritized equally.

No improvements are warranted or recommended as part of the proposed Development.

Preliminary Left and Right Turn Lane Warrant Assessments

Left and right turn lane warrants are based off VDOT's Road Design Manual (RDM), Appendix F. In order to determine the need for exclusive left and/or right turn lanes or tapers at the study intersections, the traffic data and anticipated development program provided in the 2027 Future Conditions with Development scenario section were utilized.

Warrants for right-turn storage lanes on two- and four-lane highways at intersections are based on Figure 3-26 and Figure 3-27 in Appendix F of VDOT's RDM. These figures provide a graphical representation for determining the necessity of a right turn lane by comparing the total volumes of a given approach with their respective right turn volumes.

Warrants for left-turn storage lanes on two-lane highways at unsignalized intersections are based on Figure 3-5 to Figure 3-21 in Appendix F of VDOT's RDM. The figures provide graphical representations for determining the necessity of a left turn lane by comparing the advancing volumes of a given approach and the respective opposing volumes with respect to the percentage of left turning vehicles of the advancing volumes and the design speed of a given roadway.

If the turn lanes and / or tapers are not provided or would not meet the minimum requirements per VDOT's RDM, turn lane waivers requests would need to be submitted as separate documentation and be approved by VDOT.

A summary of the turn lane warrant analysis is presented in **Table 8** through **Table 11**.

Table 8: Summary of Left Turn Lane Warrants at Site Entrances (2-Lane) – Build 2027

Study Scenario	Opposing Vol. (VPH)	Advancing Vol. (VPH)	Left Turn Vol. (VPH)	Left Turn %	Minimum Opposing Threshold (VPH)	VDOT RDM F Figure	Treatment
INT 6 - WBL AM - TF 2027	254	202	2	0.99%	1,208	Fig. 3-4	Not Warranted
INT 6 - WBL PM - TF 2027	217	246	6	2.44%	1,054	Fig. 3-4	Not Warranted
INT 7 - WBL AM - TF 2027	205	228	19	8.33%	841	Fig. 3-5	Not Warranted
INT 7 - WBL PM - TF 2027	194	281	62	22.06%	274	Fig. 3-8	Not Warranted

Table 9: Summary of Right Turn Lane Warrants at Site Entrances (2-Lane) - Build 2027

Study Scenario	Approach Volume	Right Turn Volume	Minimum Right Turn Taper Threshold	Minimum Right Turn Full Lane Threshold	Treatment
INT 4 - NBR - 2027 TF AM Peak	95	7	37	90	Not Warranted
INT 4 - NBR - 2027 TF PM Peak	149	12	36	90	Not Warranted
INT 4 - SBR - 2027 TF AM Peak	90	5	37	90	Not Warranted
INT 4 - SBR - 2027 TF PM Peak	119	32	36	90	Not Warranted

Table 10: Summary of Left Turn Lane Warrants at Brach Drive (Study Intersection 4) (4-Lane) - Existing 2023

Study Scenario	Opposing Vol. (VPH)	Advancing Vol. (VPH)	Left Turning Vol.	Left Turn %	Treatment
INT 4 - NBL - 2023 EX AM Peak	90	95	23	24.2%	Not Warranted
INT 4 - NBL - 2023 EX PM Peak	119	149	94	63.1%	Full-width Turn Lane and Taper Warranted (for Undivided and Divided)
INT 4 - SBL - 2023 EX AM Peak	95	90	18	20.0%	Not Warranted
INT 4 - SBL - 2023 EX PM Peak	149	119	48	40.3%	Full-width Turn Lane and Taper Warranted (for Undivided)

Table 11: Summary of Left Turn Lane Warrants at Brach Drive (Study Intersection 4) (4-Lane) – Build 2027

Study Scenario	Opposing Vol. (VPH)	Advancing Vol. (VPH)	Left Turning Vol.	Left Turn %	Treatment
INT 4 - NBL - 2027 TF AM Peak	145	115	24	20.9%	Not Warranted
INT 4 - NBL - 2027 TF PM Peak	155	210	97	46.2%	Full-width Turn Lane and Taper Warranted (for Undivided and Divided)
INT 4 - SBL - 2027 TF AM Peak	115	145	18	12.4%	Not Warranted
INT 4 - SBL - 2027 TF PM Peak	210	155	48	31.0%	Full-width Turn Lane and Taper Warranted (for Undivided)

No turn lanes are warranted at the site entrances. At the request of VDOT and the Town, turn lanes were evaluated at the Study Intersection 4 (Branch Drive at Warrenton Village Driveway / Safeway Driveway). The northbound left turn lane is warranted under Build 2027 conditions, but it is also warranted under existing conditions. Therefore, a northbound left turn

lane on Branch Drive is not recommended to be installed by the proposed Development. Graphics and information regarding the methodology used to determine the turn lane warrants are provided in Appendix J.

Preliminary Access Management Evaluation (Intersection Spacing)

The minimum spacing standards for the Commonwealth of Virginia are specified in VDOT's Road Design Manual (RDM). Appendix F of the RDM focuses primarily on access management practices. The minimum spacing standard are particularly specified in Table 2-2 through Table 2-4. Table 2-2 provides guidance on the minimum spacing standard for commercial entrances, intersections, and median crossovers, and are based on a roadway's speed limit and functional classification. Table 2-3 and 2-4 provide guidance for minimum spacing standards for the spacing between interchanges and intersections or commercial entrances.

As mentioned previously, Oak Springs Road is classified by VDOT as "Major Collector," with a posted speed limit of 25 mph. Based on the applicable intersection spacing requirements (centerline-to-centerline) per RDM Appendix F Table 2-2, **Table 12** lists the summary of the future intersections with corresponding roadway information and the appropriate distance requirements. **Figure 22** shows the approximate proposed distances between the study intersections and the corresponding required distances with the proposed intersections in place for the Site.

Table 12: Future Intersection Spacing

Functional Classification	Design Speed (See Note 2)	Minimum Spacing (Distance) in Feet			
		Type 1 (Signalized)	Type 2 (Unsignalized/ Full Crossover)	Type 3 (Full Access /Directional Crossover)	Type 4 (Partial Access)
Principal Arterial	≤ 30 mph	1,050	880	440	250
	35 to 45 mph	1,320	1,050	565	305
	≥ 50 mph	2,640	1,320	750	495
Minor Arterial	≤ 30 mph	880	660	355	200
	35 to 45 mph	1,050	660	470	250
	≥ 50 mph	1,320	1,050	555	425
Collector	≤ 30 mph	660	440	225	200
	35 to 45 mph	660	440	335	250
	≥ 50 mph	1,050	660	445	360
Local Street	See Note 1				

TABLE 2-2 MINIMUM SPACING STANDARDS FOR COMMERCIAL ACCESSES, INTERSECTIONS AND MEDIAN CROSSOVERS*

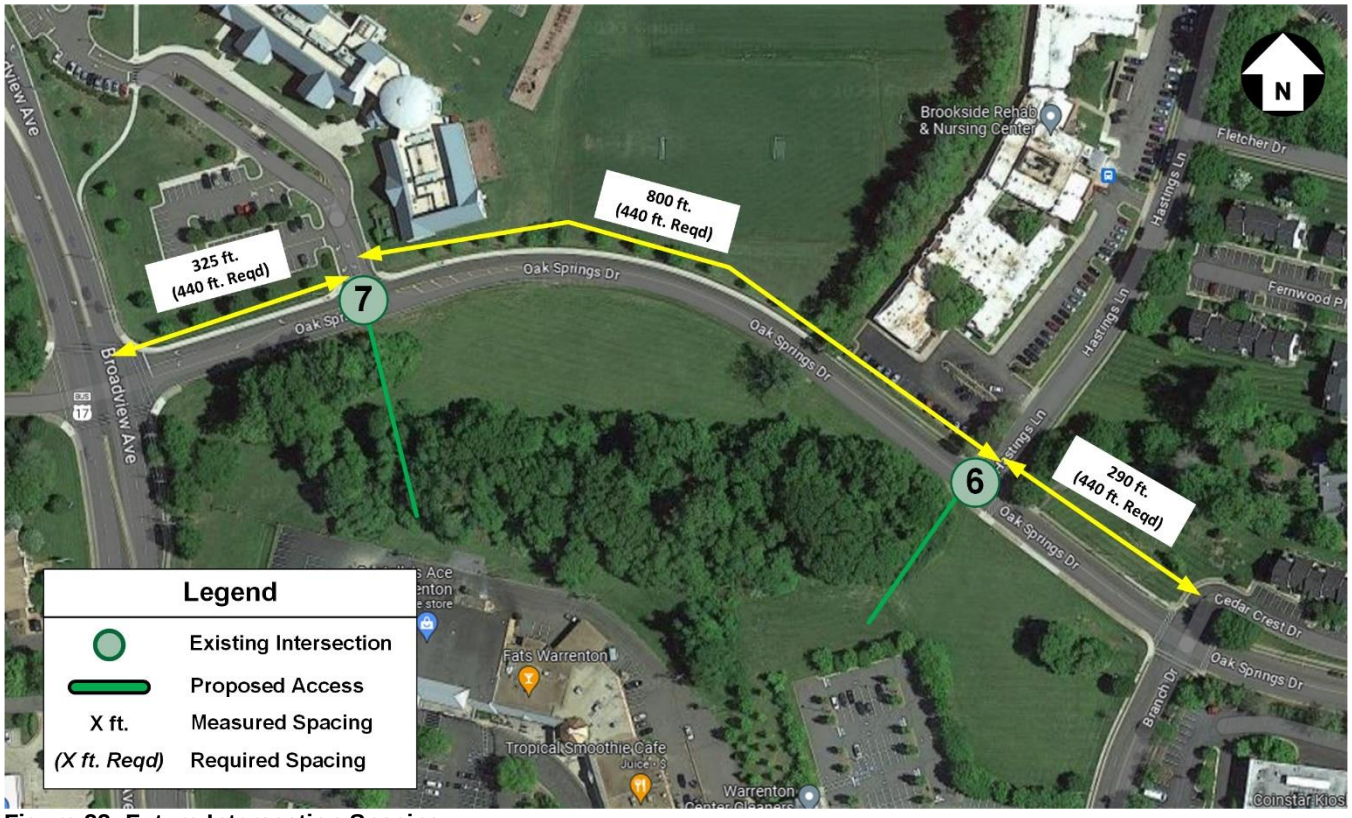


Figure 22: Future Intersection Spacing

As described in

Table 12**2** and depicted in **Figure 22,** the two proposed entrances do not meet the spacing requirements for unsignalized intersections on a 25 mph Major Collector. However, the entrances are proposed as the fourth leg to existing intersections instead of creating new entrances with offsets. However, Oak Springs Drive does not appear to be a VDOT maintained roadway, so an Access Management Exception (AM-E) request will not be submitted.

Preliminary Signal Warrant Analysis

Signal warrants are based on *Chapter 4C: Traffic Control Signal Needs Studies* of the Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition. Chapter 4C discusses nine (9) separate warrants, by which only one warrant needs to be satisfied to justify the installation of a traffic control signal. In order to provide an assessment for the possible signalization of Broadview Avenue at Oak Springs Road (Study Intersection 8) under the build 2027 traffic volumes, Warrant Two (Four-Hour Vehicular Volume) was analyzed, since the warrant usually is a significant factor signalization and is often the warrant that is most readily satisfied for typical conditions.

Portions of the MUTCD used in this analysis are provided in Appendix K.

Warrant Two: Four-Hour Vehicular Volume

Warrant Two is satisfied when the plotted points representing the vehicles per hour (vph) on the major street (total of both approaches and the corresponding vph on the high-volume minor-street approach (one direction only), for each of any four hours of an average day, all fall above either MUTCD Figure 4C-1 or Figure 4C-2 (depending on the applicability) for the future combination of approach lanes.

The traffic volumes utilized to evaluate Warrant Two, using Figure 4C-1 are shown in **Table 13** for the study intersection. It should be noted that the intersection was analyzed as being two lanes on the major approach and one lane on the minor approach. In addition, only two hourly volumes were utilized, the build 2027 AM and PM peak hour volumes, because it is not anticipated that the other hourly volumes would be any higher or more likely to satisfy the conditions than that of the two selected. Lastly, as the capacity analysis of future conditions indicated that 100% of right turners could perform right turn maneuvers on red from the side-street approaches and there are currently exclusive northbound and westbound right turn lanes, a 100% right turn on red (RTOR) reduction was applied to all approaches, as depicted below.

Table 13: Volume Projections – Broadview Avenue at Oak Springs Road (Intersection 8)

Time Period	Broadview Ave (NB/SB)	Oak Springs Dr (WBL)
7:30AM to 8:30 AM	872	80
4:00 PM to 5:00 PM	985	110

Note: 100% right turn reductions are applied on all approaches

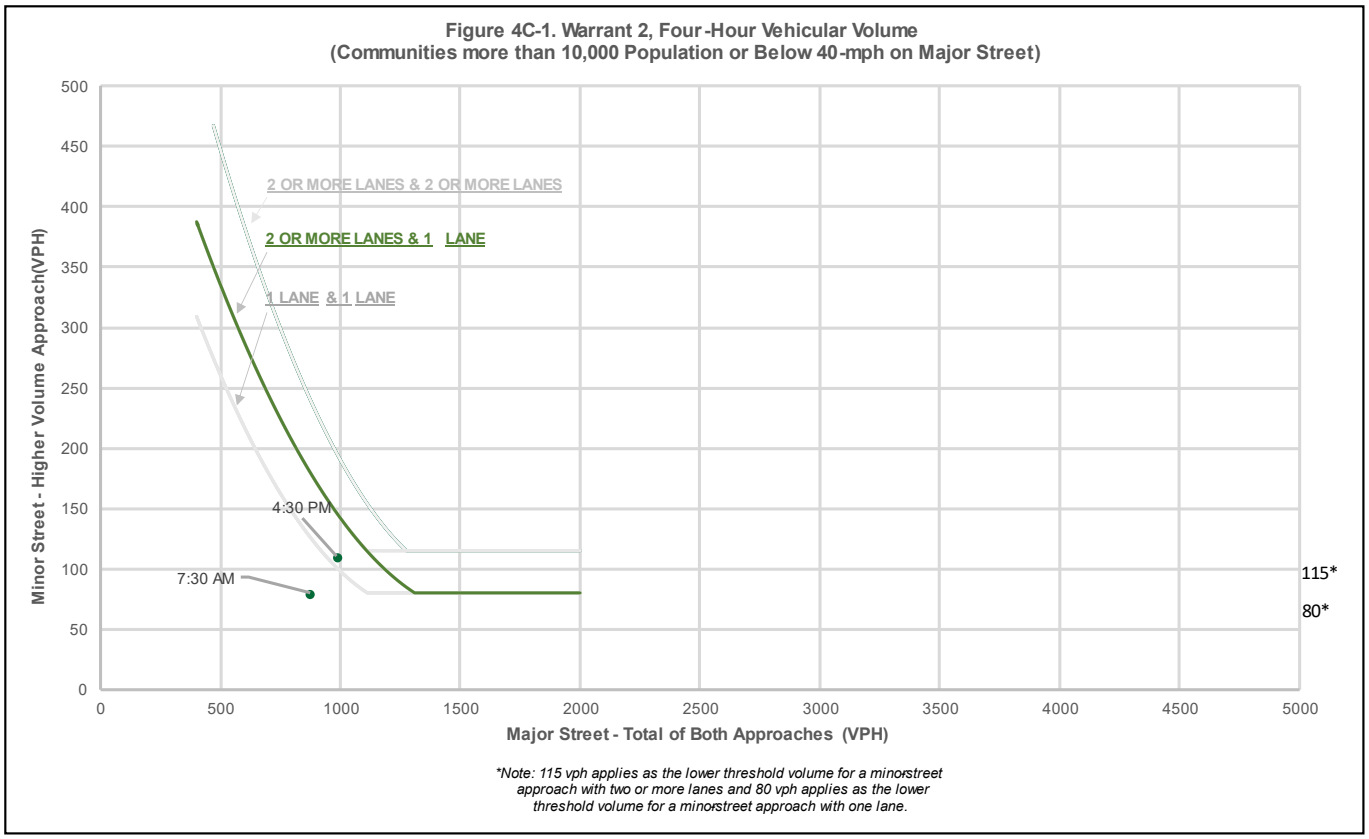


Figure 23: Four-Hour Warrant Analysis – Broadview Avenue at Oak Springs Road (Intersection 8)

As seen in the figure above, the build 2027 peak hour traffic volumes with a 100% RTOR reduction does not meet the threshold for two of the four hours required. As mentioned earlier, it is most likely that the next two hours with the highest traffic volume will generate even lower trips than the AM and PM peak hours. Therefore, based on traffic volumes, a signal would not be warranted at this intersection under this analysis.

The minor street volume is above the minimum threshold of 80 vehicles to warrant a signal; however, the major street volume is not high enough.

Additionally, the capacity analysis in the 2011 TIA shows that all reported movements at this unsignalized study intersection are anticipated to operate at LOS C or better during both AM and PM peak hours. This capacity analysis is acceptable and an indication that there is not an operational need for signalization.

Bicycle and Pedestrian Accommodations

The property currently contains a sidewalk with a buffer across the north side of the Oak Springs frontage. The existing sidewalk will be maintained with the proposed development, and sidewalk will be constructed along the south side of Oak Springs Road across the property frontage. There is at least one crosswalk at every study intersection, with the exception of Study Intersection 2 (Lee Highway at Warrenton Village / Chick-fil-a Driveway).

The school and mixed-use area create opportunities for the proposed Site to create paths and areas for multimodal connectivity. As shown on the concept plan, The Site is proposing a multitude of improvements that will increase pedestrian connectivity throughout the entire area. New sidewalks will be added along the entire perimeter of all residential blocks, including direct sidewalk connectivity to ground floor units. The extension of Hastings Lane and accompanying sidewalks will offer a new pedestrian access point from Oak Springs Drive. The proposed road that will connect the Hastings Lane extension through the existing commercial building and into the heart of the retail center via a new cut-through street that will allow maximum ease to walk from one side of the site to the other.

The unsignalized pedestrian crossings were reviewed as per TE-384.1 and will be submitted as a separate document.

Conclusions

This report presents the findings of a Traffic Impact Analysis (TIA) conducted for the proposed Warrenton Village Center (the Site / the Development / the Property) along the southern frontage of Oak Springs Drive (Town Route 3), east of Broadview Avenue (US Route 17 Business) and west of Branch Drive (Town Route 4) in the Town of Warrenton, Virginia

The development will be situated on a single parcel of vacant land (approximately 6.46 acres) and a portion of an adjacent developed parcel of land, which can be identified on Fauquier County Tax Maps with the following GPIN #s: 6985-20-7247-000, and 6984-29-6753-000, respectively. The property is currently zoned as C (Commercial District) with a Future Land Use of Mixed Use as part of the New Town Warrenton Character District (Lee Highway Urban Development Area [UDA]).

The Applicant is proposing to apply for a Special Use Permit (SUP) in order to construct approximately 386 multifamily residential dwelling units (320 multifamily apartments, 36 2-over-2 units, and 30 townhomes) and a parking deck. The site has an anticipated build-out date of 2027.

Access to the site will be provided via one full movement parking deck entry along Oak Springs Drive (Town Route 3) forming the fourth leg of the High School Driveway, one full movement driveway along Oak Springs Drive forming the fourth leg to the existing full-movement intersection of Hastings Lane, and via the existing shopping center accesses to the south.

Analysis Components

- 2023 existing volumes were derived via turning movement counts collected at intersections within the study area in February 2023.
- As determined based on review comments from VDOT and the Town, an inherent regional growth of 1.0% per year was applied to the Lee Highway mainline through movements at the intersection of Lee Highway at Broadview Avenue (US Route 17 Business). The growth volumes were balanced along the road network by increasing the mainline through movements at subsequent study intersections along the road network where applicable for the period between 2023 and 2027 to account for 2027 conditions.
- The trip generation associated with the Site was based on the ITE Trip Generation Manual, 11th Edition publication. The Site in total is expected to generate approximately 154 new trips during the AM peak hour, 197 new trips during the PM peak hour, and 2,602 new daily trips on a typical weekday.
- Intersection capacity and queuing analyses were performed for all analysis scenarios at the study area intersections during the weekday morning (AM) and weekday afternoon (PM) peak hours. *Synchro*, version 11, was used to analyze the study intersections with results based on the Transportation Research Board's (TRB) Highway Capacity Manual (HCM) methodology and analysis guidelines provided in VDOT's Traffic Operations and Safety Analysis Manual (TOSAM) (version 2). The analysis herein includes level of service (LOS), delay, and queue length comparisons for the turning movements analyzed.
- The analysis also considers an assessment of historical crash data at all existing study intersections.
- The analysis also includes preliminary access management assessment and turn lane warrant assessments for the Site access points along Oak Springs Drive.

Analysis Results

2023 Existing Conditions

- Based on the capacity analysis of Existing Conditions, the two signalized study intersections operate at an overall level of service D or better during both the AM and PM peak hours.

- Based on the capacity analysis of Existing Conditions, three study intersections have at least one approach that operates at levels of service (LOS E or F) for at least one peak hour. The remaining intersection approaches operate at acceptable levels of service during both peak hours.
- Based on the analysis of the Synchro 95th percentile queue lengths, all turning movements have queue lengths that can be accommodated within the available storage length of the turn bays, except the southbound left turn movement at Study Intersection 1 (Broadview Avenue / Lee Highway at Winchester Street).

2027 Future Conditions without Development

- Based on the capacity analysis of 2027 Future Conditions with Development, the signalized study intersection would operate at an overall level of service D or better during both the AM and PM peak hours.
- The planned roundabout is expected to operate at an overall LOS B or better with all approaches operating at LOS D or better during the AM and PM peak hours.
- Based on the capacity analysis of 2027 Future Conditions without Development, two study intersections have at least one approach that would operate at levels of service (LOS E or F) for at least one peak hour. The remaining intersection approaches would operate at acceptable levels of service during both peak hours.
- Based on the analysis of the Synchro 95th percentile queue lengths, all turning movements have queue lengths that could be accommodated within the available storage length of the turn bays.

2027 Future Conditions with Development

- The Site is expected to generate approximately 154 new total trips during the AM peak hour, 197 new trips during the PM peak hour and 2,602 new trips during a typical weekday.
- Based on the capacity analysis of 2027 Future Conditions with Development, the signalized study intersection would operate at an overall level of service D or better during both the AM and PM peak hours.
- The planned roundabout is expected to operate at an overall LOS B with all approaches operating at LOS D or better during the AM and PM peak hours.
- Based on the capacity analysis of the 2027 Future Conditions with Development, two study intersections have at least one approach that would operate at levels of service (LOS E or F) for at least one peak hour (similar to 2027 Future Conditions without Development) during the AM and PM peak hours. The remaining intersection approaches would operate at acceptable levels of service during both peak hours.
- Based on the queuing analysis performed for the 2027 Future Conditions with Development, all turning movements have queue lengths that could be accommodated within the available storage length of the turn bays.

Overall Conclusion

Based on the capacity and queueing analysis results, the proposed Development will not have a substantial impact to the surrounding transportation and roadway network, assuming that the site is constructed as depicted on the concept plan. No improvements are warranted or recommend to accommodate the proposed Development.

Transportation Technical Appendix

Warrenton Village Center

Town of Warrenton, Virginia

GOROVE SLADE
Transportation Planners and Engineers

TABLE OF CONTENTS

A. Signed Scoping Document

THIS IS NOT A CHAPTER 870 STUDY

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:	Kevin Sitzman, Gorove Slade Associates, Inc. 703.787.9595 kevin.sitzman@goroveslade.com		
Developer/Owner Name: Tele: E-mail:	Jess Achenbach jachenbach@castledp.com		
Project Information			
Project Name:	Warrenton Village Mixed-Use Center	Locality/County:	Town of Warrenton
Project Location: (Attach regional and site specific location map)	The proposed development will be located primarily along the southern frontage of Oak Springs Drive (Town Route 3), east of Broadview Avenue (US Route 17 Business) and west of Branch Drive (Town Route 4) in the Town of Warrenton, Virginia. **(See Figure 1).**		
Submission Type	Comp Plan ☐	REZ/SUP ☒	Site Plan ☐ / Subd Plat ☐
Project Description: (Including details on the land use, acreage, phasing, access location, etc. Attach additional sheet if necessary)	The development will be situated on a single parcel of vacant land (approximately 6.46 acres) and a portion of an adjacent developed parcel of land, which can be identified on Fauquier County Tax Maps with the following GPIN #s: 6985-20-7247-000, and 6984-29-6753-000, respectively. The property is currently zoned as C (Commercial District) with a Future Land Use of Mixed Use as part of the New Town Warrenton Character District (Lee Highway Urban Development Area [UDA]). The Applicant is proposing to apply for a Special Use Permit (SUP) in order to construct approximately 376 multifamily residential dwelling units (320 multifamily apartments, 36 2-over-2 units, and 20 townhomes) and a parking deck. The site has an anticipated build-out date of 2027. Access to the site will be provided via one full movement parking deck entry along Oak Springs Drive (Town Route 3) forming the forth leg of the High School Driveway, one full movement driveway along Oak Springs Drive forming the fourth-leg to the existing full-movement intersection of Hastings Lane, and via the existing shopping center accesses to the south.		
Proposed Use(s): (Check all that apply; attach additional pages as necessary)	Residential ☒ / Commercial ☐ / Mixed Use ☐ / Other ☐		
	Residential Uses(s) ITE LU Code(s): 220 Number of Units: 376 **Other Use(s)**	**Commercial Use(s)** ITE LU Code(s): Square Ft or Other Variable:	

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.

	ITE LU Code(s): Square Ft or Other Variable:			
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: 2027	Design Year: N/A
Study Area Boundaries (Attach map)	North: Oak Springs Drive (Town Route 3)	South: US Route 211 / 29 Business	
	West: Broadview Avenue (US Route 17 Business)	East: Branch Drive (Town Route 4)	
External Factors That Could Affect Project (Planned road improvements, other nearby developments)	Waterloo Junction Single Family homes along Patrick Ryan Way Smart Scale Roundabouts 1. Broadview/Winchester/Lee 2. Roebling/Broadview		
Consistency With Comprehensive Plan (Land use, transportation plan)	Yes		
Available Traffic Data (Historical, forecasts)	2023 TMC's VDOT Historical AADT Data		
Trip Distribution **(Please refer to attached Figure 2 in Supplement)**	Road Name: (to/from the North) – N/A	Road Name: (to/from the South) – N/A	
	Road Name: (to/from the West) – N/A	Road Name: (to/from the East) – N/A	
Annual Vehicle Trip Growth Rate: (See Note 2.)	1.0%/yr. (2023 to 2027)	Peak Period for Study (check all that apply)	☒ AM ☒ PM ☐ SAT
		Peak Hour of the Adj. (to be used in study)	AM: 150 / PM: 192 / Daily: 2,534

Study Intersections and/or Road Segments (Attach additional sheets as necessary) **(Please refer to attached Figure 1.)**				
	1.	Broadview Avenue (US Route 17) / Lee Highway at Broadview Avenue / Winchester Street	6.	Oak Springs Drive (Town Route 3) at Hastings Lane / Future Access
	2.	Lee Highway (US Route 17) at Warrenton Village Center Driveway at Chick-fil-a Driveway	7.	Oak Springs Drive (Town Route 3) at Highland School Driveway / Future Garage Access
	3.	Lee Highway (US Route 17) at Branch Drive (Town Route 4)	8.	Broadview Avenue (US Route 17 Business) at Oak Springs Drive (Town Route 3)
	4.	Branch Drive (Town Route 4) at Warrenton Village Driveway / Safeway Driveway	9.	Broadview Avenue (US Route 17 Business) at Warrenton Village Center South Driveway
	5.	Oak Springs Drive (Town Route 3) at Branch Drive (Town Route 4) / Cedar Crest Drive	10.	Broadview Avenue (US Route 17 Business) at Warrenton Village Center North Driveway

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.

Trip Adjustment Factors	Internal allowance Reduction: ☐ Yes ☒ No	Pass-by allowance Reduction: ☐ Yes ☒ No
Software Methodology	☒ Synchro ☐ HCS (v.2000/+) ☒ SIDRA ☐ CORSIM ☐ Other _____	
Traffic Signal Proposed or Affected (Analysis software to be used, progression speed, cycle length)	Existing traffic signals that could be affected: 1. Broadview Avenue (US Route 17) / Lee Highway at Broadview Avenue / Winchester Street 2. Lee Highway (US Route 17) at Branch Drive (Town Route 4) Analysis Software: Synchro version 11 Results: HCM 6 Methodology (See Note 7) Queue Lengths to be Reported: 95th Percentile	
Improvement(s) Assumed or to be Considered	Smart Scale Roundabouts 1. Broadview/Winchester/Lee 2. Roebling/Broadview	
Background Traffic Studies Considered	Waterloo Junction Single Family homes along Patrick Ryan Way	
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 (_____)	

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.

NOTES on ASSUMPTIONS:

1. The scenarios to be included in the study are Existing Conditions (2023), Future without Development (2027) and Future with Development (2027). The study will analyze AM and PM peak hours.
2. Existing traffic volumes will be based on 2023 traffic count data. In order to project 2027 future conditions, a regional growth of 1.0% per annum will be applied to all turning movements at all study intersections.
3. Existing peak hour factors will be based on the traffic counts and utilized on a by-intersection basis. Peak hours factors by intersection in the range of 0.85 to 1.00 will be used for existing scenario. Peak hour factors of 0.92 will be used for all future scenarios if the existing peak hour factor by intersection is less than 0.92.
4. Heavy vehicle percentages (HV%) will be based on existing counts per movement. For any new leg or intersection, the HV% will be based on a default *Synchro* value of 2.0% per movement.
5. For any approach, a level of service (LOS) D or better would be considered as acceptable/desirable traffic operation condition. For all approaches, the projected future conditions without development LOS and delay will be maintained in the future with development condition. Will show intersection, approach, and movement LOS.
6. 95th percentile queues will be provided from *Synchro*.
7. HCM 6 methodology will be utilized where applicable; HCM 2000 methodology will be utilized if HCM 6 methodology is not applicable.
8. Preliminary access management and turn lane warrant assessments will be conducted for the site entrances.
9. Crash Data obtained from VDOT's Crash Analysis Tool will be analyzed at existing intersections.

SIGNED:  DATE: 6/30/2023
Applicant or Consultant

PRINT NAME: Kevin Sitzman
Applicant or Consultant

SIGNED: _____ DATE: _____
VDOT Representative

PRINT NAME: _____
VDOT Representative

SIGNED: _____ DATE: _____
Local Government Representative

PRINT NAME: _____
Local Government Representative

Table 1: Historic Growth (Based on VDOT Traffic Data)

Road Segment:	From:	To:	Published VDOT AADT					Growth Rate			
			2015	2016	2017	2018	2019	2015 - 2019	2016 - 2019	2017 - 2019	2018 - 2019
Broadview Avenue	Bus US 29 Lee Hwy	NCL Warrenton	10,000	10,000	10,000	10,000	11,000	2%	3%	5%	10%
Oak Springs Drive	Broadview Ave	Branch Dr	3,200	3,200	3,200	3,200	3,100	-1%	-1%	-2%	-3%
Branch Drive	Lee Highway	Oak Springs Drive	3,800	4,200	4,200	4,300	4,300	3%	1%	1%	0%

Figure 1: Site Location and Study Intersections

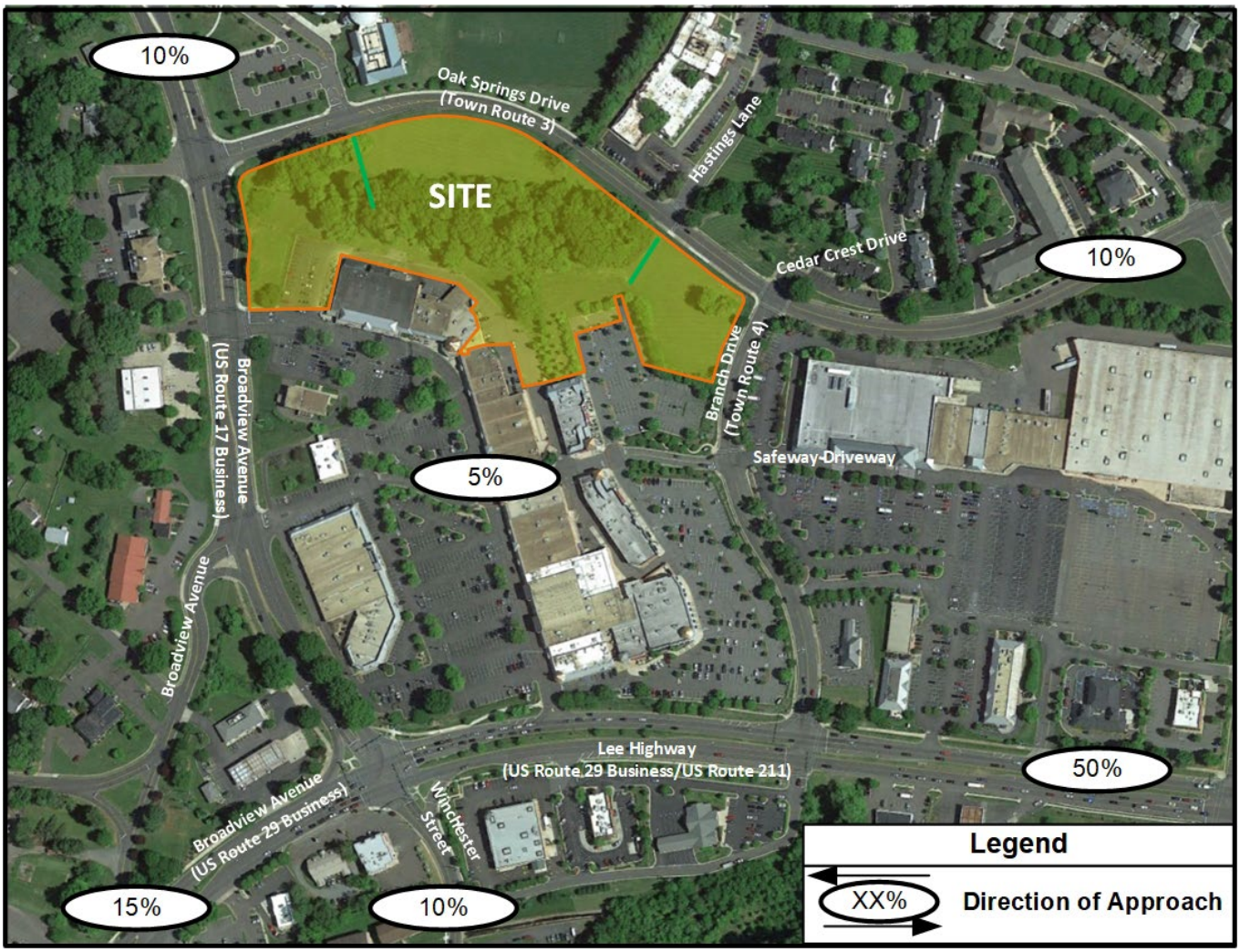


Figure 2: Direction of Approach

Table 2: Trip Generation – Peak Hour of the Adjacent Street (ITE 11th Edition) – To Be Used in Study

Land Use	ITE Code	Size	------ Weekday ------						
			AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	Total
Multifamily Housing	220	376 DU	36	114	150	121	71	192	2,534

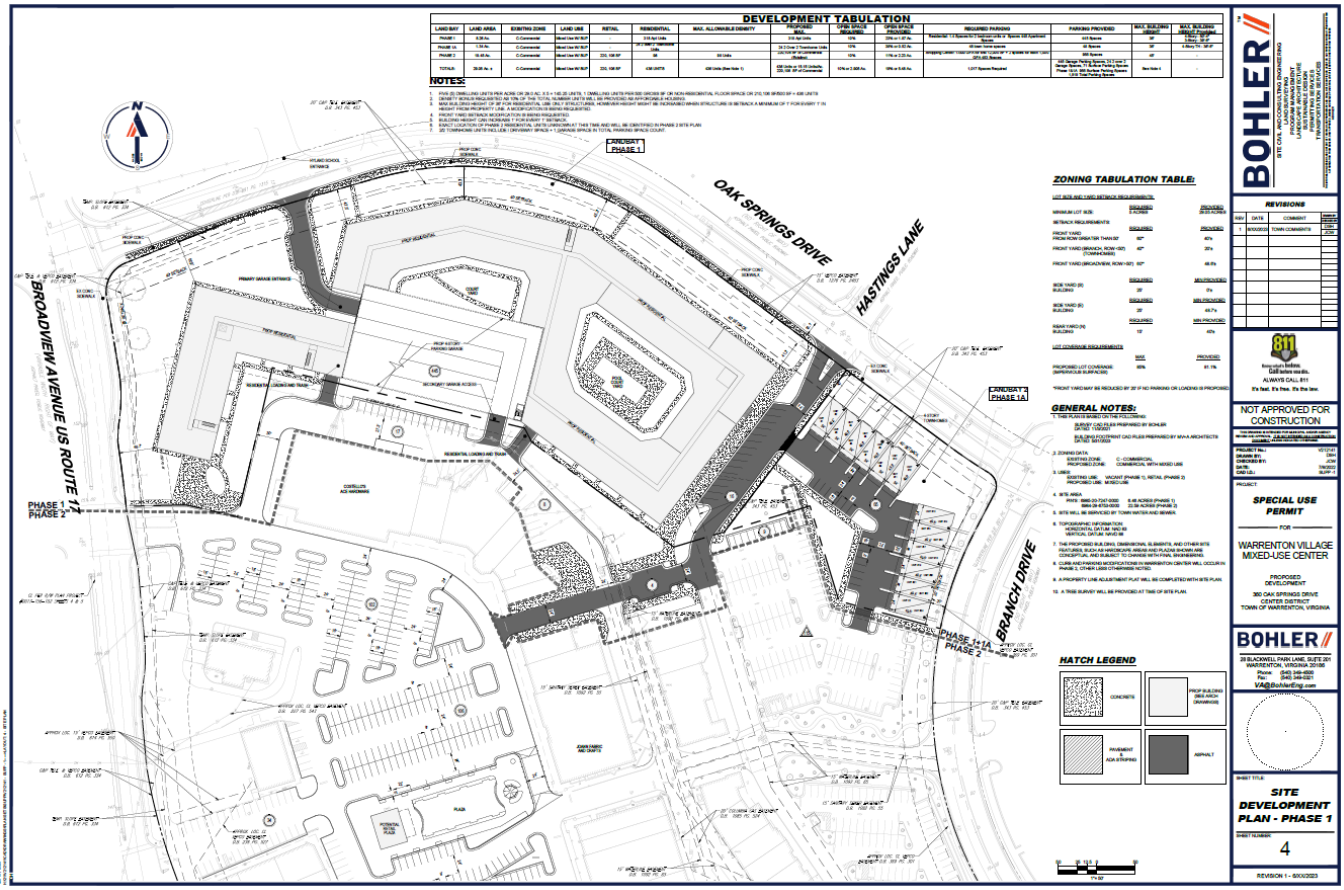


Figure 3: Illustrative Site Plan (Provided by Bohler)
Note: For conceptual purposes only.

B. Crash Data by Study Intersection

VDOT Crash Data Summary Table

Intersection Crash Analysis	Crash Data for the Intersection of Lee Highway (US 211/US 29 BUS) and Broadview Avenue (US 17 BUS) (May 2018 - April 2023)							
	2018	2019	2020	2021	2022	2023	Total	Relative Frequency
Crash Severity								
Fatal Collision (Type K)								0.00%
Injury Collision (Type A, B, and C)	2	6	1	1	2		12	30.00%
Type A	*1*						*1*	
Type B		*2*			*2*		*4*	
Type C	*1*	*4*	*1*	*1*			*7*	
Property Damage Only (Type PDO)	3	8	3	8	6		28	70.00%
TOTAL*	***5***	***14***	***4***	***9***	***8***		***40***	***100.00%***
Crash Type								
Fixed Object/ Single-Vehicle Crash								0.00%
Head-On								0.00%
Sideswipe / Same Direction		1			2		3	7.50%
Sideswipe / Opposite Direction								0.00%
Rear-End Collision	3	8	4	5	4		24	60.00%
Angle Collision	1	5		4	1		11	27.50%
Backed Into								0.00%
Pedestrian Collision								0.00%
Deer/Animal								0.00%
Other	1				1		2	5.00%
TOTAL*	***5***	***14***	***4***	***9***	***8***		***40***	***100.00%***
Other Factors								
Distracted Driver								0.00%
Alcohol**	1						1	2.50%
Work-Zone								0.00%
Inclement Weather (Non-Dry)		1			2		3	7.50%
Speeding	2						2	5.00%
Pedestrian Injury***								N/A
Time of Day								
AM Peak Period (6 - 10 AM)	*1*	*5*		*2*			*8*	*20.00%*
Off Peak - Daytime (10 AM - 3 PM)	*1*	*5*	*3*	*4*	*4*		*17*	*42.50%*
PM Peak Period (3 - 7 PM)	*2*	*3*	*1*	*3*	*2*		*11*	*27.50%*
Off Peak - Nighttime (7 PM - 6 AM)	*1*	*1*			*2*		*4*	*10.00%*
CALCULATED CRASH RATE*****							***0.75***	***Crashes per MEV***

* It should be noted that an intersection radius of 300 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

VDOT Crash Data Summary Table

Crash Data for the Intersection of Lee Highway (US 211/US 29 BUS) and Broadview Avenue (US 17 BUS) (May 2018 - April 2023)

Document Number	Date	Crash Severity	Collsion Type	Pedestrain Injury	Persons Injured	Fatalities	Work Zone Related	Adverse Weather Conditions	Distracted Driver
182555077	9/11/2018	A. Severe Injury	16. Other	0	1	0		no	no
181915232	7/5/2018	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
181845228	6/28/2018	PDO. Property Damage Only	2. Angle	0	0	0		no	no
182415104	8/20/2018	C. Nonvisible Injury	1. Rear End	0	1	0		no	no
182885118	10/13/2018	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
192075126	7/20/2019	B. Visible Injury	2. Angle	0	1	0		no	no
193445038	8/21/2019	PDO. Property Damage Only	2. Angle	0	0	0		no	no
191415326	5/15/2019	PDO. Property Damage Only	2. Angle	0	0	0		no	no
191685219	5/22/2019	PDO. Property Damage Only	2. Angle	0	0	0		no	no
190705057	3/5/2019	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
190935057	4/2/2019	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
192325410	8/20/2019	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
191895108	7/5/2019	C. Nonvisible Injury	1. Rear End	0	5	0		no	no
193445107	10/30/2019	C. Nonvisible Injury	1. Rear End	0	1	0		no	no
193445122	11/14/2019	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
193445083	10/13/2019	C. Nonvisible Injury	1. Rear End	0	1	0		no	no
193445100	10/22/2019	C. Nonvisible Injury	1. Rear End	0	3	0		yes	no
193445071	9/30/2019	PDO. Property Damage Only	4. Sideswipe - Same Direction	0	0	0		no	no
191295165	5/8/2019	B. Visible Injury	2. Angle	0	1	0		no	no
203495122	12/11/2020	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
202175264	7/29/2020	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
203175313	11/2/2020	C. Nonvisible Injury	1. Rear End	0	1	0		no	no
201635154	6/2/2020	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
212215197	7/25/2021	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
212285259	8/6/2021	PDO. Property Damage Only	2. Angle	0	0	0		no	no
211945123	7/6/2021	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
211535051	5/26/2021	PDO. Property Damage Only	1. Rear End	0	0	0		no	no

VDOT Crash Data Summary Table

Crash Data for the Intersection of Lee Highway (US 211/US 29 BUS) and Broadview Avenue (US 17 BUS) (May 2018 - April 2023)									
Document Number	**Date**	**Crash Severity**	**Collsion Type**	**Pedestrain Injury**	**Persons Injured**	**Fatalities**	**Work Zone Related**	**Adverse Weather Conditions**	**Distracted Driver**
212725106	9/20/2021	C. Nonvisible Injury	1. Rear End	0	1	0		no	no
213275307	11/17/2021	PDO. Property Damage Only	2. Angle	0	0	0		no	no
211805101	6/21/2021	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
213145192	11/6/2021	PDO. Property Damage Only	2. Angle	0	0	0		no	no
210905134	3/20/2021	PDO. Property Damage Only	2. Angle	0	0	0		no	no
220205117	1/12/2022	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
222345164	8/21/2022	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
220975211	3/18/2022	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
222795285	10/6/2022	B. Visible Injury	8. Non-Collision	0	1	0		no	no
222015106	7/14/2022	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
221295161	5/7/2022	B. Visible Injury	4. Sideswipe - Same Direction	0	1	0		yes	no
220135226	1/6/2022	PDO. Property Damage Only	2. Angle	0	0	0		no	no
222165194	7/8/2022	PDO. Property Damage Only	4. Sideswipe - Same Direction	0	0	0		yes	no

VDOT Crash Data Summary Table

Intersection Crash Analysis	Crash Data for the Intersection of Lee Highway (US 211/US 29 BUS) and Warrenton Village / Chick-fil-a Driveway (May 2018 - April 2023)							
	2018	2019	2020	2021	2022	2023	Total	Relative Frequency
Crash Severity								
Fatal Collision (Type K)								0.00%
Injury Collision (Type A, B, and C)		1			1		2	40.00%
Type A		*1*			*1*		*2*	
Type B								
Type C								
Property Damage Only (Type PDO)			1		2		3	60.00%
TOTAL*		***1***	***1***		***3***		***5***	***100.00%***
Crash Type								
Fixed Object/ Single-Vehicle Crash			1		1		2	40.00%
Head-On								0.00%
Sideswipe / Same Direction								0.00%
Sideswipe / Opposite Direction								0.00%
Rear-End Collision					1		1	20.00%
Angle Collision		1			1		2	40.00%
Backed Into								0.00%
Pedestrian Collision								0.00%
Deer/Animal								0.00%
Other								0.00%
TOTAL*		***1***	***1***		***3***		***5***	***100.00%***
Other Factors								
Distracted Driver								0.00%
Alcohol**					1		1	20.00%
Work-Zone								0.00%
Inclement Weather (Non-Dry)			1				1	20.00%
Speeding					1		1	20.00%
Pedestrian Injury***								N/A
Time of Day								
AM Peak Period (6 - 10 AM)								*0.00%*
Off Peak - Daytime (10 AM - 3 PM)					*1*		*1*	*20.00%*
PM Peak Period (3 - 7 PM)		*1*			*1*		*2*	*40.00%*
Off Peak - Nighttime (7 PM - 6 AM)			*1*		*1*		*2*	*40.00%*
CALCULATED CRASH RATE***							***0.13***	***Crashes per MEV***

* It should be noted that an intersection radius of 300 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

VDOT Crash Data Summary Table

Crash Data for the Intersection of Lee Highway (US 211/US 29 BUS) and Warrenton Village / Chick-fil-a Driveway (May 2018 - April 2023)									
Document Number	**Date**	**Crash Severity**	**Collsion Type**	**Pedestrain Injury**	**Persons Injured**	**Fatalities**	**Work Zone Related**	**Adverse Weather Conditions**	**Distracted Driver**
193445020	7/26/2019	A. Severe Injury	2. Angle	0	1	0		no	no
203025223	10/25/2020	PDO. Property Damage Only	9. Fixed Object - Off Road	0	0	0		yes	no
222785213	9/17/2022	A. Severe Injury	9. Fixed Object - Off Road	0	1	0		no	no
222135133	7/28/2022	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
223325320	11/1/2022	PDO. Property Damage Only	2. Angle	0	0	0		no	no

VDOT Crash Data Summary Table

Intersection Crash Analysis	Crash Data for the Intersection of Lee Highway (US 211/US 29 BUS) and Branch Drive (May 2018 - April 2023)							
	2018	2019	2020	2021	2022	2023	Total	Relative Frequency
Crash Severity								
Fatal Collision (Type K)								0.00%
Injury Collision (Type A, B, and C)	1		2	1	1		5	26.32%
Type A								
Type B								
Type C	*1*		*2*	*1*	*1*		*5*	
Property Damage Only (Type PDO)	2	1		3	8		14	73.68%
TOTAL*	***3***	***1***	***2***	***4***	***9***		***19***	***100.00%***
Crash Type								
Fixed Object/ Single-Vehicle Crash				1			1	5.26%
Head-On								0.00%
Sideswipe / Same Direction	1						1	5.26%
Sideswipe / Opposite Direction				1			1	5.26%
Rear-End Collision	2			1	3		6	31.58%
Angle Collision			2	1	5		8	42.11%
Backed Into		1					1	5.26%
Pedestrian Collision								0.00%
Deer/Animal								0.00%
Other					1		1	5.26%
TOTAL*	***3***	***1***	***2***	***4***	***9***		***19***	***100.00%***
Other Factors								
Distracted Driver								0.00%
Alcohol**								0.00%
Work-Zone								0.00%
Inclement Weather (Non-Dry)				2	1		3	15.79%
Speeding			1		1		2	10.53%
Pedestrian Injury***								N/A
Time of Day								
AM Peak Period (6 - 10 AM)	*1*			*1*	*1*		*3*	*15.79%*
Off Peak - Daytime (10 AM - 3 PM)			*2*	*2*	*2*		*6*	*31.58%*
PM Peak Period (3 - 7 PM)	*2*	*1*		*1*	*6*		*10*	*52.63%*
Off Peak - Nighttime (7 PM - 6 AM)								*0.00%*
CALCULATED CRASH RATE***							***0.45***	***Crashes per MEV***

* It should be noted that an intersection radius of 300 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

VDOT Crash Data Summary Table

Crash Data for the Intersection of Lee Highway (US 211/US 29 BUS) and Branch Drive (May 2018 - April 2023)									
Document Number	**Date**	**Crash Severity**	**Collsion Type**	**Pedestrain Injury**	**Persons Injured**	**Fatalities**	**Work Zone Related**	**Adverse Weather Conditions**	**Distracted Driver**
190035248	12/24/2018	PDO. Property Damage Only	4. Sideswipe - Same Direction	0	0	0		no	no
182955427	10/20/2018	C. Nonvisible Injury	1. Rear End	0	2	0		no	no
183655065	12/17/2018	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
193445084	10/13/2019	PDO. Property Damage Only	15. Backed Into	0	0	0		no	no
201995197	7/12/2020	C. Nonvisible Injury	2. Angle	0	1	0		no	no
201275157	4/1/2020	C. Nonvisible Injury	2. Angle	0	1	0		no	no
211335075	5/10/2021	PDO. Property Damage Only	2. Angle	0	0	0		no	no
212925308	10/10/2021	PDO. Property Damage Only	9. Fixed Object - Off Road	0	0	0		yes	no
212705186	9/20/2021	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
211935132	6/22/2021	C. Nonvisible Injury	5. Sideswipe - Opposite Direction	0	2	0		yes	no
222805102	10/6/2022	PDO. Property Damage Only	2. Angle	0	0	0		no	no
220825133	3/21/2022	PDO. Property Damage Only	2. Angle	0	0	0		no	no
221965176	7/9/2022	PDO. Property Damage Only	2. Angle	0	0	0		yes	no
221965175	6/29/2022	PDO. Property Damage Only	2. Angle	0	0	0		no	no
221735151	6/2/2022	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
222205137	8/6/2022	PDO. Property Damage Only	2. Angle	0	0	0		no	no
222695228	9/24/2022	C. Nonvisible Injury	1. Rear End	0	1	0		no	no
220385210	2/6/2022	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
222975113	10/23/2022	PDO. Property Damage Only	16. Other	0	0	0		no	no

VDOT Crash Data Summary Table

Intersection Crash Analysis	Crash Data for the Intersection of Branch Drive and Warrenton Village / Safeway (May 2018 - April 2023)							
	2018	2019	2020	2021	2022	2023	Total	Relative Frequency
Crash Severity								
Fatal Collision (Type K)								0.00%
Injury Collision (Type A, B, and C)					1		1	50.00%
Type A								
Type B								
Type C					*1*		*1*	
Property Damage Only (Type PDO)				1			1	50.00%
TOTAL*				***1***	***1***		***2***	***100.00%***
Crash Type								
Fixed Object/ Single-Vehicle Crash								0.00%
Head-On								0.00%
Sideswipe / Same Direction								0.00%
Sideswipe / Opposite Direction								0.00%
Rear-End Collision								0.00%
Angle Collision				1	1		2	100.00%
Backed Into								0.00%
Pedestrian Collision								0.00%
Deer/Animal								0.00%
Other								0.00%
TOTAL*				***1***	***1***		***2***	***100.00%***
Other Factors								
Distracted Driver								0.00%
Alcohol**				1			1	50.00%
Work-Zone								0.00%
Inclement Weather (Non-Dry)					1		1	50.00%
Speeding								0.00%
Pedestrian Injury***								N/A
Time of Day								
AM Peak Period (6 - 10 AM)					*1*		*1*	*50.00%*
Off Peak - Daytime (10 AM - 3 PM)								*0.00%*
PM Peak Period (3 - 7 PM)				*1*			*1*	*50.00%*
Off Peak - Nighttime (7 PM - 6 AM)								*0.00%*
CALCULATED CRASH RATE*							***0.24***	***Crashes per MEV***

* It should be noted that an intersection radius of 300 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

VDOT Crash Data Summary Table

Crash Data for the Intersection of Branch Drive and Warrenton Village / Safeway (May 2018 - April 2023)									
Document Number	**Date**	**Crash Severity**	**Collsion Type**	**Pedestrain Injury**	**Persons Injured**	**Fatalities**	**Work Zone Related**	**Adverse Weather Conditions**	**Distracted Driver**
213055189	10/15/2021	PDO: Property Damage Only	2. Angle	0	0	0		no	no
223255325	11/11/2022	C. Nonvisible Injury	2. Angle	0	1	0		yes	no

VDOT Crash Data Summary Table

Intersection Crash Analysis	Crash Data for the Intersection of Branch Drive and Oak Springs Drive (May 2018 - April 2023)							
	2018	2019	2020	2021	2022	2023	Total	Relative Frequency
Crash Severity								
Fatal Collision (Type K)								0.00%
Injury Collision (Type A, B, and C)								0.00%
Type A								
Type B								
Type C								
Property Damage Only (Type PDO)			1		1		2	100.00%
TOTAL*			***1***		***1***		***2***	***100.00%***
Crash Type								
Fixed Object/ Single-Vehicle Crash								0.00%
Head-On								0.00%
Sideswipe / Same Direction								0.00%
Sideswipe / Opposite Direction								0.00%
Rear-End Collision								0.00%
Angle Collision			1		1		2	100.00%
Backed Into								0.00%
Pedestrian Collision								0.00%
Deer/Animal								0.00%
Other								0.00%
TOTAL*			***1***		***1***		***2***	***100.00%***
Other Factors								
Distracted Driver								0.00%
Alcohol**								0.00%
Work-Zone								0.00%
Inclement Weather (Non-Dry)								0.00%
Speeding								0.00%
Pedestrian Injury***								N/A
Time of Day								
AM Peak Period (6 - 10 AM)								*0.00%*
Off Peak - Daytime (10 AM - 3 PM)					*1*		*1*	*50.00%*
PM Peak Period (3 - 7 PM)			*1*				*1*	*50.00%*
Off Peak - Nighttime (7 PM - 6 AM)								*0.00%*
CALCULATED CRASH RATE***							***0.27***	***Crashes per MEV***

* It should be noted that an intersection radius of 300 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

VDOT Crash Data Summary Table

Crash Data for the Intersection of Branch Drive and Oak Springs Drive (May 2018 - April 2023)

Document Number	Date	Crash Severity	Collsion Type	Pedestrain Injury	Persons Injured	Fatalities	Work Zone Related	Adverse Weather Conditions	Distracted Driver
202745301	9/18/2020	PDO: Property Damage Only	2. Angle	0	0	0		no	no
220335106	1/31/2022	PDO: Property Damage Only	2. Angle	0	0	0		no	no

VDOT Crash Data Summary Table

Intersection Crash Analysis	Crash Data for the Intersection of Broadview Avenue and Oak Springs Drive (May 2018 - April 2023)							
	2018	2019	2020	2021	2022	2023	Total	Relative Frequency
Crash Severity								
Fatal Collision (Type K)								0.00%
Injury Collision (Type A, B, and C)	1						1	33.33%
Type A	*1*						*1*	
Type B								
Type C								
Property Damage Only (Type PDO)			2				2	66.67%
TOTAL*	***1***		***2***				***3***	***100.00%***
Crash Type								
Fixed Object/ Single-Vehicle Crash								0.00%
Head-On								0.00%
Sideswipe / Same Direction								0.00%
Sideswipe / Opposite Direction								0.00%
Rear-End Collision								0.00%
Angle Collision	1		2				3	100.00%
Backed Into								0.00%
Pedestrian Collision								0.00%
Deer/Animal								0.00%
Other								0.00%
TOTAL*	***1***		***2***				***3***	***100.00%***
Other Factors								
Distracted Driver								0.00%
Alcohol**								0.00%
Work-Zone								0.00%
Inclement Weather (Non-Dry)								0.00%
Speeding								0.00%
Pedestrian Injury***								N/A
Time of Day								
AM Peak Period (6 - 10 AM)								*0.00%*
Off Peak - Daytime (10 AM - 3 PM)			*1*				*1*	*33.33%*
PM Peak Period (3 - 7 PM)	*1*		*1*				*2*	*66.67%*
Off Peak - Nighttime (7 PM - 6 AM)								*0.00%*
CALCULATED CRASH RATE***							***0.14***	***Crashes per MEV***

* It should be noted that an intersection radius of 300 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

VDOT Crash Data Summary Table

Crash Data for the Intersection of Broadview Avenue and Oak Springs Drive (May 2018 - April 2023)									
Document Number	**Date**	**Crash Severity**	**Collsion Type**	**Pedestrain Injury**	**Persons Injured**	**Fatalities**	**Work Zone Related**	**Adverse Weather Conditions**	**Distracted Driver**
182435282	8/23/2018	A. Severe Injury	2. Angle	0	1	0		no	no
202585163	2/22/2020	PDO. Property Damage Only	2. Angle	0	0	0		no	no
202115210	7/15/2020	PDO. Property Damage Only	2. Angle	0	0	0		no	no

VDOT Crash Data Summary Table

Intersection Crash Analysis	Crash Data for the Intersection of Broadview Avenue and Warrenton Village North (May 2018 - April 2023)							
	2018	2019	2020	2021	2022	2023	Total	Relative Frequency
Crash Severity								
Fatal Collision (Type K)								0.00%
Injury Collision (Type A, B, and C)			1		1		2	50.00%
Type A								
Type B			*1*				*1*	
Type C					*1*		*1*	
Property Damage Only (Type PDO)		1		1			2	50.00%
TOTAL*		***1***	***1***	***1***	***1***		***4***	***100.00%***
Crash Type								
Fixed Object/ Single-Vehicle Crash								0.00%
Head-On								0.00%
Sideswipe / Same Direction								0.00%
Sideswipe / Opposite Direction								0.00%
Rear-End Collision								0.00%
Angle Collision			1	1	1		3	75.00%
Backed Into								0.00%
Pedestrian Collision								0.00%
Deer/Animal		1					1	25.00%
Other								0.00%
TOTAL*		***1***	***1***	***1***	***1***		***4***	***100.00%***
Other Factors								
Distracted Driver								0.00%
Alcohol**					1		1	25.00%
Work-Zone								0.00%
Inclement Weather (Non-Dry)					1		1	25.00%
Speeding								0.00%
Pedestrian Injury***								N/A
Time of Day								
AM Peak Period (6 - 10 AM)		*1*					*1*	*25.00%*
Off Peak - Daytime (10 AM - 3 PM)								*0.00%*
PM Peak Period (3 - 7 PM)			*1*	*1*	*1*		*3*	*75.00%*
Off Peak - Nighttime (7 PM - 6 AM)								*0.00%*
CALCULATED CRASH RATE***							***0.21***	***Crashes per MEV***

* It should be noted that an intersection radius of 300 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

VDOT Crash Data Summary Table

Crash Data for the Intersection of Broadview Avenue and Warrenton Village North (May 2018 - April 2023)									
Document Number	**Date**	**Crash Severity**	**Collsion Type**	**Pedestrain Injury**	**Persons Injured**	**Fatalities**	**Work Zone Related**	**Adverse Weather Conditions**	**Distracted Driver**
192545226	9/11/2019	PDO. Property Damage Only	10. Deer	0	0	0		no	no
202765309	9/20/2020	B. Visible Injury	2. Angle	0	1	0		no	no
211665121	5/27/2021	PDO. Property Damage Only	2. Angle	0	0	0		no	no
223465170	12/6/2022	C. Nonvisible Injury	2. Angle	0	1	0		yes	no

VDOT Crash Data Summary Table

Intersection Crash Analysis	Crash Data for the Intersection of Broadview Avenue and Warrenton Village South (May 2018 - April 2023)							
	2018	2019	2020	2021	2022	2023	Total	Relative Frequency
Crash Severity								
Fatal Collision (Type K)								0.00%
Injury Collision (Type A, B, and C)	2			2	3		7	53.85%
Type A								
Type B								
Type C	*2*			*2*	*3*		*7*	
Property Damage Only (Type PDO)	1		2	2	1		6	46.15%
TOTAL*	***3***		***2***	***4***	***4***		***13***	***100.00%***
Crash Type								
Fixed Object/ Single-Vehicle Crash								0.00%
Head-On	1				2		3	23.08%
Sideswipe / Same Direction				1			1	7.69%
Sideswipe / Opposite Direction								0.00%
Rear-End Collision			1				1	7.69%
Angle Collision	1		1	3	2		7	53.85%
Backed Into								0.00%
Pedestrian Collision								0.00%
Deer/Animal								0.00%
Other	1						1	7.69%
TOTAL*	***3***		***2***	***4***	***4***		***13***	***100.00%***
Other Factors								
Distracted Driver								0.00%
Alcohol**	1						1	7.69%
Work-Zone								0.00%
Inclement Weather (Non-Dry)								0.00%
Speeding			1				1	7.69%
Pedestrian Injury***								N/A
Time of Day								
AM Peak Period (6 - 10 AM)					*1*		*1*	*7.69%*
Off Peak - Daytime (10 AM - 3 PM)	*1*		*2*	*2*	*2*		*7*	*53.85%*
PM Peak Period (3 - 7 PM)	*1*			*2*	*1*		*4*	*30.77%*
Off Peak - Nighttime (7 PM - 6 AM)	*1*						*1*	*7.69%*
CALCULATED CRASH RATE***							***0.54***	***Crashes per MEV***

* It should be noted that an intersection radius of 300 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

VDOT Crash Data Summary Table

Crash Data for the Intersection of Broadview Avenue and Warrenton Village South (May 2018 - April 2023)									
Document Number	**Date**	**Crash Severity**	**Collsion Type**	**Pedestrain Injury**	**Persons Injured**	**Fatalities**	**Work Zone Related**	**Adverse Weather Conditions**	**Distracted Driver**
182505243	9/5/2018	C. Nonvisible Injury	6. Fixed Object in Road	0	1	0		no	no
182835057	10/4/2018	C. Nonvisible Injury	2. Angle	0	1	0		no	no
182135102	7/31/2018	PDO. Property Damage Only	3. Head On	0	0	0		no	no
201265208	2/25/2020	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
201265233	3/12/2020	PDO. Property Damage Only	2. Angle	0	0	0		no	no
213625118	12/15/2021	C. Nonvisible Injury	2. Angle	0	2	0		no	no
213145191	11/3/2021	PDO. Property Damage Only	2. Angle	0	0	0		no	no
210135154	1/6/2021	C. Nonvisible Injury	2. Angle	0	1	0		no	no
212425152	8/23/2021	PDO. Property Damage Only	4. Sideswipe - Same Direction	0	0	0		no	no
221235227	4/29/2022	C. Nonvisible Injury	3. Head On	0	1	0		no	no
221045273	3/28/2022	PDO. Property Damage Only	3. Head On	0	0	0		no	no
220945207	3/29/2022	C. Nonvisible Injury	2. Angle	0	1	0		no	no
223325319	11/23/2022	C. Nonvisible Injury	2. Angle	0	1	0		no	no

C. Turning Movement Counts Data

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/Winchester St & US 17/US 211/Broadview Ave
City: Warrenton
Control: Signalized

Project ID: 23-260020-001
Date: 2/9/2023

Data - Total

NS/EW Streets:	US 17/Winchester St				US 17/Winchester St				US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	1	0	1.5	0.5	1	0	2	1.5	0.5	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	5	5	2	0	28	3	15	0	18	155	2	1	2	48	21	1	306
6:15 AM	7	0	6	0	15	2	19	0	21	167	1	1	0	78	32	1	350
6:30 AM	7	9	8	0	18	1	31	0	18	179	2	0	0	90	27	0	390
6:45 AM	12	11	8	0	27	5	45	0	23	163	0	3	6	122	32	0	457
7:00 AM	13	13	10	0	27	3	97	0	46	171	1	1	7	134	41	0	564
7:15 AM	20	8	11	0	31	8	89	0	58	208	5	2	6	119	31	1	597
7:30 AM	15	25	14	0	28	9	34	0	83	220	13	1	6	154	49	0	651
7:45 AM	27	42	32	0	34	40	61	0	73	169	5	2	5	162	64	1	717
8:00 AM	14	19	12	0	22	26	61	0	57	204	7	2	9	140	29	1	603
8:15 AM	17	17	12	0	26	18	59	0	44	165	6	0	11	159	29	1	564
8:30 AM	24	11	21	0	29	13	61	0	52	159	13	2	11	125	28	3	552
8:45 AM	16	17	8	0	45	26	54	0	53	170	16	4	4	141	24	3	581
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	177	177	144	0	330	154	626	0	546	2130	71	19	67	1472	407	12	6332
APPROACH %'s :	35.54%	35.54%	28.92%	0.00%	29.73%	13.87%	56.40%	0.00%	19.74%	77.01%	2.57%	0.69%	3.42%	75.18%	20.79%	0.61%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	76	94	69	0	115	83	245	0	271	801	30	7	26	575	173	3	2568
PEAK HR FACTOR :	0.704	0.560	0.539	0.000	0.846	0.519	0.688	0.000	0.816	0.910	0.577	0.875	0.722	0.887	0.676	0.750	0.895
	0.592				0.820				0.875				0.837				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	1	0	1.5	0.5	1	0	2	1.5	0.5	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	29	18	21	0	72	18	94	1	51	194	14	0	7	309	23	1	852
4:15 PM	32	27	15	0	46	23	86	1	69	167	9	1	19	240	40	1	776
4:30 PM	24	28	16	0	50	23	103	0	71	223	9	1	17	261	24	4	854
4:45 PM	29	22	15	0	44	19	94	0	67	210	8	0	13	264	19	4	808
5:00 PM	12	35	13	0	47	14	63	0	68	170	13	2	14	265	23	4	743
5:15 PM	18	34	18	0	46	18	75	0	60	180	11	1	13	284	28	1	787
5:30 PM	22	29	15	0	28	19	69	0	44	183	7	4	12	218	40	1	691
5:45 PM	16	27	16	0	37	23	74	0	47	176	8	1	8	252	25	6	716
6:00 PM	32	23	15	0	42	14	44	0	54	135	12	1	19	222	23	3	639
6:15 PM	14	12	17	0	42	19	45	0	47	144	6	1	17	236	34	4	638
6:30 PM	19	16	20	0	26	13	42	0	49	137	8	0	16	185	22	4	557
6:45 PM	14	17	20	0	25	10	35	0	43	107	9	1	13	194	24	4	516
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	261	288	201	0	505	213	824	2	670	2026	114	13	168	2930	325	37	8577
APPROACH %'s :	34.80%	38.40%	26.80%	0.00%	32.71%	13.80%	53.37%	0.13%	23.73%	71.77%	4.04%	0.46%	4.86%	84.68%	9.39%	1.07%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	114	95	67	0	212	83	377	2	258	794	40	2	56	1074	106	10	3290
PEAK HR FACTOR :	0.891	0.848	0.798	0.000	0.736	0.902	0.915	0.500	0.908	0.890	0.714	0.500	0.737	0.869	0.663	0.625	0.963
	0.932				0.911				0.900				0.916				

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/Winchester St & US 17/US 211/Broadview Ave
City: Warrenton
Control: Signalized

Project ID: 23-260020-001
Date: 2/9/2023

Data - Cars

NS/EW Streets:	US 17/Winchester St				US 17/Winchester St				US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	1	0	1.5	0.5	1	0	2	1.5	0.5	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	5	5	2	0	27	3	14	0	16	149	2	1	2	48	21	1	296
6:15 AM	7	0	6	0	15	2	19	0	18	163	1	1	0	74	31	1	338
6:30 AM	7	9	8	0	17	1	29	0	15	171	1	0	0	87	27	0	372
6:45 AM	12	11	8	0	27	5	43	0	22	160	0	3	5	112	31	0	439
7:00 AM	12	13	10	0	26	3	92	0	39	165	1	1	7	127	40	0	536
7:15 AM	19	7	11	0	28	8	83	0	55	196	5	2	6	112	30	1	563
7:30 AM	14	25	13	0	25	9	30	0	81	213	13	1	6	146	48	0	624
7:45 AM	25	42	31	0	33	40	61	0	70	159	5	2	5	155	63	1	692
8:00 AM	12	18	12	0	22	25	61	0	54	199	6	2	9	131	27	1	579
8:15 AM	16	16	11	0	24	17	57	0	39	157	6	0	11	136	26	1	517
8:30 AM	23	9	21	0	27	13	49	0	51	155	12	2	11	108	25	3	509
8:45 AM	14	17	7	0	43	26	50	0	52	166	16	4	3	125	22	3	548
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	166	172	140	0	314	152	588	0	512	2053	68	19	65	1361	391	12	6013
APPROACH %'s :	34.73%	35.98%	29.29%	0.00%	29.79%	14.42%	55.79%	0.00%	19.31%	77.41%	2.56%	0.72%	3.55%	74.41%	21.38%	0.66%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	70	92	67	0	108	82	235	0	260	767	29	7	26	544	168	3	2458
PEAK HR FACTOR :	0.700	0.548	0.540	0.000	0.818	0.513	0.708	0.000	0.802	0.900	0.558	0.875	0.722	0.877	0.667	0.750	0.888
	0.584				0.793				0.863				0.827				

NS/EW Streets:	US 17/Winchester St				US 17/Winchester St				US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	1	0	1.5	0.5	1	0	2	1.5	0.5	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	29	18	21	0	72	18	90	1	50	190	14	0	7	303	23	1	837
4:15 PM	32	27	15	0	45	23	79	1	67	164	9	1	19	235	40	1	758
4:30 PM	24	27	16	0	49	23	101	0	69	220	9	1	17	251	24	4	835
4:45 PM	29	22	15	0	44	19	91	0	64	205	8	0	13	260	17	4	791
5:00 PM	12	35	13	0	47	14	61	0	67	168	13	2	13	261	23	4	733
5:15 PM	18	34	17	0	46	18	74	0	59	177	11	1	13	278	28	1	775
5:30 PM	22	29	15	0	28	18	67	0	44	181	7	4	12	214	40	1	682
5:45 PM	16	27	16	0	37	23	72	0	45	172	8	1	7	250	24	6	704
6:00 PM	31	23	15	0	42	14	44	0	53	132	12	1	19	220	23	3	632
6:15 PM	14	12	17	0	42	19	44	0	46	141	6	1	17	235	33	4	631
6:30 PM	19	16	19	0	26	13	42	0	48	137	8	0	16	179	22	4	549
6:45 PM	14	17	20	0	25	10	35	0	42	104	9	1	13	191	23	4	508
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	260	287	199	0	503	212	800	2	654	1991	114	13	166	2877	320	37	8435
APPROACH %'s :	34.85%	38.47%	26.68%	0.00%	33.16%	13.97%	52.74%	0.13%	23.59%	71.83%	4.11%	0.47%	4.88%	84.62%	9.41%	1.09%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	114	94	67	0	210	83	361	2	250	779	40	2	56	1049	104	10	3221
PEAK HR FACTOR :	0.891	0.870	0.798	0.000	0.729	0.902	0.894	0.500	0.906	0.885	0.714	0.500	0.737	0.866	0.650	0.625	0.962
	0.929				0.906				0.895				0.912				

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/Winchester St & US 17/US 211/Broadview Ave
City: Warrenton
Control: Signalized

Project ID: 23-260020-001
Date: 2/9/2023

Data - HT

NS/EW Streets:	US 17/Winchester St				US 17/Winchester St				US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	1	0	1.5	0.5	1	0	2	1.5	0.5	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	1	0	1	0	2	6	0	0	0	0	0	0	10
6:15 AM	0	0	0	0	0	0	0	0	3	4	0	0	0	4	1	0	12
6:30 AM	0	0	0	0	1	0	2	0	3	8	1	0	0	3	0	0	18
6:45 AM	0	0	0	0	0	0	2	0	1	3	0	0	1	10	1	0	18
7:00 AM	1	0	0	0	1	0	5	0	7	6	0	0	0	7	1	0	28
7:15 AM	1	1	0	0	3	0	6	0	3	12	0	0	0	7	1	0	34
7:30 AM	1	0	1	0	3	0	4	0	2	7	0	0	0	8	1	0	27
7:45 AM	2	0	1	0	1	0	0	0	3	10	0	0	0	7	1	0	25
8:00 AM	2	1	0	0	0	1	0	0	3	5	1	0	0	9	2	0	24
8:15 AM	1	1	1	0	2	1	2	0	5	8	0	0	0	23	3	0	47
8:30 AM	1	2	0	0	2	0	12	0	1	4	1	0	0	17	3	0	43
8:45 AM	2	0	1	0	2	0	4	0	1	4	0	0	1	16	2	0	33
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	11	5	4	0	16	2	38	0	34	77	3	0	2	111	16	0	319
APPROACH %'s :	55.00%	25.00%	20.00%	0.00%	28.57%	3.57%	67.86%	0.00%	29.82%	67.54%	2.63%	0.00%	1.55%	86.05%	12.40%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	6	2	2	0	7	1	10	0	11	34	1	0	0	31	5	0	110
PEAK HR FACTOR :	0.750	0.500	0.500	0.000	0.583	0.250	0.417	0.000	0.917	0.708	0.250	0.000	0.000	0.861	0.625	0.000	0.809
	0.833				0.500				0.767				0.818				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	1	0	1.5	0.5	1	0	2	1.5	0.5	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	4	0	1	4	0	0	0	6	0	0	15
4:15 PM	0	0	0	0	1	0	7	0	2	3	0	0	0	5	0	0	18
4:30 PM	0	1	0	0	1	0	2	0	2	3	0	0	0	10	0	0	19
4:45 PM	0	0	0	0	0	0	3	0	3	5	0	0	0	4	2	0	17
5:00 PM	0	0	0	0	0	0	2	0	1	2	0	0	1	4	0	0	10
5:15 PM	0	0	1	0	0	0	1	0	1	3	0	0	0	6	0	0	12
5:30 PM	0	0	0	0	0	1	2	0	0	2	0	0	0	4	0	0	9
5:45 PM	0	0	0	0	0	0	2	0	2	4	0	0	1	2	1	0	12
6:00 PM	1	0	0	0	0	0	0	0	1	3	0	0	0	2	0	0	7
6:15 PM	0	0	0	0	0	0	1	0	1	3	0	0	0	1	1	0	7
6:30 PM	0	0	1	0	0	0	0	0	1	0	0	0	0	6	0	0	8
6:45 PM	0	0	0	0	0	0	0	0	1	3	0	0	0	3	1	0	8
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	1	1	2	0	2	1	24	0	16	35	0	0	2	53	5	0	142
APPROACH %'s :	25.00%	25.00%	50.00%	0.00%	7.41%	3.70%	88.89%	0.00%	31.37%	68.63%	0.00%	0.00%	3.33%	88.33%	8.33%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	1	0	0	2	0	16	0	8	15	0	0	0	25	2	0	69
PEAK HR FACTOR :	0.000	0.250	0.000	0.000	0.500	0.000	0.571	0.000	0.667	0.750	0.000	0.000	0.000	0.625	0.250	0.000	0.908
	0.250				0.563				0.719				0.675				

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/Winchester St & US 17/US 211/Broadview Ave
City: Warrenton
Control: Signalized

Project ID: 23-260020-001
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	US 17/Winchester St				US 17/Winchester St				US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	1	0	1.5	0.5	1	0	2	1.5	0.5	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	1	0	1.5	0.5	1	0	2	1.5	0.5	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%					
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/Winchester St & US 17/US 211/Broadview Ave **Project ID:** 23-260020-001
City: Warrenton **Date:** 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	US 17/Winchester St		US 17/Winchester St		US 17/US 211/Broadview Ave		US 17/US 211/Broadview Ave		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	1	2	3
8:30 AM	1	0	0	0	0	0	0	0	1
8:45 AM	0	1	0	0	0	0	0	0	1
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	1	1	0	0	0	0	1	2	5
APPROACH %'s :	50.00%	50.00%					33.33%	66.67%	
PEAK HR :	07:15 AM - 08:15 AM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	1	1	2	0	0	4
4:15 PM	1	1	0	0	1	2	0	0	5
4:30 PM	1	0	0	0	0	0	0	0	1
4:45 PM	2	0	0	2	0	0	2	0	6
5:00 PM	0	0	0	0	0	4	0	0	4
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	2	0	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	2	0	0	0	3	0	0	0	5
6:15 PM	1	0	0	0	0	0	0	0	1
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	1	1	0	0	0	0	2
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	7	1	1	4	7	8	2	0	30
APPROACH %'s :	87.50%	12.50%	20.00%	80.00%	46.67%	53.33%	100.00%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM								TOTAL
PEAK HR VOL :	4	1	0	3	2	4	2	0	16
PEAK HR FACTOR :	0.500	0.250		0.375	0.500	0.500	0.250		0.667
	0.625		0.375		0.500		0.250		

Prepared by National Data & Surveying Services

US 17/Winchester St & US 17/US 211/Broadview Ave

Peak Hour Turning Movement Count

ID: 23-260020-001
City: Warrenton

Day: Thursday
Date: 2/9/2023

PEAK HOURS	COUNT PERIODS
07:15 AM - 08:15 AM	6:00 AM - 09:00 AM
NONE	NONE
04:00 PM - 05:00 PM	4:00 PM - 07:00 PM

SOUTHBOUND (US 17/Winchester St)

AM	245	83	115	0	538	AM
NOON	0	0	0	0	0	NOON
PM	377	83	212	2	461	PM
	1	0.5	1.5	0		

EASTBOUND (US 17/US 211/Broadview Ave)

AM	NOON	PM	
903	0	1567	
7	0	2	0
271	0	258	2
801	0	794	1.5
30	0	40	0.5

WESTBOUND (US 17/US 211/Broadview Ave)

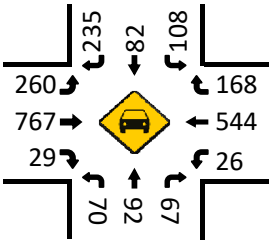
PM	NOON	AM	
106	0	173	1
1074	0	575	2
56	0	26	1
10	0	3	0
1083	0	988	

NORTHBOUND (US 17/Winchester St)

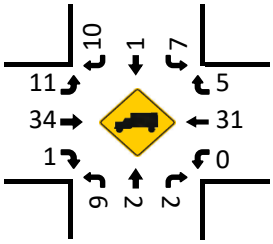
PM	179	0	114	95	67	PM
NOON	0	0	0	0	0	NOON
AM	139	0	76	94	69	AM
	0	1	1	1		

CONTROL			
Signalized			
TEV	2568 AM	0 NOON	3290 PM
PHF	0.90		0.96

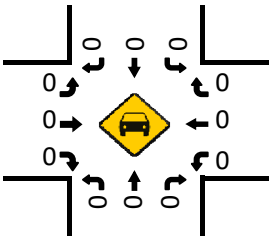
Cars (AM)



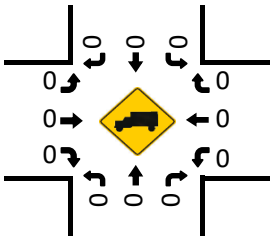
HT (AM)



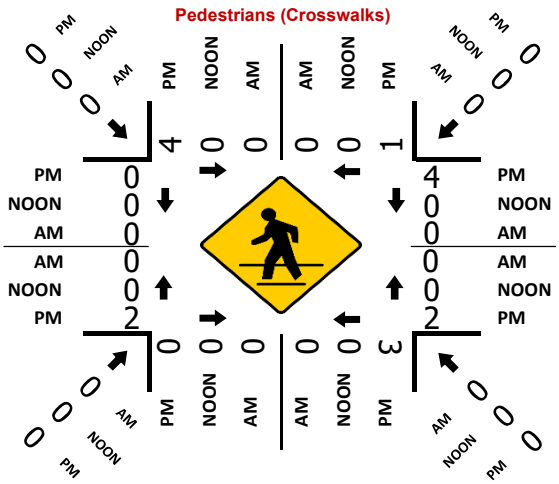
Cars (NOON)



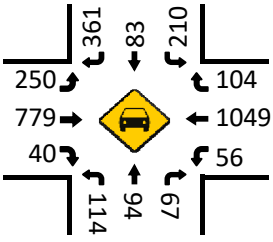
HT (NOON)



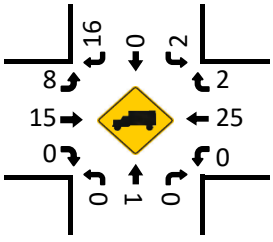
Pedestrians (Crosswalks)



Cars (PM)



HT (PM)



National Data & Surveying Services Intersection Turning Movement Count

Location: Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy & US 17/US 211/Broadview Ave
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-002
Date: 2/9/2023

Data - Total

NS/EW Streets:	Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy				Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy				US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	3	0	0	0	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	183	0	0	0	67	2	0	252
6:15 AM	0	0	0	0	0	0	0	0	0	192	0	0	0	115	0	0	307
6:30 AM	0	0	0	0	0	0	0	0	0	203	0	0	0	113	2	0	318
6:45 AM	0	0	0	0	0	0	2	0	0	196	0	0	0	157	1	0	356
7:00 AM	0	0	0	0	0	0	1	0	0	212	0	0	0	185	4	0	402
7:15 AM	0	0	0	0	0	0	3	0	0	244	0	0	0	164	3	0	414
7:30 AM	0	0	0	0	0	0	3	0	0	269	0	0	0	196	9	0	477
7:45 AM	0	0	0	0	0	0	8	0	0	236	0	0	0	234	9	0	487
8:00 AM	0	0	0	0	0	0	3	0	0	236	0	0	0	168	6	0	413
8:15 AM	0	0	0	0	0	0	6	0	0	207	0	0	0	196	7	0	416
8:30 AM	0	0	0	0	0	0	6	0	0	208	0	0	0	159	10	0	383
8:45 AM	0	0	0	0	0	0	7	0	0	230	0	0	0	168	23	0	428
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	39	0	0	2616	0	0	0	1922	76	0	4653
APPROACH %'s :					0.00%	0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	96.20%	3.80%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	20	0	0	948	0	0	0	794	31	0	1793
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.625	0.000	0.000	0.881	0.000	0.000	0.000	0.848	0.861	0.000	0.920
					0.625				0.881				0.849				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	3	0	0	0	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	17	0	0	291	0	0	0	320	25	0	653
4:15 PM	0	0	0	0	0	0	19	0	0	227	0	0	0	284	25	0	555
4:30 PM	0	0	0	0	0	0	17	0	0	295	0	0	0	286	18	0	616
4:45 PM	0	0	0	0	0	0	26	0	0	271	0	0	0	274	34	0	605
5:00 PM	0	0	0	0	0	0	20	0	0	236	0	0	0	295	35	0	586
5:15 PM	0	0	0	0	0	0	26	0	0	245	0	0	0	302	24	0	597
5:30 PM	0	0	0	0	0	0	16	0	0	223	0	0	0	244	16	0	499
5:45 PM	0	0	0	0	0	0	20	0	0	239	0	0	0	277	38	0	574
6:00 PM	0	0	0	0	0	0	29	0	0	190	0	0	0	250	38	0	507
6:15 PM	0	0	0	0	0	0	25	0	0	212	0	0	0	248	42	0	527
6:30 PM	0	0	0	0	0	0	24	0	0	185	0	0	0	203	22	0	434
6:45 PM	0	0	0	0	0	0	21	0	0	158	0	0	0	219	22	0	420
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	260	0	0	2772	0	0	0	3202	339	0	6573
APPROACH %'s :					0.00%	0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	90.43%	9.57%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	79	0	0	1084	0	0	0	1164	102	0	2429
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.760	0.000	0.000	0.919	0.000	0.000	0.000	0.909	0.750	0.000	0.930
					0.760				0.919				0.917				

National Data & Surveying Services Intersection Turning Movement Count

Location: Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy & US 17/US 211/Broadview Ave
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-002
Date: 2/9/2023

Data - Cars

NS/EW Streets:	Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy				Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy				US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	3	0	0	0	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	176	0	0	0	67	2	0	245
6:15 AM	0	0	0	0	0	0	0	0	0	188	0	0	0	110	0	0	298
6:30 AM	0	0	0	0	0	0	0	0	0	194	0	0	0	110	2	0	306
6:45 AM	0	0	0	0	0	0	2	0	0	193	0	0	0	144	1	0	340
7:00 AM	0	0	0	0	0	0	1	0	0	205	0	0	0	178	4	0	388
7:15 AM	0	0	0	0	0	0	2	0	0	229	0	0	0	156	3	0	390
7:30 AM	0	0	0	0	0	0	3	0	0	258	0	0	0	188	9	0	458
7:45 AM	0	0	0	0	0	0	8	0	0	224	0	0	0	225	9	0	466
8:00 AM	0	0	0	0	0	0	3	0	0	231	0	0	0	156	6	0	396
8:15 AM	0	0	0	0	0	0	6	0	0	196	0	0	0	172	7	0	381
8:30 AM	0	0	0	0	0	0	6	0	0	204	0	0	0	137	10	0	357
8:45 AM	0	0	0	0	0	0	7	0	0	221	0	0	0	151	23	0	402
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	38	0	0	2519	0	0	0	1794	76	0	4427
APPROACH %'s :					0.00%	0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	95.94%	4.06%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	20	0	0	909	0	0	0	741	31	0	1701
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.625	0.000	0.000	0.881	0.000	0.000	0.000	0.823	0.861	0.000	0.913
					0.625				0.881				0.825				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	3	0	0	0	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	17	0	0	286	0	0	0	314	25	0	642
4:15 PM	0	0	0	0	0	0	19	0	0	223	0	0	0	277	25	0	544
4:30 PM	0	0	0	0	0	0	17	0	0	291	0	0	0	278	18	0	604
4:45 PM	0	0	0	0	0	0	26	0	0	266	0	0	0	268	34	0	594
5:00 PM	0	0	0	0	0	0	19	0	0	234	0	0	0	291	35	0	579
5:15 PM	0	0	0	0	0	0	26	0	0	241	0	0	0	296	24	0	587
5:30 PM	0	0	0	0	0	0	15	0	0	221	0	0	0	241	16	0	493
5:45 PM	0	0	0	0	0	0	20	0	0	235	0	0	0	273	38	0	566
6:00 PM	0	0	0	0	0	0	29	0	0	187	0	0	0	248	38	0	502
6:15 PM	0	0	0	0	0	0	25	0	0	209	0	0	0	246	42	0	522
6:30 PM	0	0	0	0	0	0	24	0	0	184	0	0	0	197	22	0	427
6:45 PM	0	0	0	0	0	0	21	0	0	155	0	0	0	215	22	0	413
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	258	0	0	2732	0	0	0	3144	339	0	6473
APPROACH %'s :					0.00%	0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	90.27%	9.73%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	79	0	0	1066	0	0	0	1137	102	0	2384
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.760	0.000	0.000	0.916	0.000	0.000	0.000	0.905	0.750	0.000	0.928
					0.760				0.916				0.914				

National Data & Surveying Services Intersection Turning Movement Count

Location: Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy & US 17/US 211/Broadview Ave
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-002
Date: 2/9/2023

Data - HT

NS/EW Streets:	Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy				Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy				US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	3	0	0	0	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	7
6:15 AM	0	0	0	0	0	0	0	0	0	4	0	0	0	5	0	0	9
6:30 AM	0	0	0	0	0	0	0	0	0	9	0	0	0	3	0	0	12
6:45 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	13	0	0	16
7:00 AM	0	0	0	0	0	0	0	0	0	7	0	0	0	7	0	0	14
7:15 AM	0	0	0	0	0	0	1	0	0	15	0	0	0	8	0	0	24
7:30 AM	0	0	0	0	0	0	0	0	0	11	0	0	0	8	0	0	19
7:45 AM	0	0	0	0	0	0	0	0	0	12	0	0	0	9	0	0	21
8:00 AM	0	0	0	0	0	0	0	0	0	5	0	0	0	12	0	0	17
8:15 AM	0	0	0	0	0	0	0	0	0	11	0	0	0	24	0	0	35
8:30 AM	0	0	0	0	0	0	0	0	0	4	0	0	0	22	0	0	26
8:45 AM	0	0	0	0	0	0	0	0	0	9	0	0	0	17	0	0	26
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	1	0	0	97	0	0	0	128	0	0	226
APPROACH %'s :					0.00%	0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	39	0	0	0	53	0	0	92
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.813	0.000	0.000	0.000	0.552	0.000	0.000	0.657
										0.813				0.552			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	3	0	0	0	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	6	0	0	11
4:15 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	7	0	0	11
4:30 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	8	0	0	12
4:45 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	6	0	0	11
5:00 PM	0	0	0	0	0	0	1	0	0	2	0	0	0	4	0	0	7
5:15 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	6	0	0	10
5:30 PM	0	0	0	0	0	0	1	0	0	2	0	0	0	3	0	0	6
5:45 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0	0	8
6:00 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	5
6:15 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	5
6:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	6	0	0	7
6:45 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	4	0	0	7
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	2	0	0	40	0	0	0	58	0	0	100
APPROACH %'s :					0.00%	0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	18	0	0	0	27	0	0	45
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.900	0.000	0.000	0.000	0.844	0.000	0.000	0.938
										0.900				0.844			

National Data & Surveying Services Intersection Turning Movement Count

Location: Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy & US 17/US 211/Broadview Ave
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-002
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy				Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy				US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	3	0	0	0	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	3	0	0	0	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%					
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

National Data & Surveying Services Intersection Turning Movement Count

Location: Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy & US 17/L **Project ID:** 23-260020-002
City: Warrenton **Date:** 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	Warrenton Village Center Dwy (Chipotle)/Walgreens		Warrenton Village Center Dwy (Chipotle)/Walgreens		US 17/US 211/Broadview Ave		US 17/US 211/Broadview Ave		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	1	0	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	1	0	0	0	0	0	0	0	1
APPROACH %'s :	100.00%	0.00%							
PEAK HR :	**07:30 AM - 08:30 AM**								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	1	0	0	0	0	0	0	1
4:30 PM	1	0	0	0	0	0	0	0	1
4:45 PM	2	0	0	0	0	0	0	0	2
5:00 PM	0	2	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0
6:15 PM	1	0	0	0	0	0	0	0	1
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	4	3	0	0	0	0	0	0	7
APPROACH %'s :	57.14%	42.86%							
PEAK HR :	**04:00 PM - 05:00 PM**								TOTAL
PEAK HR VOL :	3	1	0	0	0	0	0	0	4
PEAK HR FACTOR :	0.375	0.250							0.500
	0.500								

Prepared by National Data & Surveying Services

Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy & US 17/US 211/Broadview Ave

Peak Hour Turning Movement Count

ID: 23-260020-002
City: Warrenton

Day: Thursday
Date: 2/9/2023

PEAK HOURS		COUNT PERIODS
AM	07:30 AM - 08:30 AM	6:00 AM - 09:00 AM
NOON	NONE	NONE
PM	04:00 PM - 05:00 PM	4:00 PM - 07:00 PM

SOUTHBOUND
Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy

	Right	Thru	Left	U-Turn	Approach total
AM	20	0	0	0	31
NOON	0	0	0	0	0
PM	79	0	0	0	102
Lanes	0	1	0	0	

EASTBOUND
US 17/US 211/Broadview Ave

	AM	NOON	PM	Lanes
Approach total	814	0	1243	
U-Turn	0	0	0	0
Left	0	0	0	0
Thru	948	0	1084	3
Right	0	0	0	0

WESTBOUND
US 17/US 211/Broadview Ave

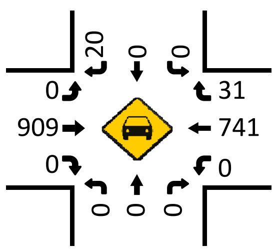
	Lanes	PM	NOON	AM
Left	1	102	0	31
Thru	2	1164	0	794
Right	0	0	0	0
U-Turn	0	0	0	0
Approach total		1084	0	948

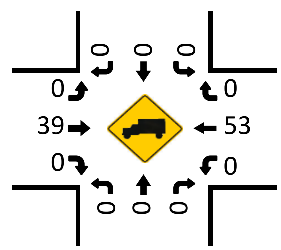
CONTROL
1-Way Stop(SB)

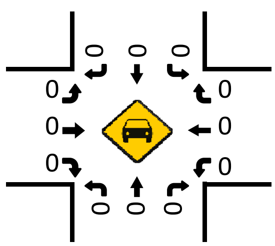
	AM	NOON	PM
TEV	1793	0	2429
PHF	0.92		0.93

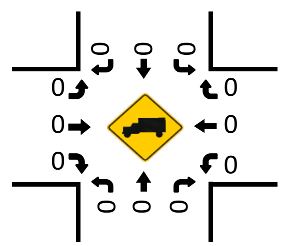
NORTHBOUND
Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy

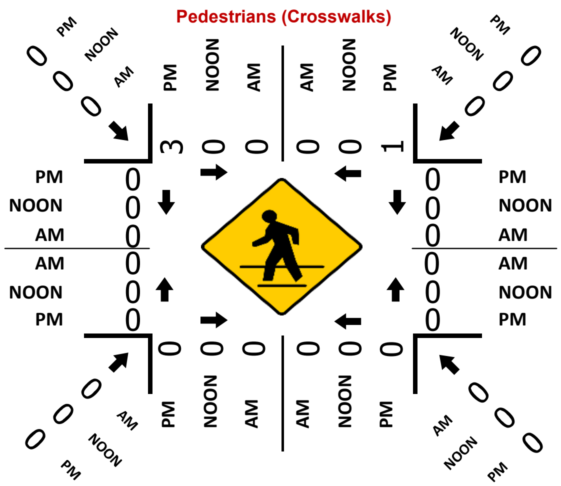
	Approach total	U-Turn	Left	Thru	Right
Lanes		0	0	0	0
PM	0	0	0	0	0
NOON	0	0	0	0	0
AM	0	0	0	0	0

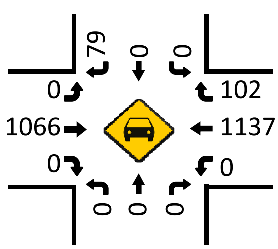
Cars (AM)


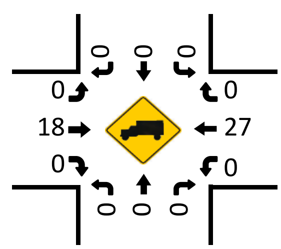
HT (AM)


Cars (NOON)


HT (NOON)


Pedestrians (Crosswalks)


Cars (PM)


HT (PM)


National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & US 211/Lee Hwy/Broadview Ave
City: Warrenton
Control: Signalized

Project ID: 23-260020-003
Date: 2/9/2023

Data - Total

NS/EW Streets:	Branch Dr				Branch Dr				US 211/Lee Hwy/Broadview Ave				US 211/Lee Hwy/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0.5	0.5	1	0	0.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	1	0	4	0	3	1	1	0	0	180	0	0	3	69	3	0	265
6:15 AM	0	0	4	0	2	1	7	0	4	180	0	0	6	106	3	0	313
6:30 AM	0	0	8	0	1	1	4	0	4	190	0	0	11	114	3	0	336
6:45 AM	1	1	7	0	2	0	8	0	9	176	0	0	7	152	9	0	372
7:00 AM	3	0	6	0	1	1	12	0	5	213	1	1	11	167	4	0	425
7:15 AM	2	0	8	0	5	5	7	0	8	225	0	2	10	158	6	0	436
7:30 AM	4	4	14	0	3	1	9	0	6	245	0	2	10	192	15	0	505
7:45 AM	2	5	10	0	11	3	11	0	9	220	0	3	11	223	18	0	526
8:00 AM	1	2	8	0	10	2	4	0	7	215	0	1	11	172	12	0	445
8:15 AM	3	0	6	0	10	2	26	0	7	195	1	1	12	169	6	0	438
8:30 AM	4	3	9	0	12	5	9	0	10	187	0	2	17	156	5	2	421
8:45 AM	0	3	11	0	11	2	11	0	11	214	2	3	17	176	14	0	475
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	21	18	95	0	71	24	109	0	80	2440	4	15	126	1854	98	2	4957
APPROACH %'s :	15.67%	13.43%	70.90%	0.00%	34.80%	11.76%	53.43%	0.00%	3.15%	96.10%	0.16%	0.59%	6.06%	89.13%	4.71%	0.10%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	10	11	38	0	34	8	50	0	29	875	1	7	44	756	51	0	1914
PEAK HR FACTOR :	0.625	0.550	0.679	0.000	0.773	0.667	0.481	0.000	0.806	0.893	0.250	0.583	0.917	0.848	0.708	0.000	0.910
	0.670				0.605				0.901				0.844				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0.5	0.5	1	0	0.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	7	4	15	0	40	4	39	0	23	252	1	1	17	275	26	1	705
4:15 PM	3	4	18	0	39	4	36	0	34	208	1	3	14	272	23	0	659
4:30 PM	5	7	20	0	34	6	24	0	35	218	0	1	15	269	10	0	644
4:45 PM	2	2	22	0	26	4	42	0	39	224	0	4	18	277	25	0	685
5:00 PM	2	3	16	0	30	7	31	0	28	205	1	4	19	298	22	2	668
5:15 PM	4	8	16	0	26	6	31	0	29	203	0	3	14	266	15	2	623
5:30 PM	3	4	13	0	30	1	20	0	18	187	0	3	13	241	19	0	552
5:45 PM	5	2	17	0	31	2	21	0	25	210	0	3	22	279	19	0	636
6:00 PM	6	2	12	0	44	5	28	0	29	160	1	1	16	262	15	0	581
6:15 PM	3	5	17	0	30	4	25	0	19	160	0	6	13	247	17	1	547
6:30 PM	4	4	16	0	32	4	21	0	13	162	0	0	22	202	19	5	504
6:45 PM	1	1	9	0	27	9	20	0	17	149	0	4	10	214	11	0	472
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	45	46	191	0	389	56	338	0	309	2338	4	33	193	3102	221	11	7276
APPROACH %'s :	15.96%	16.31%	67.73%	0.00%	49.68%	7.15%	43.17%	0.00%	11.51%	87.11%	0.15%	1.23%	5.47%	87.95%	6.27%	0.31%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	17	17	75	0	139	18	141	0	131	902	2	9	64	1093	84	1	2693
PEAK HR FACTOR :	0.607	0.607	0.852	0.000	0.869	0.750	0.839	0.000	0.840	0.895	0.500	0.563	0.889	0.986	0.808	0.250	0.955
	0.852				0.898				0.942				0.970				

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & US 211/Lee Hwy/Broadview Ave
City: Warrenton
Control: Signalized

Project ID: 23-260020-003
Date: 2/9/2023

Data - Cars

NS/EW Streets:	Branch Dr				Branch Dr				US 211/Lee Hwy/Broadview Ave				US 211/Lee Hwy/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0.5	0.5	1	0	0.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	1	0	4	0	3	1	1	0	0	174	0	0	3	69	3	0	259
6:15 AM	0	0	4	0	2	1	6	0	3	176	0	0	6	102	3	0	303
6:30 AM	0	0	8	0	1	1	4	0	3	183	0	0	11	111	3	0	325
6:45 AM	1	1	6	0	1	0	5	0	9	173	0	0	6	142	9	0	353
7:00 AM	3	0	6	0	1	1	11	0	5	206	1	1	11	161	4	0	411
7:15 AM	2	0	8	0	4	5	7	0	8	210	0	2	10	150	6	0	412
7:30 AM	4	4	14	0	3	1	9	0	6	235	0	2	10	184	15	0	487
7:45 AM	2	5	10	0	11	3	11	0	9	208	0	3	11	214	18	0	505
8:00 AM	1	2	8	0	9	2	3	0	7	211	0	1	11	161	12	0	428
8:15 AM	3	0	6	0	10	2	18	0	7	184	1	0	11	154	6	0	402
8:30 AM	4	3	9	0	11	5	8	0	10	183	0	2	15	135	5	2	392
8:45 AM	0	2	11	0	10	2	10	0	11	206	2	3	17	159	14	0	447
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	21	17	94	0	66	24	93	0	78	2349	4	14	122	1742	98	2	4724
APPROACH %'s :	15.91%	12.88%	71.21%	0.00%	36.07%	13.11%	50.82%	0.00%	3.19%	96.07%	0.16%	0.57%	6.21%	88.70%	4.99%	0.10%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	10	11	38	0	33	8	41	0	29	838	1	6	43	713	51	0	1822
PEAK HR FACTOR :	0.625	0.550	0.679	0.000	0.750	0.667	0.569	0.000	0.806	0.891	0.250	0.500	0.977	0.833	0.708	0.000	0.902
	0.670				0.683				0.899				0.830				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0.5	0.5	1	0	0.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	7	4	15	0	40	4	39	0	23	247	1	1	17	269	25	1	693
4:15 PM	3	4	18	0	39	4	35	0	34	206	1	3	14	265	23	0	649
4:30 PM	5	7	20	0	33	6	24	0	35	213	0	1	15	262	10	0	631
4:45 PM	2	2	22	0	26	4	42	0	39	218	0	4	18	271	25	0	673
5:00 PM	2	3	15	0	30	7	30	0	28	203	1	4	19	295	21	2	660
5:15 PM	4	8	16	0	26	6	29	0	29	199	0	3	14	262	14	2	612
5:30 PM	3	4	13	0	29	1	20	0	18	185	0	3	13	237	19	0	545
5:45 PM	5	2	17	0	31	2	21	0	25	206	0	3	22	276	19	0	629
6:00 PM	6	2	12	0	44	5	27	0	29	158	1	1	16	261	15	0	577
6:15 PM	3	5	17	0	30	4	25	0	19	156	0	6	13	245	17	1	541
6:30 PM	4	4	16	0	32	4	21	0	13	161	0	0	22	196	19	5	497
6:45 PM	1	1	9	0	27	9	19	0	17	146	0	4	10	211	11	0	465
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	45	46	190	0	387	56	332	0	309	2298	4	33	193	3050	218	11	7172
APPROACH %'s :	16.01%	16.37%	67.62%	0.00%	49.94%	7.23%	42.84%	0.00%	11.69%	86.91%	0.15%	1.25%	5.56%	87.85%	6.28%	0.32%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	17	17	75	0	138	18	140	0	131	884	2	9	64	1067	83	1	2646
PEAK HR FACTOR :	0.607	0.607	0.852	0.000	0.863	0.750	0.833	0.000	0.840	0.895	0.500	0.563	0.889	0.984	0.830	0.250	0.955
	0.852				0.892				0.943				0.967				

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & US 211/Lee Hwy/Broadview Ave
City: Warrenton
Control: Signalized

Project ID: 23-260020-003
Date: 2/9/2023

Data - HT

NS/EW Streets:	Branch Dr				Branch Dr				US 211/Lee Hwy/Broadview Ave				US 211/Lee Hwy/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0.5	0.5	1	0	0.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	6
6:15 AM	0	0	0	0	0	0	1	0	1	4	0	0	0	4	0	0	10
6:30 AM	0	0	0	0	0	0	0	0	1	7	0	0	0	3	0	0	11
6:45 AM	0	0	1	0	1	0	3	0	0	3	0	0	1	10	0	0	19
7:00 AM	0	0	0	0	0	0	1	0	0	7	0	0	0	6	0	0	14
7:15 AM	0	0	0	0	1	0	0	0	0	15	0	0	0	8	0	0	24
7:30 AM	0	0	0	0	0	0	0	0	0	10	0	0	0	8	0	0	18
7:45 AM	0	0	0	0	0	0	0	0	0	12	0	0	0	9	0	0	21
8:00 AM	0	0	0	0	1	0	1	0	0	4	0	0	0	11	0	0	17
8:15 AM	0	0	0	0	0	0	8	0	0	11	0	1	1	15	0	0	36
8:30 AM	0	0	0	0	1	0	1	0	0	4	0	0	2	21	0	0	29
8:45 AM	0	1	0	0	1	0	1	0	0	8	0	0	0	17	0	0	28
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1	1	0	5	0	16	0	2	91	0	1	4	112	0	0	233
APPROACH %'s :	0.00%	50.00%	50.00%	0.00%	23.81%	0.00%	76.19%	0.00%	2.13%	96.81%	0.00%	1.06%	3.45%	96.55%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	1	0	9	0	0	37	0	1	1	43	0	0	92
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.250	0.000	0.281	0.000	0.000	0.771	0.000	0.250	0.250	0.717	0.000	0.000	0.639
							0.313				0.792				0.688		

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0.5	0.5	1	0	0.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	6	1	0	12
4:15 PM	0	0	0	0	0	0	1	0	0	2	0	0	0	7	0	0	10
4:30 PM	0	0	0	0	1	0	0	0	0	5	0	0	0	7	0	0	13
4:45 PM	0	0	0	0	0	0	0	0	0	6	0	0	0	6	0	0	12
5:00 PM	0	0	1	0	0	0	1	0	0	2	0	0	0	3	1	0	8
5:15 PM	0	0	0	0	0	0	2	0	0	4	0	0	0	4	1	0	11
5:30 PM	0	0	0	0	1	0	0	0	0	2	0	0	0	4	0	0	7
5:45 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	3	0	0	7
6:00 PM	0	0	0	0	0	0	1	0	0	2	0	0	0	1	0	0	4
6:15 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	2	0	0	6
6:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	6	0	0	7
6:45 PM	0	0	0	0	0	0	1	0	0	3	0	0	0	3	0	0	7
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	1	0	2	0	6	0	0	40	0	0	0	52	3	0	104
APPROACH %'s :	0.00%	0.00%	100.00%	0.00%	25.00%	0.00%	75.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	94.55%	5.45%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	1	0	1	0	0	18	0	0	0	26	1	0	47
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.250	0.000	0.250	0.000	0.000	0.750	0.000	0.000	0.000	0.929	0.250	0.000	0.904
							0.500				0.750				0.964		

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & US 211/Lee Hwy/Broadview Ave
City: Warrenton
Control: Signalized

Project ID: 23-260020-003
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	Branch Dr				Branch Dr				US 211/Lee Hwy/Broadview Ave				US 211/Lee Hwy/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0.5	0.5	1	0	0.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0.5	0.5	1	0	0.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	3
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.500
														0.500			

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & US 211/Lee Hwy/Broadview Ave
City: Warrenton
Project ID: 23-260020-003
Date: 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	Branch Dr		Branch Dr		US 211/Lee Hwy/Broadview Ave		US 211/Lee Hwy/Broadview Ave		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	2	0	0	0	0	0	0	0	2
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	1	1	0	0	0	0	0	0	2
8:45 AM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	3	1	0	0	0	0	0	0	4
APPROACH %'s :	75.00%	25.00%							
PEAK HR :	07:30 AM - 08:30 AM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	1	0	0	0	0	0	0	0	1
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	1	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	2	0	0	0	0	2
5:00 PM	0	2	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	1	0	0	0	0	0	1
6:00 PM	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	1	0	0	1
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	2	2	1	2	0	1	0	0	8
APPROACH %'s :	50.00%	50.00%	33.33%	66.67%	0.00%	100.00%			
PEAK HR :	04:00 PM - 05:00 PM								TOTAL
PEAK HR VOL :	2	0	0	2	0	0	0	0	4
PEAK HR FACTOR :	0.500			0.250					0.500
	0.500			0.250					

Prepared by National Data & Surveying Services

Branch Dr & US 211/Lee Hwy/Broadview Ave

Peak Hour Turning Movement Count

ID: 23-260020-003
City: Warrenton

Day: Thursday
Date: 2/9/2023

PEAK HOURS	COUNT PERIODS
07:30 AM - 08:30 AM	6:00 AM - 09:00 AM
NONE	NONE
04:00 PM - 05:00 PM	4:00 PM - 07:00 PM

SOUTHBOUND (Branch Dr)

	L	T	R	U	Total	
AM	50	8	34	0	91	AM
NOON	0	0	0	0	0	NOON
PM	141	18	139	0	232	PM

EASTBOUND (US 211/Lee Hwy/Broadview Ave)

	L	T	R	U	
AM	7	29	875	1	
NOON	0	0	0	0	
PM	9	131	902	2	
	0	1	2	1	

WESTBOUND (US 211/Lee Hwy/Broadview Ave)

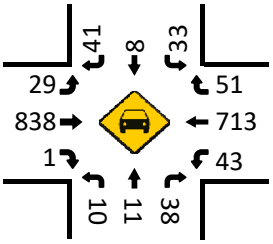
	L	T	R	U	
PM	84	1093	64	1	
NOON	0	0	0	0	
AM	51	756	44	0	
	1	2	1	0	

NORTHBOUND (Branch Dr)

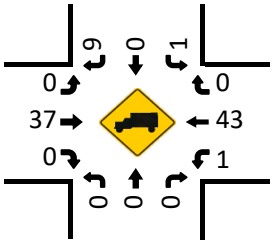
	L	T	R	U	Total	
PM	84	0	17	17	75	PM
NOON	0	0	0	0	0	NOON
AM	53	0	10	11	38	AM

CONTROL			
Signalized			
TEV	1914 AM	0 NOON	2693 PM
PHF	0.91		0.95

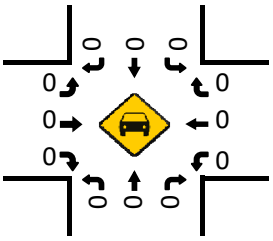
Cars (AM)



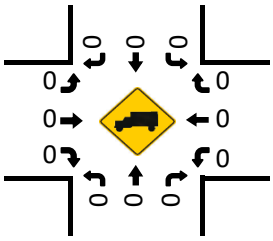
HT (AM)



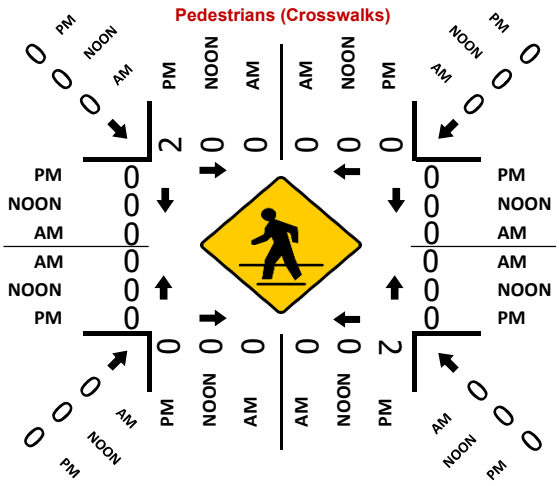
Cars (NOON)



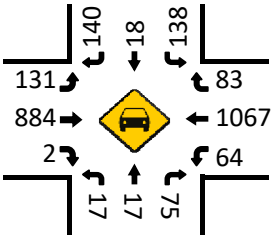
HT (NOON)



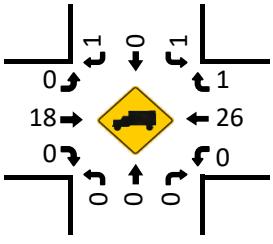
Pedestrians (Crosswalks)



Cars (PM)



HT (PM)



National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Warrenton Village Center Dwy/Shopping Center Dwy
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-004
Date: 2/9/2023

Data - Total

NS/EW Streets:	Branch Dr				Branch Dr				Warrenton Village Center Dwy/Shopping Center Dwy				Warrenton Village Center Dwy/Shopping Center Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	2	2	0	0	2	5	0	0	0	4	2	0	1	0	0	0	18
6:15 AM	0	1	1	0	1	2	0	0	0	1	0	0	4	2	0	0	12
6:30 AM	1	3	1	0	1	4	0	0	0	3	2	0	3	1	0	0	19
6:45 AM	7	2	0	0	3	8	0	0	0	1	0	0	2	2	0	0	25
7:00 AM	3	6	0	0	0	9	0	0	0	4	5	0	3	6	1	0	37
7:15 AM	3	6	1	0	5	8	2	0	1	5	5	0	3	3	5	0	47
7:30 AM	10	16	0	0	2	10	1	0	0	5	5	0	1	3	5	0	58
7:45 AM	5	26	3	0	5	21	1	0	4	3	9	0	3	2	3	0	85
8:00 AM	6	14	3	0	6	16	0	0	1	4	10	0	2	4	2	0	68
8:15 AM	2	9	1	0	5	20	3	0	1	3	14	0	8	2	4	0	72
8:30 AM	9	5	0	0	3	17	5	0	3	2	5	0	1	4	3	0	57
8:45 AM	8	9	1	0	2	14	4	0	1	6	7	0	3	2	0	0	57
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	56	99	11	0	35	134	16	0	11	41	64	0	34	31	23	0	555
APPROACH %'s :	33.73%	59.64%	6.63%	0.00%	18.92%	72.43%	8.65%	0.00%	9.48%	35.34%	55.17%	0.00%	38.64%	35.23%	26.14%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	23	65	7	0	18	67	5	0	6	15	38	0	14	11	14	0	283
PEAK HR FACTOR :	0.575	0.625	0.583	0.000	0.750	0.798	0.417	0.000	0.375	0.750	0.679	0.000	0.438	0.688	0.700	0.000	0.832
	0.699				0.804				0.819				0.696				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	32	10	0	0	11	13	8	0	3	22	29	0	14	12	6	0	160
4:15 PM	19	6	3	0	10	11	8	0	6	22	28	0	10	12	14	0	149
4:30 PM	15	16	5	0	13	9	10	0	2	20	33	0	7	10	12	0	152
4:45 PM	28	11	4	0	14	6	6	0	6	13	26	0	14	16	9	0	153
5:00 PM	28	9	1	0	12	13	10	0	3	12	35	0	7	12	12	0	154
5:15 PM	25	7	3	0	12	9	9	0	6	12	30	0	11	9	12	0	145
5:30 PM	27	15	4	0	6	0	10	0	11	26	32	0	6	14	10	0	161
5:45 PM	28	6	2	0	9	6	8	0	5	22	32	0	12	21	7	0	158
6:00 PM	29	9	1	0	5	6	9	0	8	22	48	0	10	17	13	0	177
6:15 PM	20	16	2	0	4	6	6	0	6	17	32	0	8	14	8	0	139
6:30 PM	18	8	2	0	3	9	4	0	4	10	25	0	10	17	4	0	114
6:45 PM	10	6	0	0	1	5	7	0	4	9	36	0	4	7	10	0	99
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	279	119	27	0	100	93	95	0	64	207	386	0	113	161	117	0	1761
APPROACH %'s :	65.65%	28.00%	6.35%	0.00%	34.72%	32.29%	32.99%	0.00%	9.74%	31.51%	58.75%	0.00%	28.90%	41.18%	29.92%	0.00%	
PEAK HR :	05:15 PM - 06:15 PM																TOTAL
PEAK HR VOL :	109	37	10	0	32	21	36	0	30	82	142	0	39	61	42	0	641
PEAK HR FACTOR :	0.940	0.617	0.625	0.000	0.667	0.583	0.900	0.000	0.682	0.788	0.740	0.000	0.813	0.726	0.808	0.000	0.905
	0.848				0.742				0.814				0.888				

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Warrenton Village Center Dwy/Shopping Center Dwy
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-004
Date: 2/9/2023

Data - Cars

NS/EW Streets:	Branch Dr				Branch Dr				Warrenton Village Center Dwy/Shopping Center Dwy				Warrenton Village Center Dwy/Shopping Center Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	2	2	0	0	2	5	0	0	0	4	2	0	1	0	0	0	18
6:15 AM	0	0	1	0	1	2	0	0	0	1	0	0	3	2	0	0	10
6:30 AM	1	3	0	0	1	4	0	0	0	3	1	0	3	1	0	0	17
6:45 AM	6	2	0	0	3	6	0	0	0	1	0	0	1	1	0	0	20
7:00 AM	3	6	0	0	0	8	0	0	0	4	5	0	3	5	1	0	35
7:15 AM	3	6	1	0	4	8	1	0	1	5	4	0	3	3	5	0	44
7:30 AM	10	16	0	0	2	10	1	0	0	5	5	0	1	3	5	0	58
7:45 AM	5	26	3	0	5	21	1	0	4	3	9	0	3	1	3	0	84
8:00 AM	6	14	3	0	6	13	0	0	1	4	10	0	2	4	2	0	65
8:15 AM	2	9	1	0	5	14	3	0	1	3	14	0	8	2	4	0	66
8:30 AM	9	5	0	0	3	16	5	0	3	2	4	0	1	3	3	0	54
8:45 AM	8	9	1	0	2	13	4	0	1	6	7	0	1	2	0	0	54
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	55	98	10	0	34	120	15	0	11	41	61	0	30	27	23	0	525
APPROACH %'s :	33.74%	60.12%	6.13%	0.00%	20.12%	71.01%	8.88%	0.00%	9.73%	36.28%	53.98%	0.00%	37.50%	33.75%	28.75%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	23	65	7	0	18	58	5	0	6	15	38	0	14	10	14	0	273
PEAK HR FACTOR :	0.575	0.625	0.583	0.000	0.750	0.690	0.417	0.000	0.375	0.750	0.679	0.000	0.438	0.625	0.700	0.000	0.813
	0.699				0.750				0.819				0.679				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	32	9	0	0	11	13	8	0	3	22	29	0	14	12	6	0	159
4:15 PM	19	6	3	0	10	10	8	0	6	22	27	0	10	11	13	0	145
4:30 PM	15	16	5	0	13	9	10	0	2	20	32	0	7	10	11	0	150
4:45 PM	28	11	4	0	14	6	6	0	6	13	26	0	14	16	9	0	153
5:00 PM	28	9	1	0	12	12	10	0	3	12	35	0	7	11	12	0	152
5:15 PM	25	7	3	0	12	7	9	0	6	12	30	0	11	9	12	0	143
5:30 PM	27	15	4	0	6	0	10	0	11	26	32	0	6	14	10	0	161
5:45 PM	28	6	2	0	9	6	8	0	5	22	32	0	12	20	7	0	157
6:00 PM	29	9	1	0	5	5	9	0	8	22	48	0	10	17	13	0	176
6:15 PM	20	16	2	0	4	6	6	0	6	17	32	0	8	14	8	0	139
6:30 PM	18	8	2	0	3	9	4	0	4	10	25	0	10	16	4	0	113
6:45 PM	10	6	0	0	1	4	7	0	4	9	36	0	3	7	10	0	97
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	279	118	27	0	100	87	95	0	64	207	384	0	112	157	115	0	1745
APPROACH %'s :	65.80%	27.83%	6.37%	0.00%	35.46%	30.85%	33.69%	0.00%	9.77%	31.60%	58.63%	0.00%	29.17%	40.89%	29.95%	0.00%	
PEAK HR :	05:15 PM - 06:15 PM																TOTAL
PEAK HR VOL :	109	37	10	0	32	18	36	0	30	82	142	0	39	60	42	0	637
PEAK HR FACTOR :	0.940	0.617	0.625	0.000	0.667	0.643	0.900	0.000	0.682	0.788	0.740	0.000	0.813	0.750	0.808	0.000	0.905
	0.848				0.768				0.814				0.881				

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Warrenton Village Center Dwy/Shopping Center Dwy
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-004
Date: 2/9/2023

Data - HT

NS/EW Streets:	Branch Dr				Branch Dr				Warrenton Village Center Dwy/Shopping Center Dwy				Warrenton Village Center Dwy/Shopping Center Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2
6:30 AM	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	2
6:45 AM	1	0	0	0	0	2	0	0	0	0	0	0	1	1	0	0	5
7:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
7:15 AM	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	3
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
8:00 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3
8:15 AM	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	6
8:30 AM	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	3
8:45 AM	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	3
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	1	1	1	0	1	14	1	0	0	0	3	0	4	4	0	0	30
APPROACH %'s :	33.33%	33.33%	33.33%	0.00%	6.25%	87.50%	6.25%	0.00%	0.00%	0.00%	100.00%	0.00%	50.00%	50.00%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	9	0	0	0	0	0	0	0	1	0	0	10
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.375	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.417
						0.375								0.250			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:15 PM	0	0	0	0	0	1	0	0	0	0	1	0	0	1	1	0	4
4:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
5:15 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
6:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
6:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	2
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1	0	0	0	6	0	0	0	0	2	0	1	4	2	0	16
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	14.29%	57.14%	28.57%	0.00%	
PEAK HR :	05:15 PM - 06:15 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	4
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.375	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.500
						0.375								0.250			

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Warrenton Village Center Dwy/Shopping Center Dwy
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-004
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	Branch Dr				Branch Dr				Warrenton Village Center Dwy/Shopping Center Dwy				Warrenton Village Center Dwy/Shopping Center Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	3
APPROACH %'s :					0.00%	0.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%					
PEAK HR :	05:15 PM - 06:15 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250
							0.250				0.250						

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Warrenton Village Center Dwy/Shopping Center Dwy **Project ID:** 23-260020-004
City: Warrenton **Date:** 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	Branch Dr		Branch Dr		Warrenton Village Center Dwy/Shopping Center		Warrenton Village Center Dwy/Shopping Center		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	2	0	0	0	0	0	0	2
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	1	0	0	0	0	0	0	0	1
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	1	0	0	0	0	0	0	0	1
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	1	0	0	0	0	0	0	0	1
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	1	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	3	3	0	0	0	0	0	0	6
APPROACH %'s :	50.00%	50.00%							
PEAK HR :	**07:30 AM - 08:30 AM**								TOTAL
PEAK HR VOL :	1	1	0	0	0	0	0	0	2
PEAK HR FACTOR :	0.250	0.250							0.500
	0.500								

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	5	0	0	0	0	0	0	5
4:15 PM	1	2	0	0	1	0	0	0	4
4:30 PM	1	2	0	0	0	0	0	0	3
4:45 PM	3	0	0	0	0	1	0	0	4
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	2	1	0	0	0	0	0	0	3
5:30 PM	1	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	2	1	0	0	0	0	0	0	3
6:15 PM	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	2	0	0	0	0	0	0	2
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	10	13	0	0	1	1	0	0	25
APPROACH %'s :	43.48%	56.52%			50.00%	50.00%			
PEAK HR :	**05:15 PM - 06:15 PM**								TOTAL
PEAK HR VOL :	5	2	0	0	0	0	0	0	7
PEAK HR FACTOR :	0.625	0.500							0.583
	0.583								

Prepared by National Data & Surveying Services

Branch Dr & Warrenton Village Center Dwy/Shopping Center Dwy

Peak Hour Turning Movement Count

ID: 23-260020-004
City: Warrenton

Day: Thursday
Date: 2/9/2023

PEAK HOURS	COUNT PERIODS
07:30 AM - 08:30 AM	6:00 AM - 09:00 AM
NONE	NONE
05:15 PM - 06:15 PM	4:00 PM - 07:00 PM

CONTROL: 2-Way Stop(EB/WB)

	AM	NOON	PM
TEV	283	0	641
PHF	0.83		0.91

SOUTHBOUND (Branch Dr)

	Left	Thru	Right	U-Turn	Total
AM	5	67	18	0	85
NOON	0	0	0	0	0
PM	36	21	32	0	109

EASTBOUND (Warrenton Village Center Dwy/Shopping Center Dwy)

	Left	Thru	Right	U-Turn
AM	39	0	206	0
NOON	0	0	0	2
PM	6	0	30	0
	15	0	82	1
	38	0	142	0

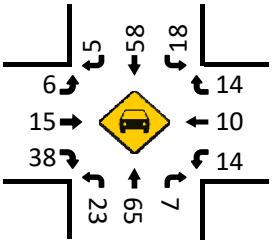
WESTBOUND (Warrenton Village Center Dwy/Shopping Center Dwy)

	Left	Thru	Right	U-Turn
AM	42	0	14	0
NOON	61	0	11	1
PM	39	0	14	0
	0	0	0	0
	124	0	40	0

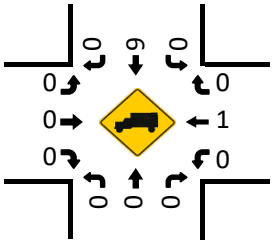
NORTHBOUND (Branch Dr)

	Left	Thru	Right	U-Turn	Total
PM	202	0	109	37	10
NOON	0	0	0	0	0
AM	119	0	23	65	7

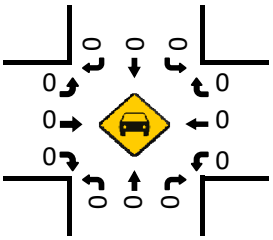
Cars (AM)



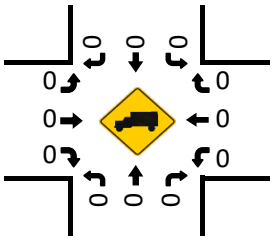
HT (AM)



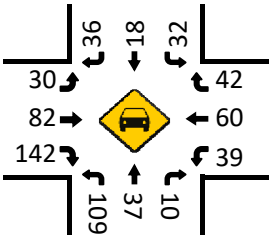
Cars (NOON)



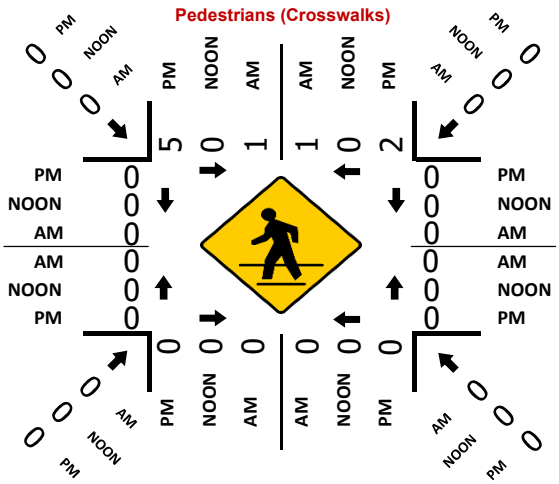
HT (NOON)



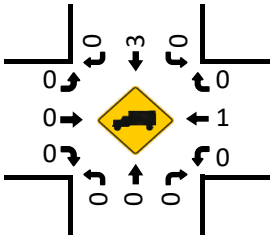
Cars (PM)



Pedestrians (Crosswalks)



HT (PM)



National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Oak Springs Dr
City: Warrenton
Control: 2-Way Stop(NB/SB)

Project ID: 23-260020-005
Date: 2/9/2023

Data - Total

NS/EW Streets:	Branch Dr				Branch Dr				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	2	0	0	0	0	0	0	0	0	3	6	0	1	0	0	0	12
6:15 AM	0	0	1	0	0	0	0	0	0	2	3	0	0	4	0	0	10
6:30 AM	3	0	0	0	0	1	0	0	0	3	4	0	0	6	0	0	17
6:45 AM	2	0	0	0	0	0	0	0	1	3	9	0	2	6	1	0	24
7:00 AM	6	0	0	0	1	0	0	0	0	5	6	0	3	12	0	0	33
7:15 AM	12	0	1	0	0	2	0	0	0	15	9	0	4	10	0	0	53
7:30 AM	17	0	2	0	0	1	0	0	0	15	7	0	5	18	0	0	65
7:45 AM	31	0	4	0	0	0	1	0	0	20	23	0	4	49	0	0	132
8:00 AM	14	0	3	0	0	0	0	0	0	14	21	0	1	22	0	0	75
8:15 AM	11	0	3	0	0	0	0	0	0	27	24	0	4	17	0	0	86
8:30 AM	9	0	2	0	0	0	1	0	0	17	18	0	7	19	0	0	73
8:45 AM	7	0	3	0	0	2	1	0	1	26	15	0	3	19	0	0	77
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	114	0	19	0	1	6	3	0	2	150	145	0	34	182	1	0	657
APPROACH %'s :	85.71%	0.00%	14.29%	0.00%	10.00%	60.00%	30.00%	0.00%	0.67%	50.51%	48.82%	0.00%	15.67%	83.87%	0.46%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	65	0	12	0	0	0	2	0	0	78	86	0	16	107	0	0	366
PEAK HR FACTOR :	0.524	0.000	0.750	0.000	0.000	0.000	0.500	0.000	0.000	0.722	0.896	0.000	0.571	0.546	0.000	0.000	0.693
	0.550				0.500				0.804				0.580				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	15	0	4	0	1	1	0	0	1	34	21	0	9	25	1	0	112
4:15 PM	13	2	10	1	0	2	0	0	2	21	20	0	6	25	1	0	103
4:30 PM	19	0	11	0	0	1	0	0	0	30	26	0	5	33	0	0	125
4:45 PM	14	0	12	0	0	1	0	0	0	20	19	0	8	29	0	0	103
5:00 PM	18	1	4	0	0	1	0	0	1	22	20	0	12	27	0	0	106
5:15 PM	19	1	6	0	0	3	0	0	1	12	21	0	6	29	0	0	98
5:30 PM	26	1	8	0	1	0	0	0	0	23	12	0	4	26	1	0	102
5:45 PM	12	1	6	0	0	0	0	0	0	20	15	0	8	20	2	0	84
6:00 PM	22	2	6	0	0	0	0	0	0	15	13	0	8	14	1	0	81
6:15 PM	18	1	10	0	0	0	0	0	1	16	10	0	5	5	1	0	67
6:30 PM	10	3	4	0	1	2	1	0	0	15	7	0	7	9	0	0	59
6:45 PM	13	0	6	0	0	0	0	0	0	12	5	0	8	3	1	0	48
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	199	12	87	1	3	11	1	0	6	240	189	0	86	245	8	0	1088
APPROACH %'s :	66.56%	4.01%	29.10%	0.33%	20.00%	73.33%	6.67%	0.00%	1.38%	55.17%	43.45%	0.00%	25.37%	72.27%	2.36%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	61	2	37	1	1	5	0	0	3	105	86	0	28	112	2	0	443
PEAK HR FACTOR :	0.803	0.250	0.771	0.250	0.250	0.625	0.000	0.000	0.375	0.772	0.827	0.000	0.778	0.848	0.500	0.000	0.886
	0.842				0.750				0.866				0.934				

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Oak Springs Dr
City: Warrenton
Control: 2-Way Stop(NB/SB)

Project ID: 23-260020-005
Date: 2/9/2023

Data - Cars

NS/EW Streets:	Branch Dr				Branch Dr				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	2	0	0	0	0	0	0	0	0	3	6	0	1	0	0	0	12
6:15 AM	0	0	0	0	0	0	0	0	0	2	3	0	0	4	0	0	9
6:30 AM	3	0	0	0	0	1	0	0	0	2	4	0	0	6	0	0	16
6:45 AM	2	0	0	0	0	0	0	0	1	3	8	0	1	6	1	0	22
7:00 AM	6	0	0	0	1	0	0	0	0	3	5	0	3	12	0	0	30
7:15 AM	12	0	1	0	0	2	0	0	0	15	8	0	3	10	0	0	51
7:30 AM	17	0	2	0	0	1	0	0	0	15	7	0	5	18	0	0	65
7:45 AM	31	0	4	0	0	0	1	0	0	20	23	0	4	48	0	0	131
8:00 AM	14	0	3	0	0	0	0	0	0	13	19	0	0	22	0	0	71
8:15 AM	11	0	3	0	0	0	0	0	0	27	18	0	4	17	0	0	80
8:30 AM	9	0	2	0	0	0	1	0	0	16	18	0	6	19	0	0	71
8:45 AM	7	0	3	0	0	2	1	0	1	26	14	0	3	19	0	0	76
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	114	0	18	0	1	6	3	0	2	145	133	0	30	181	1	0	634
APPROACH %'s :	86.36%	0.00%	13.64%	0.00%	10.00%	60.00%	30.00%	0.00%	0.71%	51.79%	47.50%	0.00%	14.15%	85.38%	0.47%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	65	0	12	0	0	0	2	0	0	76	78	0	14	106	0	0	353
PEAK HR FACTOR :	0.524	0.000	0.750	0.000	0.000	0.000	0.500	0.000	0.000	0.704	0.848	0.000	0.583	0.552	0.000	0.000	0.674
	0.550				0.500				0.856				0.577				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	14	0	4	0	1	1	0	0	1	34	21	0	9	25	1	0	111
4:15 PM	13	2	9	1	0	2	0	0	2	20	20	0	5	25	1	0	100
4:30 PM	18	0	11	0	0	1	0	0	0	29	26	0	5	33	0	0	123
4:45 PM	14	0	12	0	0	1	0	0	0	19	19	0	8	28	0	0	101
5:00 PM	18	1	4	0	0	1	0	0	1	22	20	0	11	26	0	0	104
5:15 PM	19	1	6	0	0	3	0	0	1	12	20	0	5	29	0	0	96
5:30 PM	26	1	8	0	1	0	0	0	0	23	12	0	4	26	1	0	102
5:45 PM	12	1	6	0	0	0	0	0	0	20	15	0	8	20	2	0	84
6:00 PM	22	2	6	0	0	0	0	0	0	15	13	0	7	14	1	0	80
6:15 PM	18	1	10	0	0	0	0	0	1	16	10	0	5	5	1	0	67
6:30 PM	10	3	4	0	1	2	1	0	0	15	7	0	7	9	0	0	59
6:45 PM	13	0	6	0	0	0	0	0	0	12	5	0	7	3	1	0	47
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	197	12	86	1	3	11	1	0	6	237	188	0	81	243	8	0	1074
APPROACH %'s :	66.55%	4.05%	29.05%	0.34%	20.00%	73.33%	6.67%	0.00%	1.39%	54.99%	43.62%	0.00%	24.40%	73.19%	2.41%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	59	2	36	1	1	5	0	0	3	102	86	0	27	111	2	0	435
PEAK HR FACTOR :	0.819	0.250	0.750	0.250	0.250	0.625	0.000	0.000	0.375	0.750	0.827	0.000	0.750	0.841	0.500	0.000	0.884
	0.845				0.750				0.853				0.921				

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Oak Springs Dr
City: Warrenton
Control: 2-Way Stop(NB/SB)

Project ID: 23-260020-005
Date: 2/9/2023

Data - HT

NS/EW Streets:	Branch Dr				Branch Dr				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
7:00 AM	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	3
7:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
8:00 AM	0	0	0	0	0	0	0	0	0	1	2	0	1	0	0	0	4
8:15 AM	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	6
8:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2
8:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	1	0	0	0	0	0	0	5	12	0	4	1	0	0	23
APPROACH %'s :	0.00%	0.00%	100.00%	0.00%					0.00%	29.41%	70.59%	0.00%	80.00%	20.00%	0.00%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	2	8	0	2	1	0	0	13
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.333	0.000	0.500	0.250	0.000	0.000	0.542
										0.417				0.750			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:15 PM	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	3
4:30 PM	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
4:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	2	0	1	0	0	0	0	0	0	3	1	0	5	2	0	0	14
APPROACH %'s :	66.67%	0.00%	33.33%	0.00%					0.00%	75.00%	25.00%	0.00%	71.43%	28.57%	0.00%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	2	0	1	0	0	0	0	0	0	3	0	0	1	1	0	0	8
PEAK HR FACTOR :	0.500	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.750	0.000	0.000	0.250	0.250	0.000	0.000	0.667
			0.750							0.750				0.500			

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Oak Springs Dr
City: Warrenton
Control: 2-Way Stop(NB/SB)

Project ID: 23-260020-005
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	Branch Dr				Branch Dr				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%									
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Oak Springs Dr
City: Warrenton
Project ID: 23-260020-005
Date: 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	Branch Dr		Branch Dr		Oak Springs Dr		Oak Springs Dr		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	1	0	0	0	0	0	0	0	1
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	1	0	0	1	0	0	1	3
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	1	0	0	0	0	0	0	0	1
7:30 AM	0	1	0	0	0	0	0	0	1
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	1	1	0	0	0	0	0	0	2
8:15 AM	1	0	1	0	1	1	0	0	4
8:30 AM	2	2	0	0	1	0	0	0	5
8:45 AM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	6	5	1	0	3	1	0	1	17
APPROACH %'s :	54.55%	45.45%	100.00%	0.00%	75.00%	25.00%	0.00%	100.00%	
PEAK HR :	07:45 AM - 08:45 AM								TOTAL
PEAK HR VOL :	4	3	1	0	2	1	0	0	11
PEAK HR FACTOR :	0.500	0.375	0.250		0.500	0.250			0.550
	0.438		0.250		0.375				

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	2	0	0	0	0	0	0	0	2
4:15 PM	0	0	0	0	1	0	0	0	1
4:30 PM	0	1	0	0	0	1	0	0	2
4:45 PM	0	1	0	0	0	0	0	0	1
5:00 PM	0	1	0	0	0	0	0	0	1
5:15 PM	0	1	0	0	1	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	1	0	1	0	0	2
6:00 PM	3	2	0	0	1	0	0	0	6
6:15 PM	1	0	0	0	0	1	0	0	2
6:30 PM	0	1	0	0	0	0	0	0	1
6:45 PM	0	0	1	0	0	1	0	0	2
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	6	7	1	1	3	4	0	0	22
APPROACH %'s :	46.15%	53.85%	50.00%	50.00%	42.86%	57.14%			
PEAK HR :	04:00 PM - 05:00 PM								TOTAL
PEAK HR VOL :	2	2	0	0	1	1	0	0	6
PEAK HR FACTOR :	0.250	0.500			0.250	0.250			0.750
	0.500				0.500				

Prepared by National Data & Surveying Services

Branch Dr & Oak Springs Dr

Peak Hour Turning Movement Count

ID: 23-260020-005
City: Warrenton

Day: Thursday
Date: 2/9/2023

PEAK HOURS	COUNT PERIODS
07:45 AM - 08:45 AM	6:00 AM - 09:00 AM
NONE	NONE
04:00 PM - 05:00 PM	4:00 PM - 07:00 PM

SOUTHBOUND (Branch Dr)

	L	T	R	U	Total	
AM	2	0	0	0	0	AM
NOON	0	0	0	0	0	NOON
PM	0	5	1	0	7	PM

EASTBOUND (Oak Springs Dr)

	L	T	R	U	Total	
AM	0	0	0	0	0	AM
NOON	0	0	0	0	0	NOON
PM	0	1	0	0	1	PM

AM	NOON	PM	
174	0	173	⇦
0	0	0	↶ 0
0	0	3	↱ 0
78	0	105	→ 1
86	0	86	↴ 0

WESTBOUND (Oak Springs Dr)

	L	T	R	U	Total	
AM	0	0	2	0	2	AM
NOON	0	0	0	0	0	NOON
PM	0	1	0	0	1	PM

PM	NOON	AM	
0	2	0	↰ 0
1	112	0	← 107
0	28	0	↰ 16
0	0	0	↶ 0
	143	0	90 ⇨

NORTHBOUND (Branch Dr)

	L	T	R	U	Total	
AM	102	0	65	0	12	AM
NOON	0	0	0	0	0	NOON
PM	120	1	61	2	37	PM

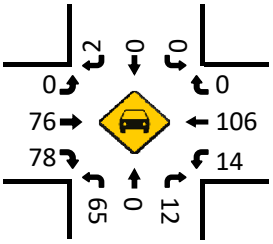
PM	NOON	AM		
120	1	61	2	37	PM
0	0	0	0	0	NOON
102	0	65	0	12	AM
⇩	0	0	2	0	

CONTROL

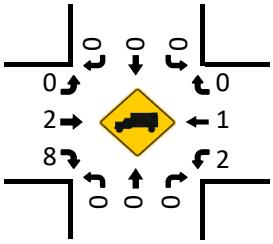
2-Way Stop(NB/SB)

TEV	366 AM	0 NOON	443 PM
PHF	0.69		0.89

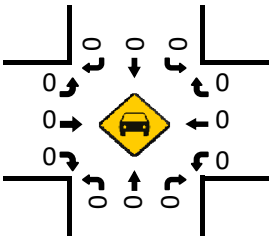
Cars (AM)



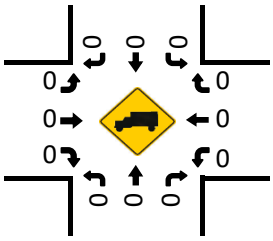
HT (AM)



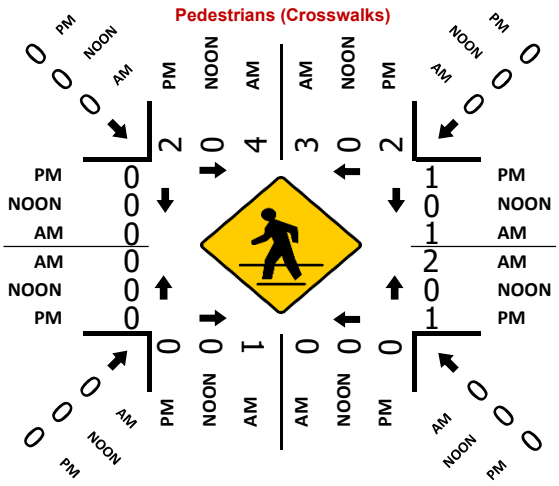
Cars (NOON)



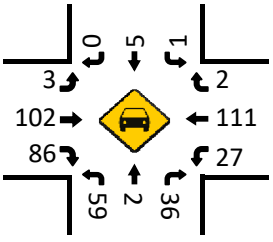
HT (NOON)



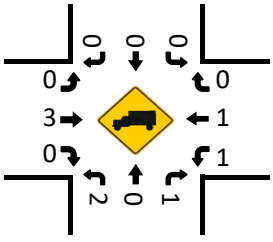
Pedestrians (Crosswalks)



Cars (PM)



HT (PM)



National Data & Surveying Services Intersection Turning Movement Count

Location: Hastings Ln & Oak Springs Dr
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-006
Date: 2/9/2023

Data - Total

NS/EW Streets:	Hastings Ln				Hastings Ln				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	4	0	0	0	1	5	0	0	0	1	1	0	12
6:15 AM	0	0	0	0	3	0	3	0	1	2	0	0	0	4	0	0	13
6:30 AM	0	0	0	0	2	0	5	0	3	5	0	0	0	6	3	0	24
6:45 AM	0	0	0	0	4	0	8	0	6	9	0	0	0	7	1	0	35
7:00 AM	0	0	0	0	5	0	5	0	7	7	0	0	0	14	4	0	42
7:15 AM	0	0	0	0	5	0	16	0	11	18	0	0	0	16	6	0	72
7:30 AM	0	0	0	0	2	0	13	0	17	20	0	0	0	24	10	0	86
7:45 AM	0	0	0	0	5	0	6	0	18	39	0	0	0	68	12	0	148
8:00 AM	0	0	0	0	14	0	20	0	24	20	0	0	0	27	10	0	115
8:15 AM	0	0	0	0	26	0	28	0	24	25	0	0	0	17	12	0	132
8:30 AM	0	0	0	0	16	0	20	0	8	19	0	0	0	21	7	0	91
8:45 AM	0	0	0	0	2	0	7	0	9	41	0	0	0	21	7	0	87
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	88	0	131	0	129	210	0	0	0	226	73	0	857
APPROACH %'s :					40.18%	0.00%	59.82%	0.00%	38.05%	61.95%	0.00%	0.00%	0.00%	75.59%	24.41%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	0	0	0	61	0	74	0	74	103	0	0	0	133	41	0	486
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.587	0.000	0.661	0.000	0.771	0.660	0.000	0.000	0.000	0.489	0.854	0.000	0.821
					0.625				0.776				0.544				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	24	0	12	0	7	32	0	0	0	39	1	0	115
4:15 PM	0	0	0	0	15	0	9	0	12	29	0	0	0	35	3	0	103
4:30 PM	0	0	0	0	21	0	14	0	12	36	0	0	0	46	6	0	135
4:45 PM	0	0	0	0	7	0	17	0	11	31	0	0	0	40	2	0	108
5:00 PM	0	0	0	0	13	0	2	0	16	30	0	0	0	43	3	0	107
5:15 PM	0	0	0	0	11	0	10	0	12	23	0	0	0	40	8	0	104
5:30 PM	0	0	0	0	2	0	11	0	14	32	0	0	0	43	8	0	110
5:45 PM	0	0	0	0	7	0	10	0	6	28	0	0	0	28	5	0	84
6:00 PM	0	0	0	0	15	0	6	0	8	14	0	0	0	31	5	0	79
6:15 PM	0	0	0	0	8	0	6	0	6	18	0	0	0	15	7	0	60
6:30 PM	0	0	0	0	5	0	4	0	4	18	0	0	0	16	5	0	52
6:45 PM	0	0	0	0	4	0	5	0	4	12	0	0	0	8	8	0	41
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	132	0	106	0	112	303	0	0	0	384	61	0	1098
APPROACH %'s :					55.46%	0.00%	44.54%	0.00%	26.99%	73.01%	0.00%	0.00%	0.00%	86.29%	13.71%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	67	0	52	0	42	128	0	0	0	160	12	0	461
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.698	0.000	0.765	0.000	0.875	0.889	0.000	0.000	0.000	0.870	0.500	0.000	0.854
					0.826				0.885				0.827				

National Data & Surveying Services Intersection Turning Movement Count

Location: Hastings Ln & Oak Springs Dr
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-006
Date: 2/9/2023

Data - Cars

NS/EW Streets:	Hastings Ln				Hastings Ln				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	4	0	0	0	1	5	0	0	0	1	1	0	12
6:15 AM	0	0	0	0	3	0	3	0	1	2	0	0	0	4	0	0	13
6:30 AM	0	0	0	0	2	0	5	0	2	4	0	0	0	6	3	0	22
6:45 AM	0	0	0	0	3	0	8	0	5	9	0	0	0	7	1	0	33
7:00 AM	0	0	0	0	4	0	5	0	7	5	0	0	0	14	4	0	39
7:15 AM	0	0	0	0	5	0	16	0	11	17	0	0	0	16	6	0	71
7:30 AM	0	0	0	0	2	0	13	0	17	20	0	0	0	24	10	0	86
7:45 AM	0	0	0	0	5	0	6	0	15	39	0	0	0	67	12	0	144
8:00 AM	0	0	0	0	12	0	20	0	22	19	0	0	0	27	10	0	110
8:15 AM	0	0	0	0	20	0	28	0	24	25	0	0	0	17	12	0	126
8:30 AM	0	0	0	0	16	0	20	0	8	18	0	0	0	21	7	0	90
8:45 AM	0	0	0	0	2	0	7	0	9	40	0	0	0	21	7	0	86
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	78	0	131	0	122	203	0	0	0	225	73	0	832
APPROACH %'s :					37.32%	0.00%	62.68%	0.00%	37.54%	62.46%	0.00%	0.00%	0.00%	75.50%	24.50%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	0	0	0	53	0	74	0	69	101	0	0	0	132	41	0	470
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.663	0.000	0.661	0.000	0.719	0.647	0.000	0.000	0.000	0.493	0.854	0.000	0.816
							0.661				0.787				0.547		

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	24	0	12	0	7	32	0	0	0	38	1	0	114
4:15 PM	0	0	0	0	15	0	8	0	11	28	0	0	0	35	3	0	100
4:30 PM	0	0	0	0	21	0	14	0	12	35	0	0	0	45	6	0	133
4:45 PM	0	0	0	0	7	0	17	0	11	30	0	0	0	39	2	0	106
5:00 PM	0	0	0	0	12	0	2	0	15	30	0	0	0	42	3	0	104
5:15 PM	0	0	0	0	11	0	10	0	12	23	0	0	0	40	8	0	104
5:30 PM	0	0	0	0	2	0	11	0	14	32	0	0	0	43	8	0	110
5:45 PM	0	0	0	0	7	0	10	0	5	28	0	0	0	28	5	0	83
6:00 PM	0	0	0	0	15	0	6	0	8	14	0	0	0	31	5	0	79
6:15 PM	0	0	0	0	8	0	6	0	6	18	0	0	0	15	7	0	60
6:30 PM	0	0	0	0	5	0	4	0	3	18	0	0	0	16	5	0	51
6:45 PM	0	0	0	0	4	0	5	0	4	12	0	0	0	8	8	0	41
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	131	0	105	0	108	300	0	0	0	380	61	0	1085
APPROACH %'s :					55.51%	0.00%	44.49%	0.00%	26.47%	73.53%	0.00%	0.00%	0.00%	86.17%	13.83%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	67	0	51	0	41	125	0	0	0	157	12	0	453
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.698	0.000	0.750	0.000	0.854	0.893	0.000	0.000	0.000	0.872	0.500	0.000	0.852
							0.819				0.883				0.828		

National Data & Surveying Services Intersection Turning Movement Count

Location: Hastings Ln & Oak Springs Dr
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-006
Date: 2/9/2023

Data - HT

NS/EW Streets:	Hastings Ln				Hastings Ln				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
6:45 AM	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2
7:00 AM	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	3
7:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	0	4
8:00 AM	0	0	0	0	2	0	0	0	2	1	0	0	0	0	0	0	5
8:15 AM	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	6
8:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	10	0	0	0	7	7	0	0	0	1	0	0	25
APPROACH %'s :					100.00%	0.00%	0.00%	0.00%	50.00%	50.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	0	0	0	8	0	0	0	5	2	0	0	0	1	0	0	16
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.333	0.000	0.000	0.000	0.417	0.500	0.000	0.000	0.000	0.250	0.000	0.000	0.667
					0.333				0.583				0.250				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
4:15 PM	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	3
4:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
4:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
5:00 PM	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	3
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	1	0	1	0	4	3	0	0	0	4	0	0	13
APPROACH %'s :					50.00%	0.00%	50.00%	0.00%	57.14%	42.86%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	1	0	1	3	0	0	0	3	0	0	8
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.250	0.750	0.000	0.000	0.000	0.750	0.000	0.000	0.667
					0.250				0.500				0.750				

National Data & Surveying Services Intersection Turning Movement Count

Location: Hastings Ln & Oak Springs Dr
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-006
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	Hastings Ln				Hastings Ln				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

National Data & Surveying Services Intersection Turning Movement Count

Location: Hastings Ln & Oak Springs Dr
City: Warrenton
Project ID: 23-260020-006
Date: 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	Hastings Ln		Hastings Ln		Oak Springs Dr		Oak Springs Dr		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	1	0	0	0	0	0	0	0	1
7:00 AM	1	2	0	0	0	1	0	0	4
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	1	0	0	1
8:15 AM	1	0	0	0	1	0	0	0	2
8:30 AM	0	1	0	0	0	0	0	0	1
8:45 AM	1	0	0	0	0	0	0	0	1
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	4	3	0	0	1	2	0	0	10
APPROACH %'s :	57.14%	42.86%			33.33%	66.67%			
PEAK HR :	07:45 AM - 08:45 AM								TOTAL
PEAK HR VOL :	1	1	0	0	1	1	0	0	4
PEAK HR FACTOR :	0.250	0.250			0.250	0.250			0.500
	0.500				0.500				

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	2	0	0	0	2
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	1	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	1	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	2	0	0	0	0	0	0	0	2
6:15 PM	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	1	0	0	1
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	2	2	0	0	2	1	0	0	7
APPROACH %'s :	50.00%	50.00%			66.67%	33.33%			
PEAK HR :	04:00 PM - 05:00 PM								TOTAL
PEAK HR VOL :	0	1	0	0	2	0	0	0	3
PEAK HR FACTOR :		0.250			0.250				0.375
	0.250				0.250				

Prepared by National Data & Surveying Services

Hastings Ln & Oak Springs Dr

Peak Hour Turning Movement Count

ID: 23-260020-006
City: Warrenton

Day: Thursday
Date: 2/9/2023

	PEAK HOURS	COUNT PERIODS
AM	07:45 AM - 08:45 AM	6:00 AM - 09:00 AM
NOON	NONE	NONE
PM	04:00 PM - 05:00 PM	4:00 PM - 07:00 PM

SOUTHBOUND (Hastings Ln)

	Right	Through	Left	U-Turn	Exiting
AM	74	0	61	0	115
NOON	0	0	0	0	0
PM	52	0	67	0	54
(red)	0	1	0	0	

WESTBOUND (Oak Springs Dr)

	PM	NOON	AM	(red)
Right	12	0	41	0
Through	160	0	133	1
Left	0	0	0	0
U-Turn	0	0	0	0
Exiting	195	0	164	

EASTBOUND (Oak Springs Dr)

	AM	NOON	PM	(red)
Exiting	207	0	212	
U-Turn	0	0	0	0
Left	74	0	42	0
Through	103	0	128	1
Right	0	0	0	0

NORTHBOUND (Hastings Ln)

	Exiting	U-Turn	Left	Through	Right
(red)		0	0	0	0
PM	0	0	0	0	0
NOON	0	0	0	0	0
AM	0	0	0	0	0

CONTROL

1-Way Stop(SB)

	AM	NOON	PM
TEV	486	0	461
PHF	0.82		0.85

Cars (AM)

Approach	Left	Through	Right	U-Turn
SB	53	0	74	
EB	69	101	0	
WB	0	132	41	
NB	0	0	0	0

HT (AM)

Approach	Left	Through	Right	U-Turn
SB	8	0	0	
EB	5	2	0	
WB	0	1	0	
NB	0	0	0	0

Cars (NOON)

Approach	Left	Through	Right	U-Turn
SB	0	0	0	
EB	0	0	0	
WB	0	0	0	
NB	0	0	0	0

HT (NOON)

Approach	Left	Through	Right	U-Turn
SB	0	0	0	
EB	0	0	0	
WB	0	0	0	
NB	0	0	0	0

Cars (PM)

Approach	Left	Through	Right	U-Turn
SB	67	0	51	
EB	41	125	0	
WB	0	157	12	
NB	0	0	0	0

HT (PM)

Approach	Left	Through	Right	U-Turn
SB	0	0	1	
EB	1	3	0	
WB	0	3	0	
NB	0	0	0	0

Pedestrians (Crosswalks)

Crosswalk	Direction	AM	NOON	PM
North	→	1	0	0
North	←	1	0	1
West	↓	0	0	0
West	↑	0	0	0
East	↓	1	0	0
East	↑	1	0	2
South	→	0	0	0
South	←	0	0	0
NW diagonal		0	0	0
NE diagonal		0	0	0
SW diagonal		0	0	0
SE diagonal		0	0	0

National Data & Surveying Services Intersection Turning Movement Count

Location: Highland School Dwy & Oak Springs Dr
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-007
Date: 2/9/2023

Data - Total

NS/EW Streets:	Highland School Dwy				Highland School Dwy				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	6	0	0	0	1	0	0	7
6:15 AM	0	0	0	0	0	0	0	0	0	4	0	0	0	7	0	0	11
6:30 AM	0	0	0	0	0	0	0	0	0	7	0	0	0	11	0	0	18
6:45 AM	0	0	0	0	0	0	0	0	0	15	0	0	0	14	0	0	29
7:00 AM	0	0	0	0	0	0	0	0	2	15	0	0	0	16	4	0	37
7:15 AM	0	0	0	0	0	0	2	0	1	28	0	0	0	30	2	0	63
7:30 AM	0	0	0	0	3	0	4	0	13	34	0	0	0	25	10	0	89
7:45 AM	0	0	0	0	25	0	8	0	19	32	0	0	0	43	33	0	160
8:00 AM	0	0	0	0	2	0	6	0	5	43	0	0	0	42	5	0	103
8:15 AM	0	0	0	0	1	0	1	0	1	47	0	0	0	42	3	0	95
8:30 AM	0	0	0	0	0	0	3	0	5	28	0	0	0	32	7	0	75
8:45 AM	0	0	0	0	19	0	14	0	20	30	0	0	0	17	13	0	113
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	50	0	38	0	66	289	0	0	0	280	77	0	800
APPROACH %'s :					56.82%	0.00%	43.18%	0.00%	18.59%	81.41%	0.00%	0.00%	0.00%	78.43%	21.57%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	31	0	19	0	38	156	0	0	0	152	51	0	447
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.310	0.000	0.594	0.000	0.500	0.830	0.000	0.000	0.000	0.884	0.386	0.000	0.698
					0.379				0.951				0.668				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	2	0	1	0	2	35	0	0	0	50	1	0	91
4:15 PM	0	0	0	0	2	0	6	0	2	39	0	0	0	44	0	0	93
4:30 PM	0	0	0	0	4	0	17	0	1	44	0	0	0	59	1	0	126
4:45 PM	0	0	0	0	1	0	3	0	0	41	0	0	0	57	0	0	102
5:00 PM	0	0	0	0	0	0	0	0	0	46	0	0	0	44	1	0	91
5:15 PM	0	0	0	0	1	0	0	0	0	34	0	0	0	49	1	0	85
5:30 PM	0	0	0	0	0	0	0	0	1	47	0	0	0	54	0	0	102
5:45 PM	0	0	0	0	0	0	2	0	0	33	0	0	0	37	0	0	72
6:00 PM	0	0	0	0	0	0	0	0	0	22	0	0	0	38	0	0	60
6:15 PM	0	0	0	0	1	0	0	0	0	23	0	0	0	21	0	0	45
6:30 PM	0	0	0	0	0	0	1	0	0	22	0	0	0	20	0	0	43
6:45 PM	0	0	0	0	0	0	0	0	0	16	0	0	0	13	0	0	29
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	11	0	30	0	6	402	0	0	0	486	4	0	939
APPROACH %'s :					26.83%	0.00%	73.17%	0.00%	1.47%	98.53%	0.00%	0.00%	0.00%	99.18%	0.82%	0.00%	
PEAK HR :	04:15 PM - 05:15 PM																TOTAL
PEAK HR VOL :	0	0	0	0	7	0	26	0	3	170	0	0	0	204	2	0	412
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.438	0.000	0.382	0.000	0.375	0.924	0.000	0.000	0.000	0.864	0.500	0.000	0.817
					0.393				0.940				0.858				

National Data & Surveying Services Intersection Turning Movement Count

Location: Highland School Dwy & Oak Springs Dr
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-007
Date: 2/9/2023

Data - Cars

NS/EW Streets:	Highland School Dwy				Highland School Dwy				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	6	0	0	0	1	0	0	7
6:15 AM	0	0	0	0	0	0	0	0	0	4	0	0	0	7	0	0	11
6:30 AM	0	0	0	0	0	0	0	0	0	5	0	0	0	11	0	0	16
6:45 AM	0	0	0	0	0	0	0	0	0	14	0	0	0	14	0	0	28
7:00 AM	0	0	0	0	0	0	0	0	2	13	0	0	0	16	4	0	35
7:15 AM	0	0	0	0	0	0	2	0	1	27	0	0	0	30	2	0	62
7:30 AM	0	0	0	0	3	0	4	0	13	34	0	0	0	25	10	0	89
7:45 AM	0	0	0	0	25	0	8	0	19	29	0	0	0	42	33	0	156
8:00 AM	0	0	0	0	2	0	6	0	5	40	0	0	0	42	5	0	100
8:15 AM	0	0	0	0	1	0	1	0	1	47	0	0	0	42	3	0	95
8:30 AM	0	0	0	0	0	0	3	0	5	27	0	0	0	32	7	0	74
8:45 AM	0	0	0	0	19	0	14	0	20	29	0	0	0	17	13	0	112
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	50	0	38	0	66	275	0	0	0	279	77	0	785
APPROACH %'s :					56.82%	0.00%	43.18%	0.00%	19.35%	80.65%	0.00%	0.00%	0.00%	78.37%	21.63%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	31	0	19	0	38	150	0	0	0	151	51	0	440
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.310	0.000	0.594	0.000	0.500	0.798	0.000	0.000	0.000	0.899	0.386	0.000	0.705
					0.379				0.979				0.673				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	2	0	1	0	2	35	0	0	0	49	1	0	90
4:15 PM	0	0	0	0	2	0	6	0	2	37	0	0	0	43	0	0	90
4:30 PM	0	0	0	0	4	0	17	0	1	43	0	0	0	58	1	0	124
4:45 PM	0	0	0	0	1	0	3	0	0	40	0	0	0	56	0	0	100
5:00 PM	0	0	0	0	0	0	0	0	0	45	0	0	0	43	1	0	89
5:15 PM	0	0	0	0	1	0	0	0	0	34	0	0	0	49	1	0	85
5:30 PM	0	0	0	0	0	0	0	0	1	47	0	0	0	54	0	0	102
5:45 PM	0	0	0	0	0	0	2	0	0	32	0	0	0	37	0	0	71
6:00 PM	0	0	0	0	0	0	0	0	0	22	0	0	0	38	0	0	60
6:15 PM	0	0	0	0	1	0	0	0	0	23	0	0	0	21	0	0	45
6:30 PM	0	0	0	0	0	0	1	0	0	21	0	0	0	20	0	0	42
6:45 PM	0	0	0	0	0	0	0	0	0	16	0	0	0	13	0	0	29
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	11	0	30	0	6	395	0	0	0	481	4	0	927
APPROACH %'s :					26.83%	0.00%	73.17%	0.00%	1.50%	98.50%	0.00%	0.00%	0.00%	99.18%	0.82%	0.00%	
PEAK HR :	04:15 PM - 05:15 PM																TOTAL
PEAK HR VOL :	0	0	0	0	7	0	26	0	3	165	0	0	0	200	2	0	403
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.438	0.000	0.382	0.000	0.375	0.917	0.000	0.000	0.000	0.862	0.500	0.000	0.813
					0.393				0.933				0.856				

National Data & Surveying Services Intersection Turning Movement Count

Location: Highland School Dwy & Oak Springs Dr
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-007
Date: 2/9/2023

Data - HT

NS/EW Streets:	Highland School Dwy				Highland School Dwy				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
6:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7:00 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
7:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	4
8:00 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	14	0	0	0	1	0	0	15
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	6	0	0	0	1	0	0	7
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.250	0.000	0.000	0.438
										0.500				0.250			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
4:15 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3
4:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
4:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
5:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	7	0	0	0	5	0	0	12
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	04:15 PM - 05:15 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	5	0	0	0	4	0	0	9
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.625	0.000	0.000	0.000	1.000	0.000	0.000	0.750
										0.625				1.000			

National Data & Surveying Services Intersection Turning Movement Count

Location: Highland School Dwy & Oak Springs Dr
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-007
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	Highland School Dwy				Highland School Dwy				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	04:15 PM - 05:15 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

National Data & Surveying Services Intersection Turning Movement Count

Location: Highland School Dwy & Oak Springs Dr
City: Warrenton
Project ID: 23-260020-007
Date: 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	Highland School Dwy		Highland School Dwy		Oak Springs Dr		Oak Springs Dr		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	1	0	0	0	0	0	0	0	1
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	1	0	0	0	0	0	0	0	1
APPROACH %'s :	100.00%	0.00%							
PEAK HR :	07:30 AM - 08:30 AM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	1	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	1	0	0	0	0	0	0	1
5:15 PM	0	1	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	3	0	0	0	0	0	0	3
APPROACH %'s :	0.00%	100.00%							
PEAK HR :	04:15 PM - 05:15 PM								TOTAL
PEAK HR VOL :	0	2	0	0	0	0	0	0	2
PEAK HR FACTOR :		0.500							0.500
	0.500								

Prepared by National Data & Surveying Services

Highland School Dwy & Oak Springs Dr

Peak Hour Turning Movement Count

ID: 23-260020-007
City: Warrenton

Day: Thursday
Date: 2/9/2023

PEAK HOURS		COUNT PERIODS
AM	07:30 AM - 08:30 AM	6:00 AM - 09:00 AM
NOON	NONE	NONE
PM	04:15 PM - 05:15 PM	4:00 PM - 07:00 PM

SOUTHBOUND – Highland School Dwy

	Right	Thru	Left	U-Turn	Departing
AM	19	0	31	0	89
NOON	0	0	0	0	0
PM	26	0	7	0	5
	1	0	1	0	

EASTBOUND – Oak Springs Dr

	AM	NOON	PM	
Departing	171	0	230	
U-Turn	0	0	0	0
Left	38	0	3	1
Thru	156	0	170	1
Right	0	0	0	0

WESTBOUND – Oak Springs Dr

		PM	NOON	AM
Left	0	2	0	51
Thru	1	204	0	152
Right	0	0	0	0
U-Turn	0	0	0	0
Departing		177	0	187

NORTHBOUND – Highland School Dwy

	Departing	U-Turn	Left	Thru	Right
		0	0	0	0
PM	0	0	0	0	0
NOON	0	0	0	0	0
AM	0	0	0	0	0

CONTROL

1-Way stop(SB)

	AM	NOON	PM
TEV	447	0	412
PHF	0.70		0.82

Cars (AM)

Approach	Left	Thru	Right
SB	31	0	19
EB	38	150	0
WB	51	151	0
NB	0	0	0

HT (AM)

Approach	Left	Thru	Right
SB	0	0	0
EB	0	6	0
WB	0	1	0
NB	0	0	0

Cars (NOON)

Approach	Left	Thru	Right
SB	0	0	0
EB	0	0	0
WB	0	0	0
NB	0	0	0

HT (NOON)

Approach	Left	Thru	Right
SB	0	0	0
EB	0	0	0
WB	0	0	0
NB	0	0	0

Cars (PM)

Approach	Left	Thru	Right
SB	7	0	26
EB	3	165	0
WB	2	200	0
NB	0	0	0

HT (PM)

Approach	Left	Thru	Right
SB	0	0	0
EB	0	5	0
WB	0	4	0
NB	0	0	0

Pedestrians (Crosswalks)

Crosswalk	AM	NOON	PM
North (westward)	0	0	0
North (eastward)	0	0	2
West (southward)	0	0	0
West (northward)	0	0	0
East (southward)	0	0	0
East (northward)	0	0	0
South (westward)	0	0	0
South (eastward)	0	0	0
NW diagonal	0	0	0
NE diagonal	0	0	0
SW diagonal	0	0	0
SE diagonal	0	0	0

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Oak Springs Dr
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-008
Date: 2/9/2023

Data - Total

NS/EW Streets:	US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	38	1	0	5	29	0	0	0	0	0	0	0	0	1	0	74
6:15 AM	0	38	2	0	2	28	0	0	0	0	0	0	3	0	3	0	76
6:30 AM	0	49	3	0	4	38	0	0	0	0	0	0	6	0	6	0	106
6:45 AM	0	48	5	0	10	59	0	0	0	0	0	0	6	0	7	0	135
7:00 AM	1	65	13	0	5	113	1	0	0	0	0	0	13	0	4	0	215
7:15 AM	0	71	15	0	13	88	0	0	0	0	1	0	18	0	14	0	220
7:30 AM	1	121	29	0	17	79	1	0	0	1	0	0	9	0	18	0	276
7:45 AM	0	152	27	0	24	108	0	0	0	0	0	0	12	0	41	0	364
8:00 AM	0	73	21	0	28	90	0	0	0	0	0	0	20	0	26	0	258
8:15 AM	0	59	21	0	26	78	0	0	0	0	0	0	22	1	20	0	227
8:30 AM	0	60	18	0	19	74	1	0	0	0	0	0	23	1	12	0	208
8:45 AM	1	61	31	1	15	93	2	0	0	0	0	0	22	0	10	0	236
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	3	835	186	1	168	877	5	0	0	1	1	0	154	2	162	0	2395
APPROACH %'s :	0.29%	81.46%	18.15%	0.10%	16.00%	83.52%	0.48%	0.00%	0.00%	50.00%	50.00%	0.00%	48.43%	0.63%	50.94%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	1	405	98	0	95	355	1	0	0	1	0	0	63	1	105	0	1125
PEAK HR FACTOR :	0.250	0.666	0.845	0.000	0.848	0.822	0.250	0.000	0.000	0.250	0.000	0.000	0.716	0.250	0.640	0.000	0.773
		0.704				0.854				0.250				0.797			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	1	81	19	0	19	128	0	0	1	0	1	0	20	0	32	0	302
4:15 PM	0	95	24	0	16	142	0	0	1	0	0	0	13	0	34	0	325
4:30 PM	0	119	16	0	30	108	0	0	0	0	2	0	40	0	39	0	354
4:45 PM	1	75	18	0	21	119	2	0	0	1	1	0	24	0	34	0	296
5:00 PM	1	94	19	0	27	107	0	0	0	1	1	0	13	0	33	0	296
5:15 PM	0	85	14	0	19	116	0	0	0	0	1	0	18	0	31	0	284
5:30 PM	1	68	21	0	26	93	0	0	0	1	0	0	25	0	28	0	263
5:45 PM	0	83	9	0	24	106	1	0	0	0	0	0	22	0	18	0	263
6:00 PM	0	66	11	0	13	64	0	0	0	0	1	0	13	0	23	0	191
6:15 PM	0	66	11	0	10	87	0	0	0	0	0	0	8	0	14	0	196
6:30 PM	0	56	12	0	10	54	0	0	1	0	1	0	9	0	13	0	156
6:45 PM	0	52	8	0	8	53	0	0	0	0	0	0	3	1	8	0	133
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	4	940	182	0	223	1177	3	0	3	3	8	0	208	1	307	0	3059
APPROACH %'s :	0.36%	83.48%	16.16%	0.00%	15.89%	83.89%	0.21%	0.00%	21.43%	21.43%	57.14%	0.00%	40.31%	0.19%	59.50%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	2	370	77	0	86	497	2	0	2	1	4	0	97	0	139	0	1277
PEAK HR FACTOR :	0.500	0.777	0.802	0.000	0.717	0.875	0.250	0.000	0.500	0.250	0.500	0.000	0.606	0.000	0.891	0.000	0.902
		0.831				0.926				0.875				0.747			

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Oak Springs Dr
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-008
Date: 2/9/2023

Data - Cars

NS/EW Streets:	US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	35	1	0	5	28	0	0	0	0	0	0	0	0	1	0	70
6:15 AM	0	35	2	0	2	28	0	0	0	0	0	0	3	0	3	0	73
6:30 AM	0	47	2	0	3	36	0	0	0	0	0	0	6	0	6	0	100
6:45 AM	0	45	5	0	9	56	0	0	0	0	0	0	6	0	7	0	128
7:00 AM	1	57	11	0	5	106	0	0	0	0	0	0	13	0	4	0	197
7:15 AM	0	67	15	0	12	81	0	0	0	0	1	0	18	0	14	0	208
7:30 AM	1	117	29	0	17	71	1	0	0	1	0	0	9	0	18	0	264
7:45 AM	0	146	26	0	22	107	0	0	0	0	0	0	12	0	40	0	353
8:00 AM	0	67	21	0	25	89	0	0	0	0	0	0	20	0	26	0	248
8:15 AM	0	52	21	0	26	72	0	0	0	0	0	0	22	1	20	0	214
8:30 AM	0	56	17	0	19	59	1	0	0	0	0	0	23	1	12	0	188
8:45 AM	1	58	31	1	14	88	2	0	0	0	0	0	22	0	10	0	227
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	3	782	181	1	159	821	4	0	0	1	1	0	154	2	161	0	2270
APPROACH %'s :	0.31%	80.87%	18.72%	0.10%	16.16%	83.43%	0.41%	0.00%	0.00%	50.00%	50.00%	0.00%	48.58%	0.63%	50.79%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	1	382	97	0	90	339	1	0	0	1	0	0	63	1	104	0	1079
PEAK HR FACTOR :	0.250	0.654	0.836	0.000	0.865	0.792	0.250	0.000	0.000	0.250	0.000	0.000	0.716	0.250	0.650	0.000	0.764
		0.698				0.833				0.250				0.808			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	1	80	19	0	19	124	0	0	1	0	1	0	20	0	31	0	296
4:15 PM	0	93	22	0	16	134	0	0	1	0	0	0	12	0	34	0	312
4:30 PM	0	115	15	0	30	105	0	0	0	0	2	0	40	0	38	0	345
4:45 PM	1	71	18	0	20	116	2	0	0	1	1	0	24	0	33	0	287
5:00 PM	1	93	18	0	27	105	0	0	0	1	1	0	13	0	32	0	291
5:15 PM	0	83	14	0	19	115	0	0	0	0	1	0	18	0	31	0	281
5:30 PM	1	68	21	0	26	92	0	0	0	1	0	0	25	0	28	0	262
5:45 PM	0	82	8	0	24	105	1	0	0	0	0	0	22	0	18	0	260
6:00 PM	0	65	11	0	13	64	0	0	0	0	1	0	13	0	23	0	190
6:15 PM	0	66	11	0	10	86	0	0	0	0	0	0	8	0	14	0	195
6:30 PM	0	56	11	0	10	53	0	0	1	0	1	0	9	0	13	0	154
6:45 PM	0	51	8	0	8	52	0	0	0	0	0	0	3	1	8	0	131
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	4	923	176	0	222	1151	3	0	3	3	8	0	207	1	303	0	3004
APPROACH %'s :	0.36%	83.68%	15.96%	0.00%	16.13%	83.65%	0.22%	0.00%	21.43%	21.43%	57.14%	0.00%	40.51%	0.20%	59.30%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	2	359	74	0	85	479	2	0	2	1	4	0	96	0	136	0	1240
PEAK HR FACTOR :	0.500	0.780	0.841	0.000	0.708	0.894	0.250	0.000	0.500	0.250	0.500	0.000	0.600	0.000	0.895	0.000	0.899
		0.837				0.943				0.875				0.744			

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Oak Springs Dr
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-008
Date: 2/9/2023

Data - HT

NS/EW Streets:	US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4
6:15 AM	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
6:30 AM	0	2	1	0	1	2	0	0	0	0	0	0	0	0	0	0	6
6:45 AM	0	3	0	0	1	3	0	0	0	0	0	0	0	0	0	0	7
7:00 AM	0	8	2	0	0	7	1	0	0	0	0	0	0	0	0	0	18
7:15 AM	0	4	0	0	1	7	0	0	0	0	0	0	0	0	0	0	12
7:30 AM	0	4	0	0	0	8	0	0	0	0	0	0	0	0	0	0	12
7:45 AM	0	6	1	0	2	1	0	0	0	0	0	0	0	0	1	0	11
8:00 AM	0	6	0	0	3	1	0	0	0	0	0	0	0	0	0	0	10
8:15 AM	0	7	0	0	0	6	0	0	0	0	0	0	0	0	0	0	13
8:30 AM	0	4	1	0	0	15	0	0	0	0	0	0	0	0	0	0	20
8:45 AM	0	3	0	0	1	5	0	0	0	0	0	0	0	0	0	0	9
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	53	5	0	9	56	1	0	0	0	0	0	0	0	1	0	125
APPROACH %'s :	0.00%	91.38%	8.62%	0.00%	13.64%	84.85%	1.52%	0.00%					0.00%	0.00%	100.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	23	1	0	5	16	0	0	0	0	0	0	0	0	1	0	46
PEAK HR FACTOR :	0.000	0.821	0.250	0.000	0.417	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.885
	0.857				0.656								0.250				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	1	0	0	0	4	0	0	0	0	0	0	0	0	1	0	6
4:15 PM	0	2	2	0	0	8	0	0	0	0	0	0	1	0	0	0	13
4:30 PM	0	4	1	0	0	3	0	0	0	0	0	0	0	0	1	0	9
4:45 PM	0	4	0	0	1	3	0	0	0	0	0	0	0	0	1	0	9
5:00 PM	0	1	1	0	0	2	0	0	0	0	0	0	0	0	1	0	5
5:15 PM	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
5:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	3
6:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
6:30 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
6:45 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	17	6	0	1	26	0	0	0	0	0	0	1	0	4	0	55
APPROACH %'s :	0.00%	73.91%	26.09%	0.00%	3.70%	96.30%	0.00%	0.00%					20.00%	0.00%	80.00%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	11	3	0	1	18	0	0	0	0	0	0	1	0	3	0	37
PEAK HR FACTOR :	0.000	0.688	0.375	0.000	0.250	0.563	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.750	0.000	0.712
	0.700				0.594								1.000				

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Oak Springs Dr
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-008
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Oak Springs Dr **Project ID:** 23-260020-008
City: Warrenton **Date:** 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	US 17/US 211/Broadview Ave		US 17/US 211/Broadview Ave		Oak Springs Dr		Oak Springs Dr		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	1	0	1
7:00 AM	0	0	0	0	0	0	0	1	1
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	1	0	0	0	1
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	0	0	1	0	1	1	3
APPROACH %'s :					100.00%	0.00%	50.00%	50.00%	
PEAK HR :	**07:30 AM - 08:30 AM**								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	1	1	2
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	1	2	0	3
5:00 PM	0	1	0	0	0	0	0	1	2
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	1	0	1
5:45 PM	0	0	0	0	0	0	1	0	1
6:00 PM	0	0	0	0	3	0	0	0	3
6:15 PM	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	1	0	0	3	1	5	2	12
APPROACH %'s :	0.00%	100.00%			75.00%	25.00%	71.43%	28.57%	
PEAK HR :	**04:00 PM - 05:00 PM**								TOTAL
PEAK HR VOL :	0	0	0	0	0	1	3	1	5
PEAK HR FACTOR :						0.250	0.375	0.250	0.417
					0.250		0.500		

Prepared by National Data & Surveying Services

US 17/US 211/Broadview Ave & Oak Springs Dr

Peak Hour Turning Movement Count

ID: 23-260020-008
City: Warrenton

Day: Thursday
Date: 2/9/2023

PEAK HOURS	COUNT PERIODS
07:30 AM - 08:30 AM	6:00 AM - 09:00 AM
NONE	NONE
04:00 PM - 05:00 PM	4:00 PM - 07:00 PM

SOUTHBOUND — US 17/US 211/Broadview Ave

AM	1	355	95	0	510	AM
NOON	0	0	0	0	0	NOON
PM	2	497	86	0	511	PM

EASTBOUND — Oak Springs Dr

AM	NOON	PM		
3	0	4	⇦	
0	0	0	↶	0
0	0	2	↱	0
1	0	1	→	1
0	0	4	↴	0
AM	NOON	PM		

WESTBOUND — Oak Springs Dr

PM	NOON	AM		
139	0	105	↰	1
0	0	1	←	0
97	0	63	↰	1
0	0	0	↶	0
164	0	194	⇨	
PM	NOON	AM		

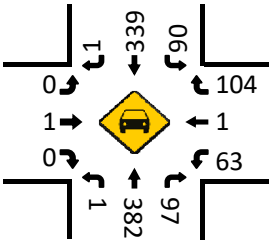
CONTROL: 2-Way Stop(EB/WB)

	AM	NOON	PM
TEV	1125	0	1277
PHF	0.77		0.90

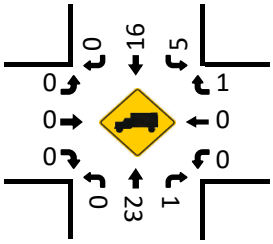
NORTHBOUND — US 17/US 211/Broadview Ave

PM	598	0	2	370	77	PM
NOON	0	0	0	0	0	NOON
AM	418	0	1	405	98	AM

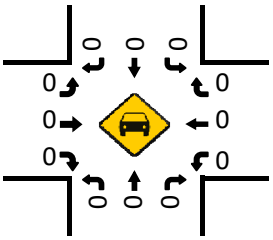
Cars (AM)



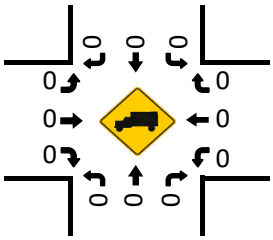
HT (AM)



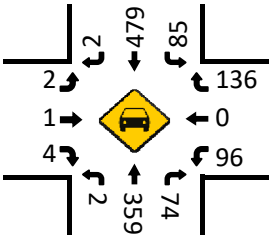
Cars (NOON)



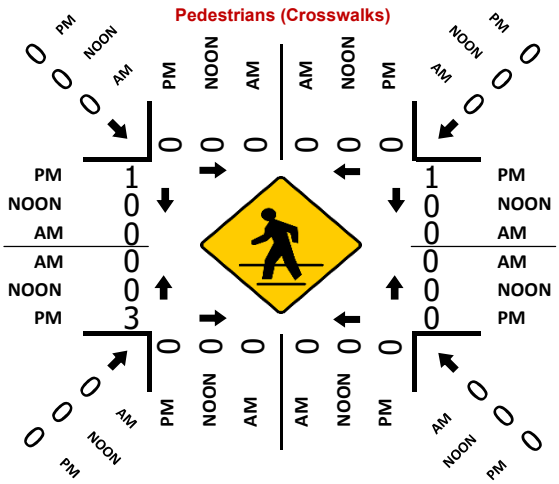
HT (NOON)



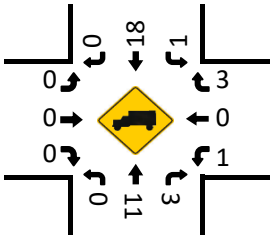
Cars (PM)



Pedestrians (Crosswalks)



HT (PM)



National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Warrenton Village North Dwy
City: Warrenton
Control: 1-Way stop(WB)

Project ID: 23-260020-009
Date: 2/9/2023

Data - Total

NS/EW Streets:	US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				Warrenton Village North Dwy				Warrenton Village North Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	38	1	0	0	28	1	0	0	0	1	0	1	0	0	0	70
6:15 AM	0	41	0	0	0	31	0	0	0	0	0	0	0	0	0	0	72
6:30 AM	0	51	0	0	1	43	0	0	0	0	0	0	0	0	0	0	95
6:45 AM	0	52	0	0	1	64	0	0	0	0	0	0	0	0	1	0	118
7:00 AM	6	78	0	0	2	123	0	0	0	0	1	0	2	0	2	0	214
7:15 AM	1	84	1	0	0	107	0	0	0	0	1	0	0	0	1	0	195
7:30 AM	2	153	1	0	3	82	0	0	0	0	0	0	0	1	0	0	242
7:45 AM	7	169	2	0	4	118	1	0	0	0	0	0	1	0	8	0	310
8:00 AM	3	89	5	0	4	106	1	0	0	0	0	0	3	0	5	0	216
8:15 AM	1	77	2	0	4	95	1	0	0	0	3	0	1	0	5	0	189
8:30 AM	4	75	4	0	3	92	1	0	0	0	2	0	2	0	5	0	188
8:45 AM	8	83	1	0	1	116	0	0	2	0	4	0	4	0	5	0	224
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	32	990	17	0	23	1005	5	0	2	0	12	0	14	1	32	0	2133
APPROACH %'s :	3.08%	95.28%	1.64%	0.00%	2.23%	97.29%	0.48%	0.00%	14.29%	0.00%	85.71%	0.00%	29.79%	2.13%	68.09%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	13	495	9	0	11	413	2	0	0	0	1	0	4	1	14	0	963
PEAK HR FACTOR :	0.464	0.732	0.450	0.000	0.688	0.875	0.500	0.000	0.000	0.000	0.250	0.000	0.333	0.250	0.438	0.000	0.777
	0.726				0.866				0.250				0.528				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	3	87	6	0	17	131	2	0	2	0	4	0	11	1	11	0	275
4:15 PM	5	104	1	1	8	146	1	0	2	0	3	0	3	0	13	0	287
4:30 PM	2	124	8	1	8	140	1	0	4	1	5	0	10	0	8	0	312
4:45 PM	3	85	0	0	7	135	2	1	2	0	5	0	9	0	5	0	254
5:00 PM	5	102	2	0	9	108	4	0	3	1	6	0	6	0	9	0	255
5:15 PM	8	91	1	0	12	121	1	0	1	1	6	0	9	0	7	0	258
5:30 PM	5	83	3	0	5	114	0	0	0	1	3	0	8	0	8	0	230
5:45 PM	2	81	3	0	13	113	1	0	0	0	1	0	2	0	10	0	226
6:00 PM	5	70	3	0	10	68	1	0	2	1	5	0	2	0	5	0	172
6:15 PM	1	62	0	0	7	88	0	0	0	0	2	0	9	0	15	0	184
6:30 PM	0	60	3	0	4	59	1	0	1	0	2	0	9	0	7	0	146
6:45 PM	3	59	1	0	8	48	0	0	0	0	5	0	3	1	1	0	129
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	42	1008	31	2	108	1271	14	1	17	5	47	0	81	2	99	0	2728
APPROACH %'s :	3.88%	93.07%	2.86%	0.18%	7.75%	91.18%	1.00%	0.07%	24.64%	7.25%	68.12%	0.00%	44.51%	1.10%	54.40%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	13	400	15	2	40	552	6	1	10	1	17	0	33	1	37	0	1128
PEAK HR FACTOR :	0.650	0.806	0.469	0.500	0.588	0.945	0.750	0.250	0.625	0.250	0.850	0.000	0.750	0.250	0.712	0.000	0.904
	0.796				0.966				0.700				0.772				

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Warrenton Village North Dwy
City: Warrenton
Control: 1-Way stop(WB)

Project ID: 23-260020-009
Date: 2/9/2023

Data - Cars

NS/EW Streets:	US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				Warrenton Village North Dwy				Warrenton Village North Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	35	1	0	0	28	0	0	0	0	0	0	1	0	0	0	65
6:15 AM	0	38	0	0	0	31	0	0	0	0	0	0	0	0	0	0	69
6:30 AM	0	48	0	0	1	41	0	0	0	0	0	0	0	0	0	0	90
6:45 AM	0	50	0	0	0	62	0	0	0	0	0	0	0	0	0	0	112
7:00 AM	6	68	0	0	2	117	0	0	0	0	0	0	2	0	2	0	197
7:15 AM	1	80	1	0	0	99	0	0	0	0	1	0	0	0	1	0	183
7:30 AM	2	149	1	0	3	74	0	0	0	0	0	0	0	1	0	0	230
7:45 AM	7	163	2	0	4	117	1	0	0	0	0	0	1	0	7	0	302
8:00 AM	3	83	5	0	4	105	1	0	0	0	0	0	3	0	5	0	209
8:15 AM	1	70	2	0	4	89	1	0	0	0	3	0	1	0	5	0	176
8:30 AM	4	71	2	0	3	77	1	0	0	0	2	0	2	0	4	0	166
8:45 AM	8	81	1	0	1	111	0	0	2	0	4	0	4	0	4	0	216
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	32	936	15	0	22	951	4	0	2	0	10	0	14	1	28	0	2015
APPROACH %'s :	3.26%	95.22%	1.53%	0.00%	2.25%	97.34%	0.41%	0.00%	16.67%	0.00%	83.33%	0.00%	32.56%	2.33%	65.12%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	13	475	9	0	11	395	2	0	0	0	1	0	4	1	13	0	924
PEAK HR FACTOR :	0.464	0.729	0.450	0.000	0.688	0.844	0.500	0.000	0.000	0.000	0.250	0.000	0.333	0.250	0.464	0.000	0.765
	0.722				0.836				0.250				0.563				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	3	86	6	0	17	127	2	0	2	0	4	0	11	1	11	0	270
4:15 PM	5	102	1	1	8	137	1	0	2	0	3	0	3	0	11	0	274
4:30 PM	2	119	8	1	8	137	1	0	4	1	5	0	10	0	8	0	304
4:45 PM	3	81	0	0	7	132	2	1	2	0	5	0	9	0	5	0	247
5:00 PM	5	101	2	0	9	106	4	0	3	1	6	0	6	0	8	0	251
5:15 PM	8	89	1	0	12	120	1	0	1	1	6	0	9	0	7	0	255
5:30 PM	4	83	3	0	5	113	0	0	0	1	2	0	8	0	8	0	227
5:45 PM	2	80	3	0	13	112	1	0	0	0	1	0	2	0	9	0	223
6:00 PM	4	69	3	0	10	68	1	0	2	1	5	0	2	0	5	0	170
6:15 PM	1	62	0	0	7	87	0	0	0	0	2	0	9	0	15	0	183
6:30 PM	0	60	3	0	3	59	1	0	1	0	2	0	9	0	6	0	144
6:45 PM	3	58	1	0	8	47	0	0	0	0	5	0	3	1	1	0	127
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	40	990	31	2	107	1245	14	1	17	5	46	0	81	2	94	0	2675
APPROACH %'s :	3.76%	93.13%	2.92%	0.19%	7.83%	91.08%	1.02%	0.07%	25.00%	7.35%	67.65%	0.00%	45.76%	1.13%	53.11%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	13	388	15	2	40	533	6	1	10	1	17	0	33	1	35	0	1095
PEAK HR FACTOR :	0.650	0.815	0.469	0.500	0.588	0.973	0.750	0.250	0.625	0.250	0.850	0.000	0.750	0.250	0.795	0.000	0.900
	0.804				0.993				0.700				0.750				

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Warrenton Village North Dwy
City: Warrenton
Control: 1-Way stop(WB)

Project ID: 23-260020-009
Date: 2/9/2023

Data - HT

NS/EW Streets:	US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				Warrenton Village North Dwy				Warrenton Village North Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	3	0	0	0	0	1	0	0	0	1	0	0	0	0	0	5
6:15 AM	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
6:30 AM	0	3	0	0	0	2	0	0	0	0	0	0	0	0	0	0	5
6:45 AM	0	2	0	0	1	2	0	0	0	0	0	0	0	0	1	0	6
7:00 AM	0	10	0	0	0	6	0	0	0	0	1	0	0	0	0	0	17
7:15 AM	0	4	0	0	0	8	0	0	0	0	0	0	0	0	0	0	12
7:30 AM	0	4	0	0	0	8	0	0	0	0	0	0	0	0	0	0	12
7:45 AM	0	6	0	0	0	1	0	0	0	0	0	0	0	0	1	0	8
8:00 AM	0	6	0	0	0	1	0	0	0	0	0	0	0	0	0	0	7
8:15 AM	0	7	0	0	0	6	0	0	0	0	0	0	0	0	0	0	13
8:30 AM	0	4	2	0	0	15	0	0	0	0	0	0	0	0	1	0	22
8:45 AM	0	2	0	0	0	5	0	0	0	0	0	0	0	0	1	0	8
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	54	2	0	1	54	1	0	0	0	2	0	0	0	4	0	118
APPROACH %'s :	0.00%	96.43%	3.57%	0.00%	1.79%	96.43%	1.79%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	0	20	0	0	0	18	0	0	0	0	0	0	0	0	1	0	39
PEAK HR FACTOR :	0.000	0.833	0.000	0.000	0.000	0.563	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.813
		0.833				0.563								0.250			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	5
4:15 PM	0	2	0	0	0	9	0	0	0	0	0	0	0	0	2	0	13
4:30 PM	0	5	0	0	0	3	0	0	0	0	0	0	0	0	0	0	8
4:45 PM	0	4	0	0	0	3	0	0	0	0	0	0	0	0	0	0	7
5:00 PM	0	1	0	0	0	2	0	0	0	0	0	0	0	0	1	0	4
5:15 PM	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
5:30 PM	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	3
5:45 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	3
6:00 PM	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
6:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
6:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	2
6:45 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	2	18	0	0	1	26	0	0	0	0	1	0	0	0	5	0	53
APPROACH %'s :	10.00%	90.00%	0.00%	0.00%	3.70%	96.30%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	12	0	0	0	19	0	0	0	0	0	0	0	0	2	0	33
PEAK HR FACTOR :	0.000	0.600	0.000	0.000	0.000	0.528	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.635
		0.600				0.528								0.250			

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Warrenton Village North Dwy
City: Warrenton
Control: 1-Way stop(WB)

Project ID: 23-260020-009
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				Warrenton Village North Dwy				Warrenton Village North Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Warrenton Village North Dwy **Project ID:** 23-260020-009
City: Warrenton **Date:** 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	US 17/US 211/Broadview Ave		US 17/US 211/Broadview Ave		Warrenton Village North Dwy		Warrenton Village North Dwy		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	1	0	1
7:00 AM	0	0	0	0	0	0	0	1	1
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	1	0	0	0	0	0	0	0	1
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	1	0	0	0	0	0	1	1	3
APPROACH %'s :	100.00%	0.00%					50.00%	50.00%	
PEAK HR :	07:15 AM - 08:15 AM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	1	1	2
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	3	0	3
5:00 PM	0	0	2	0	0	0	0	1	3
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	2	0	0	0	2
6:15 PM	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	2	0	2	0	4	2	10
APPROACH %'s :			100.00%	0.00%	100.00%	0.00%	66.67%	33.33%	
PEAK HR :	04:00 PM - 05:00 PM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	4	1	5
PEAK HR FACTOR :							0.333	0.250	0.417
							0.417		

Prepared by National Data & Surveying Services

US 17/US 211/Broadview Ave & Warrenton Village North Dwy

Peak Hour Turning Movement Count

ID: 23-260020-009
City: Warrenton

Day: Thursday
Date: 2/9/2023

PEAK HOURS	COUNT PERIODS
07:15 AM - 08:15 AM	6:00 AM - 09:00 AM
NONE	NONE
04:00 PM - 05:00 PM	4:00 PM - 07:00 PM

SOUTHBOUND — US 17/US 211/Broadview Ave

AM	2	413	11	0	509	AM
NOON	0	0	0	0	0	NOON
PM	6	552	40	1	448	PM
	0	2	1	0		

EASTBOUND — Warrenton Village North Dwy

AM	NOON	PM	
16	0	20	
0	0	0	0
0	0	10	0
0	0	1	1
1	0	17	0
AM	NOON	PM	

WESTBOUND — Warrenton Village North Dwy

PM	NOON	AM	
37	0	14	0.5
1	0	1	0.5
33	0	4	1
0	0	0	0
56	0	20	
PM	NOON	AM	

CONTROL

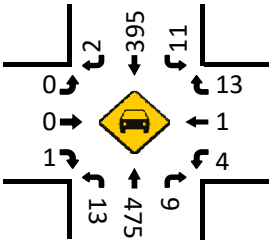
1-Way stop(WB)

TEV	963	0	1128
	AM	NOON	PM
PHF	0.78		0.90

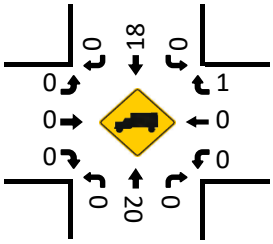
NORTHBOUND — US 17/US 211/Broadview Ave

	0	1	2	1		
PM	604	2	13	400	15	PM
NOON	0	0	0	0	0	NOON
AM	418	0	13	495	9	AM

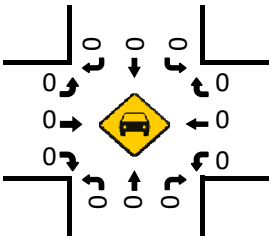
Cars (AM)



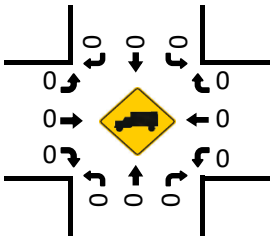
HT (AM)



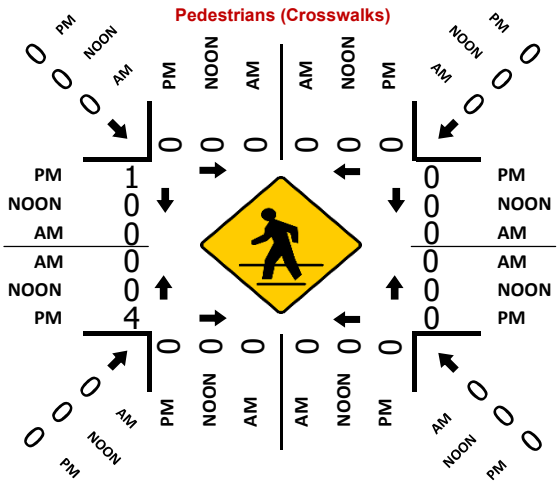
Cars (NOON)



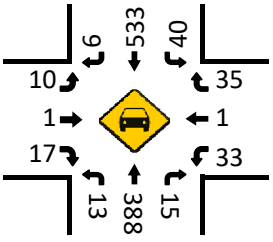
HT (NOON)



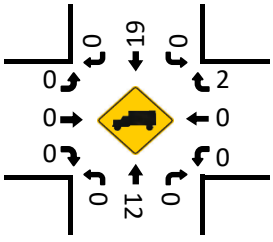
Pedestrians (Crosswalks)



Cars (PM)



HT (PM)



National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave/Winchester St & Warrenton Village South Dwy/Broadview Ave
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-010
Date: 2/9/2023

Data - Total

NS/EW Streets:	US 17/US 211/Broadview Ave/Winchester St				US 17/US 211/Broadview Ave/Winchester St				Warrenton Village South Dwy/Broadview Ave				Warrenton Village South Dwy/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	1	1	1	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	25	17	2	0	0	20	8	0	22	4	24	0	0	1	0	0	123
6:15 AM	29	21	2	0	0	26	7	0	20	1	13	0	0	2	0	0	121
6:30 AM	27	26	1	1	0	35	8	0	26	2	12	0	0	3	0	0	141
6:45 AM	32	31	3	0	0	57	7	0	20	2	21	0	0	2	0	0	175
7:00 AM	32	58	7	1	1	117	7	0	24	5	16	0	3	1	2	0	274
7:15 AM	26	66	6	0	0	98	11	0	26	8	19	0	1	0	0	0	261
7:30 AM	30	120	8	0	4	59	19	0	30	5	13	0	0	3	3	0	294
7:45 AM	34	136	7	0	1	106	11	0	39	4	25	0	1	0	0	0	364
8:00 AM	20	78	9	0	1	98	11	0	22	4	20	0	0	0	0	0	263
8:15 AM	26	55	7	1	1	89	7	0	23	4	13	0	1	0	0	0	227
8:30 AM	20	65	7	0	0	91	7	0	17	1	16	0	0	5	0	0	229
8:45 AM	14	71	9	0	0	108	15	0	20	8	19	0	0	1	2	0	267
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	315	744	68	3	8	904	118	0	289	48	211	0	6	18	7	0	2739
APPROACH %'s :	27.88%	65.84%	6.02%	0.27%	0.78%	87.77%	11.46%	0.00%	52.74%	8.76%	38.50%	0.00%	19.35%	58.06%	22.58%	0.00%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	122	380	28	1	6	380	48	0	119	22	73	0	5	4	5	0	1193
PEAK HR FACTOR :	0.897	0.699	0.875	0.250	0.375	0.812	0.632	0.000	0.763	0.688	0.730	0.000	0.417	0.333	0.417	0.000	0.819
	0.750				0.868				0.787				0.583				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	1	1	1	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	15	66	12	0	3	124	21	0	21	10	46	0	14	7	9	0	348
4:15 PM	28	93	18	0	2	124	27	0	20	12	39	0	6	3	2	0	374
4:30 PM	14	87	20	0	0	121	33	0	34	27	44	0	9	7	10	0	406
4:45 PM	19	64	27	0	2	124	25	0	21	12	35	0	14	10	4	0	357
5:00 PM	17	86	18	0	6	88	26	0	18	11	23	0	9	15	4	0	321
5:15 PM	17	77	32	1	4	100	31	0	13	10	30	0	13	10	10	0	348
5:30 PM	34	54	23	0	2	96	28	0	32	16	16	0	10	11	6	0	328
5:45 PM	16	64	21	0	5	97	14	0	10	9	27	0	7	9	12	0	291
6:00 PM	14	57	27	0	1	60	13	0	15	14	35	0	10	14	7	0	267
6:15 PM	20	49	25	1	7	72	21	0	8	16	22	0	8	7	5	0	261
6:30 PM	15	46	22	3	2	55	13	0	9	11	16	0	8	11	7	0	218
6:45 PM	21	37	27	0	2	48	6	0	17	11	10	0	14	4	9	0	206
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	230	780	272	5	36	1109	258	0	218	159	343	0	122	108	85	0	3725
APPROACH %'s :	17.87%	60.61%	21.13%	0.39%	2.57%	79.04%	18.39%	0.00%	30.28%	22.08%	47.64%	0.00%	38.73%	34.29%	26.98%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	76	310	77	0	7	493	106	0	96	61	164	0	43	27	25	0	1485
PEAK HR FACTOR :	0.679	0.833	0.713	0.000	0.583	0.994	0.803	0.000	0.706	0.565	0.891	0.000	0.768	0.675	0.625	0.000	0.914
	0.833				0.984				0.764				0.792				

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave/Winchester St & Warrenton Village South Dwy/Broadview Ave
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-010
Date: 2/9/2023

Data - Cars

NS/EW Streets:	US 17/US 211/Broadview Ave/Winchester St				US 17/US 211/Broadview Ave/Winchester St				Warrenton Village South Dwy/Broadview Ave				Warrenton Village South Dwy/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	1	1	1	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	25	15	2	0	0	19	8	0	21	4	23	0	0	1	0	0	118
6:15 AM	29	18	1	0	0	26	7	0	20	1	13	0	0	2	0	0	117
6:30 AM	27	23	1	1	0	33	8	0	26	2	11	0	0	3	0	0	135
6:45 AM	32	29	3	0	0	55	7	0	20	2	21	0	0	2	0	0	171
7:00 AM	32	50	7	1	1	111	6	0	23	5	15	0	3	1	1	0	256
7:15 AM	25	62	6	0	0	91	10	0	26	8	19	0	0	0	0	0	247
7:30 AM	30	117	8	0	4	53	17	0	30	5	12	0	0	3	2	0	281
7:45 AM	34	132	7	0	1	106	10	0	37	4	24	0	1	0	0	0	356
8:00 AM	20	72	9	0	1	97	11	0	22	4	20	0	0	0	0	0	256
8:15 AM	25	48	7	1	1	84	6	0	23	4	13	0	1	0	0	0	213
8:30 AM	19	59	7	0	0	77	6	0	17	1	15	0	0	5	0	0	206
8:45 AM	13	69	9	0	0	104	14	0	20	8	18	0	0	1	2	0	258
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	311	694	67	3	8	856	110	0	285	48	204	0	5	18	5	0	2614
APPROACH %'s :	28.93%	64.56%	6.23%	0.28%	0.82%	87.89%	11.29%	0.00%	53.07%	8.94%	37.99%	0.00%	17.86%	64.29%	17.86%	0.00%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	121	361	28	1	6	361	43	0	116	22	70	0	4	4	3	0	1140
PEAK HR FACTOR :	0.890	0.684	0.875	0.250	0.375	0.813	0.632	0.000	0.784	0.688	0.729	0.000	0.333	0.333	0.375	0.000	0.801
	0.738				0.869				0.800				0.550				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	1	1	1	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	15	65	12	0	3	120	21	0	21	10	46	0	14	7	9	0	343
4:15 PM	28	91	18	0	2	116	26	0	20	12	39	0	6	3	2	0	363
4:30 PM	14	84	20	0	0	118	33	0	32	27	43	0	9	7	10	0	397
4:45 PM	18	60	27	0	2	121	25	0	21	12	35	0	14	10	4	0	349
5:00 PM	17	85	18	0	6	86	26	0	18	11	23	0	9	14	4	0	317
5:15 PM	17	76	32	1	4	99	31	0	13	10	30	0	13	10	9	0	345
5:30 PM	34	54	23	0	2	94	28	0	31	16	16	0	9	11	6	0	324
5:45 PM	16	62	20	0	5	96	14	0	10	9	27	0	7	9	12	0	287
6:00 PM	14	56	27	0	1	60	13	0	15	14	35	0	10	14	7	0	266
6:15 PM	19	49	24	1	7	71	21	0	8	16	22	0	8	7	5	0	258
6:30 PM	15	46	21	3	2	55	13	0	9	11	16	0	8	11	7	0	217
6:45 PM	21	36	26	0	2	47	6	0	17	11	10	0	14	4	9	0	203
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	228	764	268	5	36	1083	257	0	215	159	342	0	121	107	84	0	3669
APPROACH %'s :	18.02%	60.40%	21.19%	0.40%	2.62%	78.71%	18.68%	0.00%	30.03%	22.21%	47.77%	0.00%	38.78%	34.29%	26.92%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	75	300	77	0	7	475	105	0	94	61	163	0	43	27	25	0	1452
PEAK HR FACTOR :	0.670	0.824	0.713	0.000	0.583	0.981	0.795	0.000	0.734	0.565	0.886	0.000	0.768	0.675	0.625	0.000	0.914
	0.825				0.972				0.779				0.792				

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave/Winchester St & Warrenton Village South Dwy/Broadview Ave
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-010
Date: 2/9/2023

Data - HT

NS/EW Streets:	US 17/US 211/Broadview Ave/Winchester St				US 17/US 211/Broadview Ave/Winchester St				Warrenton Village South Dwy/Broadview Ave				Warrenton Village South Dwy/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	1	1	1	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	2	0	0	0	1	0	0	1	0	1	0	0	0	0	0	5
6:15 AM	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4
6:30 AM	0	3	0	0	0	2	0	0	0	0	1	0	0	0	0	0	6
6:45 AM	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4
7:00 AM	0	8	0	0	0	6	1	0	1	0	1	0	0	0	1	0	18
7:15 AM	1	4	0	0	0	7	1	0	0	0	0	0	1	0	0	0	14
7:30 AM	0	3	0	0	0	6	2	0	0	0	1	0	0	0	1	0	13
7:45 AM	0	4	0	0	0	0	1	0	2	0	1	0	0	0	0	0	8
8:00 AM	0	6	0	0	0	1	0	0	0	0	0	0	0	0	0	0	7
8:15 AM	1	7	0	0	0	5	1	0	0	0	0	0	0	0	0	0	14
8:30 AM	1	6	0	0	0	14	1	0	0	0	1	0	0	0	0	0	23
8:45 AM	1	2	0	0	0	4	1	0	0	0	1	0	0	0	0	0	9
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	4	50	1	0	0	48	8	0	4	0	7	0	1	0	2	0	125
APPROACH %'s :	7.27%	90.91%	1.82%	0.00%	0.00%	85.71%	14.29%	0.00%	36.36%	0.00%	63.64%	0.00%	33.33%	0.00%	66.67%	0.00%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	1	19	0	0	0	19	5	0	3	0	3	0	1	0	2	0	53
PEAK HR FACTOR :	0.250	0.594	0.000	0.000	0.000	0.679	0.625	0.000	0.375	0.000	0.750	0.000	0.250	0.000	0.500	0.000	0.736
		0.625				0.750				0.500				0.750			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	1	1	1	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	5
4:15 PM	0	2	0	0	0	8	1	0	0	0	0	0	0	0	0	0	11
4:30 PM	0	3	0	0	0	3	0	0	2	0	1	0	0	0	0	0	9
4:45 PM	1	4	0	0	0	3	0	0	0	0	0	0	0	0	0	0	8
5:00 PM	0	1	0	0	0	2	0	0	0	0	0	0	0	1	0	0	4
5:15 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	3
5:30 PM	0	0	0	0	0	2	0	0	1	0	0	0	1	0	0	0	4
5:45 PM	0	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	4
6:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:15 PM	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	3
6:30 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:45 PM	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	3
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	2	16	4	0	0	26	1	0	3	0	1	0	1	1	1	0	56
APPROACH %'s :	9.09%	72.73%	18.18%	0.00%	0.00%	96.30%	3.70%	0.00%	75.00%	0.00%	25.00%	0.00%	33.33%	33.33%	33.33%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	1	10	0	0	0	18	1	0	2	0	1	0	0	0	0	0	33
PEAK HR FACTOR :	0.250	0.625	0.000	0.000	0.000	0.563	0.250	0.000	0.250	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.750
		0.550				0.528				0.250							

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave/Winchester St & Warrenton Village South Dwy/Broadview Ave
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-010
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	US 17/US 211/Broadview Ave/Winchester St				US 17/US 211/Broadview Ave/Winchester St				Warrenton Village South Dwy/Broadview Ave				Warrenton Village South Dwy/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	1	1	1	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	1	1	1	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave/Winchester St & Warrenton Village Sc **Project ID:** 23-260020-010
City: Warrenton **Date:** 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	US 17/US 211/Broadview Ave/Winchester St		US 17/US 211/Broadview Ave/Winchester St		Warrenton Village South Dwy/Broadview Ave		Warrenton Village South Dwy/Broadview Ave		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	2	0	0	2
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	1	0	0	0	0	0	0	1
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	1	0	0	0	2	0	0	3
APPROACH %'s :	0.00%	100.00%			0.00%	100.00%			
PEAK HR :	**07:00 AM - 08:00 AM**								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	1	0	0	0	0	0	0	1
4:15 PM	0	4	0	0	3	0	0	0	7
4:30 PM	0	1	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	6	0	0	3	0	0	0	9
APPROACH %'s :	0.00%	100.00%			100.00%	0.00%			
PEAK HR :	**04:00 PM - 05:00 PM**								TOTAL
PEAK HR VOL :	0	6	0	0	3	0	0	0	9
PEAK HR FACTOR :		0.375			0.250				0.321
	0.375				0.250				

Prepared by National Data & Surveying Services

US 17/US 211/Broadview Ave/Winchester St & Warrenton Village South Dwy/Broadview Ave

Peak Hour Turning Movement Count

ID: 23-260020-010
City: Warrenton

Day: Thursday
Date: 2/9/2023

PEAK HOURS	COUNT PERIODS
07:00 AM - 08:00 AM	6:00 AM - 09:00 AM
NONE	NONE
04:00 PM - 05:00 PM	4:00 PM - 07:00 PM

SOUTHBOUND — US 17/US 211/Broadview Ave/Winchester St

AM	48	380	6	0	504	AM
NOON	0	0	0	0	0	NOON
PM	106	493	7	0	431	PM
	1	2	1	0		

EASTBOUND — Warrenton Village South Dwy/Broadview Ave

AM	NOON	PM	
174	0	209	
0	0	0	0
119	0	96	1
22	0	61	1
73	0	164	1
AM	NOON	PM	

WESTBOUND — Warrenton Village South Dwy/Broadview Ave

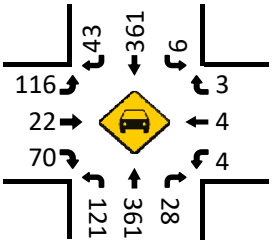
PM	NOON	AM	
25	0	5	0.5
27	0	4	0.5
43	0	5	1
0	0	0	0
145	0	56	
PM	NOON	AM	

NORTHBOUND — US 17/US 211/Broadview Ave/Winchester St

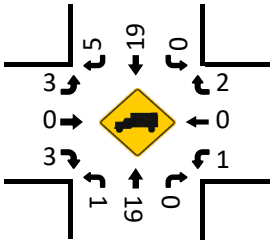
	0	1	2	1		
PM	700	0	76	310	77	PM
NOON	0	0	0	0	0	NOON
AM	459	1	122	380	28	AM

CONTROL			
2-Way Stop(EB/WB)			
TEV	1193 AM	0 NOON	1485 PM
PHF	0.82		0.91

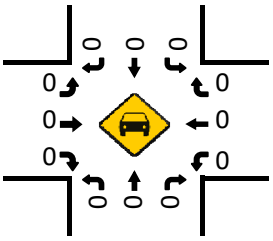
Cars (AM)



HT (AM)



Cars (NOON)



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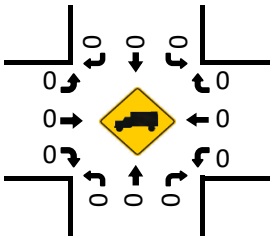
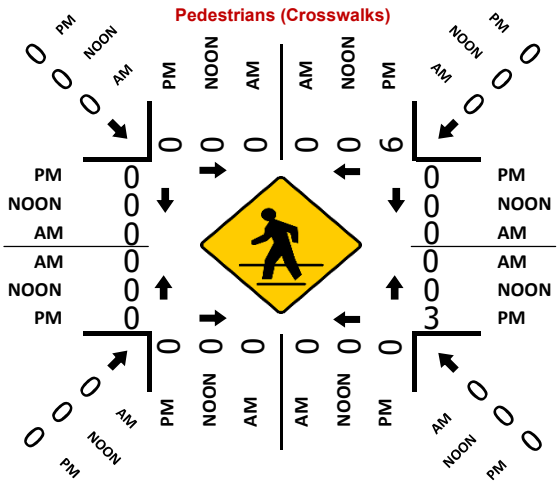
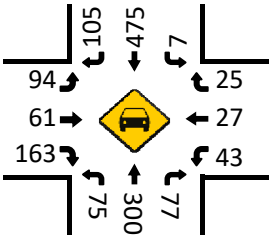


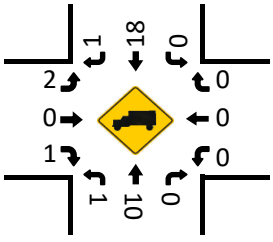
Pedestrians (Crosswalks)



Cars (PM)



HT (PM)



D. HCM Level of Service Definitions

TECHNICAL MEMORANDUM

Subject: Level of Service Definitions

Introduction

The purpose of this memorandum is to define the level of service (LOS) metric that commonly used as a measure of effectiveness (MOE) for traffic operations.

All capacity analyses are based on the procedures specified by the Transportation Research Board's (TRB) Highway Capacity Manual (HCM), which is currently on its sixth edition. Level of service ranges from A to F. A brief description of each level of service for signalized and unsignalized intersections is provided below.

Signalized Intersections

Level of service is based upon the traffic volume present in each lane on the roadway, the capacity of each lane at the intersection and the delay associated with each directional movement. The levels of service for signalized intersections are defined below:

- **Level of Service A** describes operations with very low average delay per vehicle, i.e., less than 10.0 seconds. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop. Short signal cycle lengths may also contribute to low delay.
- **Level of Service B** describes operations with average delay in the range of 10.1 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
- **Level of Service C** describes operations with delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level although many still pass through the intersection without stopping. This is generally considered the lower end of the range of the acceptable level of service in rural areas.
- **Level of Service D** describes operations with delay in the range of 35.1 to 55.0 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and/or high traffic volumes as compared to the roadway capacity. Many vehicles are required to stop and the number of vehicles that do not have to stop declines. Individual signal cycle failures, where all waiting vehicles do not clear the intersection during a single green time, are noticeable. This is generally considered the lower end of the range of the acceptable level of service in urban areas.
- **Level of Service E** describes operations with delay in the range of 55.1 to 80.0 seconds per vehicle. These higher delay values generally indicate poor progression, long cycle lengths, and high traffic volumes. Individual cycle failures are frequent occurrences. LOS E has been set as the limit of acceptable conditions.
- **Level of Service F** describes operations with average delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, i.e., when traffic arrives at a flow rate that exceeds the capacity of the intersection. It may also occur at high volumes with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such delays.

Unsignalized Intersections

At an unsignalized intersection, the major street through traffic and right-turns are assumed to operate unimpeded and therefore receive no level of service rating. The level of service for the minor street and the major street left-turn traffic is dependent on the volume and capacity of the available lanes, and, the number and frequency of acceptable gaps in the major street traffic to make a conflicting turn. The level of service grade is provided for each conflicting movement at an unsignalized intersection and is based on the total average delay experienced by each vehicle. The delay includes the time it takes a vehicle to move from the back of a queue through the intersection.

The unsignalized intersection level of service analysis does not account for variations in driver behavior or the effects of nearby traffic signals. Therefore, the results from this analysis usually indicate worse levels of service than may be experienced in the field. The unsignalized intersection level of service descriptions are provided below:

- **Level of Service A** describes operations where there is very little to no conflicting traffic for a minor side street movement, i.e., an average total delay of less than 10.0 seconds per vehicle.
- **Level of Service B** describes operations with average total delay in the range of 10.1 to 15.0 seconds per vehicle.
- **Level of Service C** describes operations with average total delay in the range of 15.1 to 25.0 second per vehicle.
- **Level of Service D** describes operations with average total delay in the range of 25.1 to 35.0 seconds per vehicle.
- **Level of Service E** describes operations with average total delay in the range of 35.1 to 50.0 seconds per vehicle.
- **Level of Service F** describes operations with average total delay of 50 seconds per vehicle. LOS F exists when there are insufficient gaps of suitable size to allow a side street demand to cross safely through or enter a major street traffic stream. This level of service is generally evident from extremely long total delays experienced by side street traffic and by queuing on the minor approaches. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal driver behavior.

E. VDOT Signal Timings

Plan 1

Timing Report, Sorted By Phase

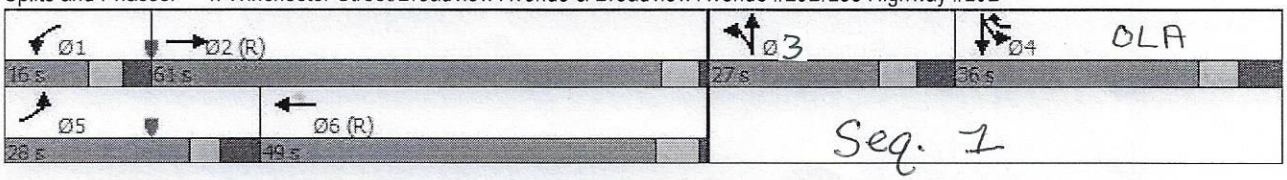
4: Winchester Street/Broadview Avenue & Broadview Avenue #29B/Lee Highway #29B 01/02/2020

Phase Number	1	2	4	5	6	3
Movement	WBL	EBT	SBTL	EBL	WBT	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	16	61	36	28	49	27
Maximum Split (%)	11.4%	43.6%	25.7%	20.0%	35.0%	19.3%
Minimum Split (s)	12.9	27.2	15.4	13.8	32.8	14.2
Yellow Time (s)	3.8	4.2	4.5	3.4	4.8	4.1
All-Red Time (s)	3.1	1	4.9	4.4	1	4.2
Minimum Initial (s)	6	15	6	6	15	6
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		15	24		20	29
Dual Entry	No	Yes	No	No	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	112	128	76	112	0	49
End Time (s)	128	49	112	0	49	76
Yield/Force Off (s)	121.1	43.8	102.6	132.2	43.2	67.7
Yield/Force Off 170(s)	121.1	28.8	78.6	132.2	23.2	39.7
Local Start Time (s)	124	0	88	124	12	61
Local Yield (s)	133.1	55.8	114.6	4.2	55.2	79.7
Local Yield 170(s)	133.1	40.8	90.6	4.2	35.2	51.7
MAX 1	40	40	25	25	40	25

Intersection Summary	
Cycle Length	140
Control Type	Actuated-Coordinated
Natural Cycle	80

Offset: 128 (91%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Splits and Phases: 4: Winchester Street/Broadview Avenue & Broadview Avenue #29B/Lee Highway #29B



OLA + 4

Plan 2

Timing Report, Sorted By Phase

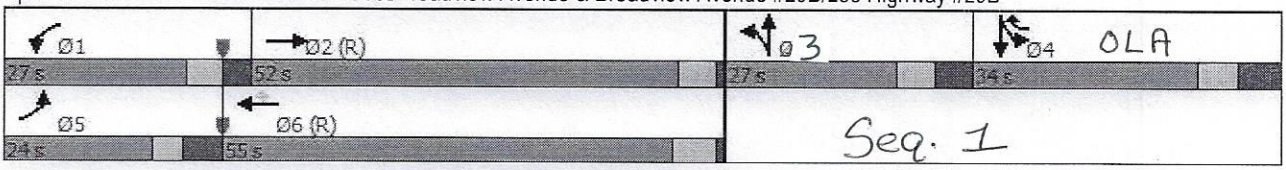
4: Winchester Street/Broadview Avenue & Broadview Avenue #29B/Lee Highway #29B 01/02/2020

Phase Number	1	2	4	5	6	3
Movement	WBL	EBT	SBTL	EBL	WBT	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	27	52	34	24	55	27
Maximum Split (%)	19.3%	37.1%	24.3%	17.1%	39.3%	19.3%
Minimum Split (s)	12.9	27.2	15.4	13.8	32.8	14.3
Yellow Time (s)	3.8	4.2	4.5	3.4	4.8	4.1
All-Red Time (s)	3.1	1	4.9	4.4	1	4.2
Minimum Initial (s)	6	15	6	6	15	6
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		15	24		20	29
Dual Entry	No	Yes	No	No	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	121	8	87	121	5	60
End Time (s)	8	60	121	5	60	87
Yield/Force Off (s)	1.1	54.8	111.6	137.2	54.2	78.7
Yield/Force Off 170(s)	1.1	39.8	87.6	137.2	34.2	50.7
Local Start Time (s)	116	3	82	116	0	55
Local Yield (s)	136.1	49.8	106.6	132.2	49.2	73.7
Local Yield 170(s)	136.1	34.8	82.6	132.2	29.2	45.7
MAX 1	40	40	25	25	40	25

Intersection Summary	
Cycle Length	140
Control Type	Actuated-Coordinated
Natural Cycle	80

Offset: 5 (4%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Splits and Phases: 4: Winchester Street/Broadview Avenue & Broadview Avenue #29B/Lee Highway #29B



OLA + 4

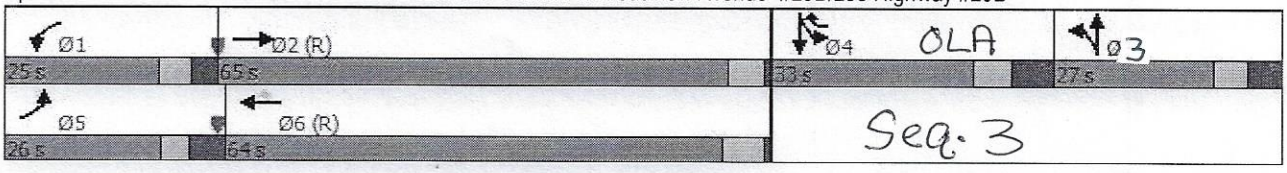
Plan 3

Phase Number	1	2	4	5	6	3
Movement	WBL	EBT	SBTL	EBL	WBT	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	25	65	33	26	64	27
Maximum Split (%)	16.7%	43.3%	22.0%	17.3%	42.7%	18.0%
Minimum Split (s)	14.9	27.2	15.4	13.8	32.8	14.3
Yellow Time (s)	3.8	4.2	4.5	3.4	4.8	4.1
All-Red Time (s)	3.1	1	4.9	4.4	1	4.2
Minimum Initial (s)	6	15	6	6	15	6
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		15	24		20	29
Dual Entry	No	Yes	No	No	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	31	56	121	31	57	4
End Time (s)	56	121	4	57	121	31
Yield/Force Off (s)	49.1	115.8	144.6	49.2	115.2	22.7
Yield/Force Off 170(s)	49.1	100.8	120.6	49.2	95.2	144.7
Local Start Time (s)	125	0	65	125	1	98
Local Yield (s)	143.1	59.8	88.6	143.2	59.2	116.7
Local Yield 170(s)	143.1	44.8	64.6	143.2	39.2	88.7
MAX 1	40	46	25	25	48	25

Intersection Summary	
Cycle Length	150
Control Type	Actuated-Coordinated
Natural Cycle	90

Offset: 56 (37%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Splits and Phases: 4: Winchester Street/Broadview Avenue & Broadview Avenue #29B/Lee Highway #29B



OLA + 4

Plan 4

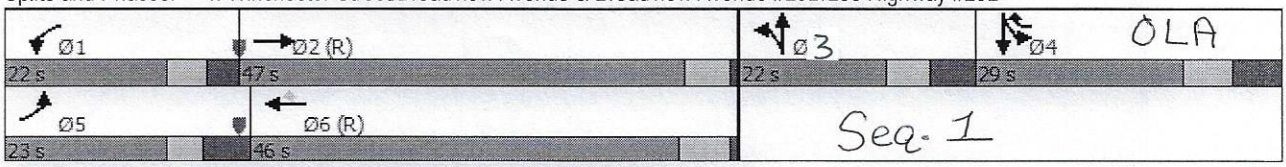
Timing Report, Sorted By Phase

4: Winchester Street/Broadview Avenue & Broadview Avenue #29B/Lee Highway #29B 01/03/2020

Phase Number	1	2	4	5	6	3
Movement	WBL	EBT	SBTL	EBL	WBT	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	22	47	29	23	46	22
Maximum Split (%)	18.3%	39.2%	24.2%	19.2%	38.3%	18.3%
Minimum Split (s)	12.9	27.2	15.4	13.8	32.8	14.3
Yellow Time (s)	3.8	4.2	4.5	3.4	4.8	4.1
All-Red Time (s)	3.1	1	4.9	4.4	1	4.2
Minimum Initial (s)	6	15	6	6	15	6
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		15	24		20	29
Dual Entry	No	Yes	No	No	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	115	17	86	115	18	64
End Time (s)	17	64	115	18	64	86
Yield/Force Off (s)	10.1	58.8	105.6	10.2	58.2	77.7
Yield/Force Off 170(s)	10.1	43.8	81.6	10.2	38.2	49.7
Local Start Time (s)	98	0	69	98	1	47
Local Yield (s)	113.1	41.8	88.6	113.2	41.2	60.7
Local Yield 170(s)	113.1	26.8	64.6	113.2	21.2	32.7
MAX 1	40	40	25	25	40	25

Intersection Summary						
Cycle Length			120			
Control Type	Actuated-Coordinated					
Natural Cycle			80			
Offset: 17 (14%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green						

Splits and Phases: 4: Winchester Street/Broadview Avenue & Broadview Avenue #29B/Lee Highway #29B



OLA +4

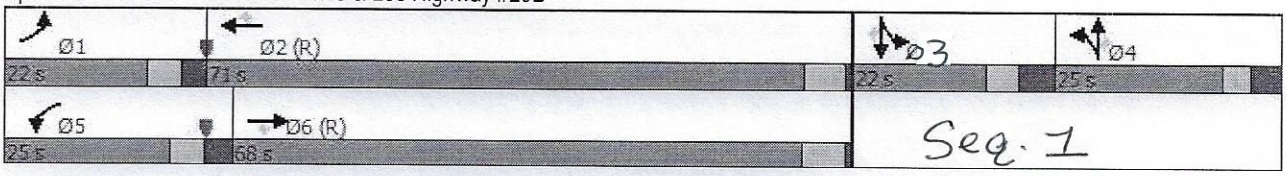
Plan 1

Phase Number	1	2	4	5	6	3
Movement	EBL	WBT	NBTL	WBL	EBT	SBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	22	71	25	25	68	22
Maximum Split (%)	15.7%	50.7%	17.9%	17.9%	48.6%	15.7%
Minimum Split (s)	12.4	27.6	12.6	12.8	27.7	13.5
Yellow Time (s)	3.7	4.6	3	3.7	4.7	3.5
All-Red Time (s)	2.7	1	3	3.1	1	4
Minimum Initial (s)	6	15	6	6	15	6
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	
Flash Dont Walk (s)		17	27		12	
Dual Entry	No	Yes	No	No	Yes	No
Inhibit Max	yes	yes	yes	yes	yes	yes
Start Time (s)	119	1	94	119	4	72
End Time (s)	1	72	119	4	72	94
Yield/Force Off (s)	134.6	66.4	112.4	137.2	66.3	86.5
Yield/Force Off 170(s)	134.6	51.4	84.4	137.2	51.3	86.5
Local Start Time (s)	118	0	93	118	3	71
Local Yield (s)	133.6	65.4	111.4	136.2	65.3	85.5
Local Yield 170(s)	133.6	50.4	83.4	136.2	50.3	85.5
MAX 1	18	45	35	18	45	35

Intersection Summary	
Cycle Length	140
Control Type	Actuated-Coordinated
Natural Cycle	70

Offset: 1 (1%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

Splits and Phases: 3: Branch Drive & Lee Highway #29B



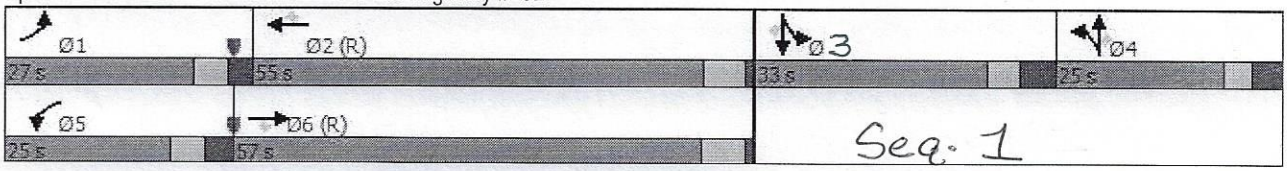
Seq. 1

Phase Number	1	2	4	5	6	3
Movement	EBL	WBT	NBTL	WBL	EBT	SBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	27	55	25	25	57	33
Maximum Split (%)	19.3%	39.3%	17.9%	17.9%	40.7%	23.6%
Minimum Split (s)	12.4	27.6	12.6	12.8	27.7	13.5
Yellow Time (s)	3.7	4.6	3	3.7	4.7	3.5
All-Red Time (s)	2.7	1	3.6	3.1	1	4
Minimum Initial (s)	6	15	6	6	15	6
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	
Flash Dont Walk (s)		17	27		12	
Dual Entry	No	Yes	No	No	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	125	12	100	125	10	67
End Time (s)	12	67	125	10	67	100
Yield/Force Off (s)	5.6	61.4	118.4	3.2	61.3	92.5
Yield/Force Off 170(s)	5.6	46.4	90.4	3.2	46.3	92.5
Local Start Time (s)	115	2	90	115	0	57
Local Yield (s)	135.6	51.4	108.4	133.2	51.3	82.5
Local Yield 170(s)	135.6	36.4	80.4	133.2	36.3	82.5
MAX 1	18	45	35	18	45	35

Intersection Summary	
Cycle Length	140
Control Type	Actuated-Coordinated
Natural Cycle	80

Offset: 10 (7%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

Splits and Phases: 3: Branch Drive & Lee Highway #29B

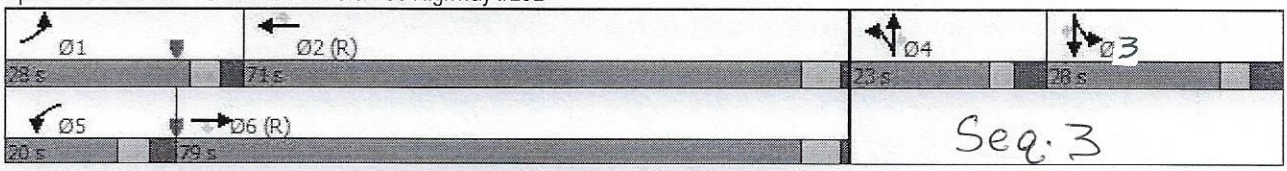


Phase Number	1	2	4	5	6	3
Movement	EBL	WBT	NBTL	WBL	EBT	SBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	28	71	23	20	79	28
Maximum Split (%)	18.7%	47.3%	15.3%	13.3%	52.7%	18.7%
Minimum Split (s)	12.4	27.6	12.6	12.8	27.7	13.5
Yellow Time (s)	3.7	4.6	3	3.7	4.7	3.5
All-Red Time (s)	2.7	1	3.6	3.1	1	4
Minimum Initial (s)	6	15	6	6	15	6
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	
Flash Dont Walk (s)		17	27		12	
Dual Entry	No	Yes	No	No	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	26	54	125	26	46	148
End Time (s)	54	125	148	46	125	26
Yield/Force Off (s)	47.6	119.4	141.4	39.2	119.3	18.5
Yield/Force Off 170(s)	47.6	104.4	113.4	39.2	104.3	18.5
Local Start Time (s)	130	8	79	130	0	102
Local Yield (s)	1.6	73.4	95.4	143.2	73.3	122.5
Local Yield 170(s)	1.6	58.4	67.4	143.2	58.3	122.5
MAX 1	18	45	35	18	45	35

Intersection Summary	
Cycle Length	150
Control Type	Actuated-Coordinated
Natural Cycle	80

Offset: 46 (31%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

Splits and Phases: 3: Branch Drive & Lee Highway #29B



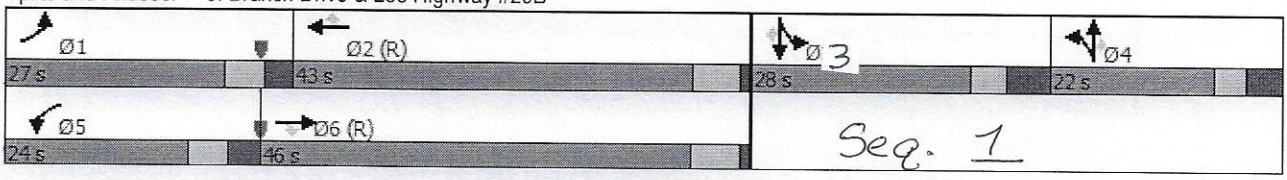
Plan 4

Phase Number	1	2	4	5	6	3
Movement	EBL	WBT	NBTL	WBL	EBT	SBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	27	43	22	24	46	28
Maximum Split (%)	22.5%	35.8%	18.3%	20.0%	38.3%	23.3%
Minimum Split (s)	12.4	27.6	12.6	12.8	27.7	13.5
Yellow Time (s)	3.7	4.6	3	3.7	4.7	3.5
All-Red Time (s)	2.7	1	3.6	3.1	1	4
Minimum Initial (s)	6	15	6	6	15	6
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	
Flash Dont Walk (s)		17	27		12	
Dual Entry	No	Yes	No	No	Yes	No
Inhibit Max	yes	yes	yes	yes	yes	yes
Start Time (s)	100	7	78	100	4	50
End Time (s)	7	50	100	4	50	78
Yield/Force Off (s)	0.6	44.4	93.4	117.2	44.3	70.5
Yield/Force Off 170(s)	0.6	29.4	65.4	117.2	29.3	70.5
Local Start Time (s)	96	3	74	96	0	46
Local Yield (s)	116.6	40.4	89.4	113.2	40.3	66.5
Local Yield 170(s)	116.6	25.4	61.4	113.2	25.3	66.5
MAX 1	18	45	35	18	45	35

Intersection Summary	
Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	75

Offset: 4 (3%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

Splits and Phases: 3: Branch Drive & Lee Highway #29B



F. 2023 Existing Conditions – Capacity Analysis Worksheets

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	298	896	38	699	194	83	117	80	117	122	244
v/c Ratio	0.72	0.51	0.37	0.48	0.21	0.49	0.62	0.21	0.59	0.58	0.41
Control Delay	69.1	26.2	96.7	21.6	3.5	68.2	73.8	1.2	69.4	67.7	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.1	26.2	96.7	21.6	3.5	68.2	73.8	1.2	69.4	67.7	11.1
Queue Length 50th (ft)	141	287	38	249	32	76	108	0	112	116	41
Queue Length 95th (ft)	186	428	78	143	46	126	166	0	167	171	95
Internal Link Dist (ft)		1315		334			509			538	
Turn Bay Length (ft)	250		130		200	250		125	215		
Base Capacity (vph)	481	1758	118	1450	1006	224	249	447	313	335	621
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.51	0.32	0.48	0.19	0.37	0.47	0.18	0.37	0.36	0.39

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	5	257	758	31	3	31	615	171	73	103	70	117
Future Volume (vph)	5	257	758	31	3	31	615	171	73	103	70	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			0%				-1%			2%		
Total Lost time (s)		7.8	5.2			6.9	5.8	9.4	8.3	8.3	6.9	9.4
Lane Util. Factor		0.97	0.95			1.00	0.95	1.00	1.00	1.00	1.00	0.95
Frpb, ped/bikes		1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.99			1.00	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)		3338	3452			1814	3359	1561	1655	1844	1537	1649
Flt Permitted		0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (perm)		3338	3452			1814	3359	1561	1655	1844	1537	1649
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)	6	292	861	35	3	35	699	194	83	117	80	133
RTOR Reduction (vph)	0	0	1	0	0	0	0	87	0	0	67	0
Lane Group Flow (vph)	0	298	895	0	0	38	699	107	83	117	13	117
Confl. Peds. (#/hr)												
Heavy Vehicles (%)	0%	5%	4%	3%	0%	0%	8%	4%	8%	2%	4%	5%
Turn Type	Prot	Prot	NA		Prot	Prot	NA	pm+ov	Split	NA	custom	Split
Protected Phases	5	5	2		1	1	6	4	3	3		4
Permitted Phases								6			1 3	
Actuated Green, G (s)		17.4	71.0			8.1	60.2	77.0	14.3	14.3	22.4	16.8
Effective Green, g (s)		17.4	71.0			8.1	60.2	77.0	14.3	14.3	22.4	16.8
Actuated g/C Ratio		0.12	0.51			0.06	0.43	0.55	0.10	0.10	0.16	0.12
Clearance Time (s)		7.8	5.2			6.9	5.8	9.4	8.3	8.3		9.4
Vehicle Extension (s)		3.0	3.0			3.0	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)		414	1750			104	1444	858	169	188	245	197
v/s Ratio Prot		c0.09	c0.26			0.02	0.21	0.01	0.05	c0.06		c0.07
v/s Ratio Perm								0.05			0.01	
v/c Ratio		0.72	0.51			0.37	0.48	0.12	0.49	0.62	0.05	0.59
Uniform Delay, d1		59.0	23.0			63.5	28.7	15.2	59.4	60.3	49.8	58.4
Progression Factor		1.00	1.00			1.38	0.65	2.21	1.00	1.00	1.00	1.00
Incremental Delay, d2		5.9	1.1			2.1	1.1	0.1	2.2	6.3	0.1	4.7
Delay (s)		64.9	24.0			89.7	19.8	33.6	61.7	66.5	49.9	63.1
Level of Service		E	C			F	B	C	E	E	D	E
Approach Delay (s)			34.2				25.5			60.3		
Approach LOS			C				C			E		

Intersection Summary			
HCM 2000 Control Delay	36.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	31.3
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	93	215
Future Volume (vph)	93	215
Ideal Flow (vphpl)	1900	1900
Grade (%)	-2%	
Total Lost time (s)	9.4	9.4
Lane Util. Factor	0.95	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.99	1.00
Satd. Flow (prot)	1769	1558
Flt Permitted	0.99	1.00
Satd. Flow (perm)	1769	1558
Peak-hour factor, PHF	0.88	0.88
Adj. Flow (vph)	106	244
RTOR Reduction (vph)	0	127
Lane Group Flow (vph)	122	117
Confl. Peds. (#/hr)		3
Heavy Vehicles (%)	2%	3%
Turn Type	NA	custom
Protected Phases	4	
Permitted Phases		4 5
Actuated Green, G (s)	16.8	43.6
Effective Green, g (s)	16.8	43.6
Actuated g/C Ratio	0.12	0.31
Clearance Time (s)	9.4	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	212	485
v/s Ratio Prot	0.07	
v/s Ratio Perm		0.07
v/c Ratio	0.58	0.24
Uniform Delay, d1	58.2	35.9
Progression Factor	1.00	1.00
Incremental Delay, d2	3.7	0.3
Delay (s)	62.0	36.1
Level of Service	E	D
Approach Delay (s)	49.2	
Approach LOS	D	

Intersection Summary

HCM 6th Edition methodology expects strict NEMA phasing.

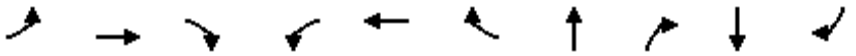
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑	↱			↱			↱
Traffic Vol, veh/h	0	885	63	0	800	31	0	0	29	0	0	20
Future Vol, veh/h	0	885	63	0	800	31	0	0	29	0	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	110	-	-	300	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	3	-	-	3	-	-	-11	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	4	3	0	7	0	0	0	3	0	0	0
Mvmt Flow	0	962	68	0	870	34	0	0	32	0	0	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	481	-	-	435
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.26	-	-	5.8
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.33	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	508	0	0	656
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	508	-	-	656
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	12.6	10.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	508	-	-	-	-	656
HCM Lane V/C Ratio	0.062	-	-	-	-	0.033
HCM Control Delay (s)	12.6	-	-	-	-	10.7
HCM Lane LOS	B	-	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	40	964	1	48	840	56	23	42	46	55
v/c Ratio	0.36	0.41	0.00	0.41	0.37	0.05	0.15	0.16	0.40	0.28
Control Delay	84.6	7.2	0.0	72.4	16.2	0.1	56.4	1.4	71.9	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.6	7.2	0.0	72.4	16.2	0.1	56.4	1.4	71.9	3.4
Queue Length 50th (ft)	40	127	0	44	188	0	21	0	43	0
Queue Length 95th (ft)	m80	133	m0	88	394	0	43	0	86	0
Internal Link Dist (ft)		457			1504		131		565	
Turn Bay Length (ft)	240		330	150		150		60		
Base Capacity (vph)	199	2364	1143	227	2284	1125	286	358	185	248
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	0.20	0.41	0.00	0.21	0.37	0.05	0.08	0.12	0.25	0.22

Intersection Summary

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

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	7	29	877	1	44	764	51	10	11	38	34	8
Future Volume (vph)	7	29	877	1	44	764	51	10	11	38	34	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			-4%			2%			0%			-1%
Total Lost time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.0	6.0		7.5
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (prot)		1791	3541	1647	1752	3372	1599		1856	1615		1792
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (perm)		1791	3541	1647	1752	3372	1599		1856	1615		1792
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)	8	32	964	1	48	840	56	11	12	42	37	9
RTOR Reduction (vph)	0	0	0	0	0	0	21	0	0	39	0	0
Lane Group Flow (vph)	0	40	964	1	48	840	35	0	23	3	0	46
Heavy Vehicles (%)	14%	0%	4%	0%	2%	6%	0%	0%	0%	0%	3%	0%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA
Protected Phases	1	1	6		5	2		4	4		3	3
Permitted Phases				6			2			4		
Actuated Green, G (s)		7.5	87.3	87.3	8.1	88.4	88.4		10.7	10.7		7.9
Effective Green, g (s)		7.5	87.3	87.3	8.1	88.4	88.4		10.7	10.7		7.9
Actuated g/C Ratio		0.05	0.62	0.62	0.06	0.63	0.63		0.08	0.08		0.06
Clearance Time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.0	6.0		7.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)		95	2208	1027	101	2129	1009		141	123		101
v/s Ratio Prot		0.02	c0.27		c0.03	0.25			c0.01			c0.03
v/s Ratio Perm				0.00			0.02			0.00		
v/c Ratio		0.42	0.44	0.00	0.48	0.39	0.04		0.16	0.03		0.46
Uniform Delay, d1		64.1	13.6	9.9	63.9	12.7	9.7		60.5	59.8		64.0
Progression Factor		1.23	0.40	1.00	1.00	1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2		2.7	0.6	0.0	3.5	0.5	0.1		0.5	0.1		3.2
Delay (s)		81.5	6.0	9.9	67.4	13.2	9.8		61.0	59.9		67.2
Level of Service		F	A	A	E	B	A		E	E		E
Approach Delay (s)			9.0			15.8			60.3			64.7
Approach LOS			A			B			E			E

Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	50
Future Volume (vph)	50
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	7.5
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1375
Flt Permitted	1.00
Satd. Flow (perm)	1375
Peak-hour factor, PHF	0.91
Adj. Flow (vph)	55
RTOR Reduction (vph)	52
Lane Group Flow (vph)	3
Heavy Vehicles (%)	18%
Turn Type	Perm
Protected Phases	
Permitted Phases	3
Actuated Green, G (s)	7.9
Effective Green, g (s)	7.9
Actuated g/C Ratio	0.06
Clearance Time (s)	7.5
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	77
v/s Ratio Prot	
v/s Ratio Perm	0.00
v/c Ratio	0.04
Uniform Delay, d1	62.5
Progression Factor	1.00
Incremental Delay, d2	0.2
Delay (s)	62.7
Level of Service	E
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition methodology expects strict NEMA phasing.

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Traffic Vol, veh/h	6	15	38	14	11	14	23	65	7	18	67	5
Future Vol, veh/h	6	15	38	14	11	14	23	65	7	18	67	5
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-8	-	-	-2	-	-	1	-	-	-1	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	9	0	0	0	0	0	13	0
Mvmt Flow	7	18	45	16	13	16	27	76	8	21	79	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	223	262	45	227	261	42	85	0	0	84	0	0
Stage 1	124	124	-	134	134	-	-	-	-	-	-	-
Stage 2	99	138	-	93	127	-	-	-	-	-	-	-
Critical Hdwy	5.9	4.9	6.1	7.1	6.28	6.7	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	4.9	3.9	-	6.1	5.28	-	-	-	-	-	-	-
Critical Hdwy Stg 2	4.9	3.9	-	6.1	5.28	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4.09	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	794	726	1032	733	645	1028	1524	-	-	1526	-	-
Stage 1	922	842	-	874	780	-	-	-	-	-	-	-
Stage 2	943	836	-	919	785	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	750	702	1030	669	624	1028	1524	-	-	1526	-	-
Mov Cap-2 Maneuver	750	702	-	669	624	-	-	-	-	-	-	-
Stage 1	904	830	-	857	765	-	-	-	-	-	-	-
Stage 2	895	820	-	847	774	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	10.1	1.8	1.5
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1524	-	-	890	748	1526	-	-
HCM Lane V/C Ratio	0.018	-	-	0.078	0.061	0.014	-	-
HCM Control Delay (s)	7.4	0	-	9.4	10.1	7.4	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.2	0	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↱		↕	
Traffic Vol, veh/h	1	76	75	14	106	1	73	1	12	1	1	1
Future Vol, veh/h	1	76	75	14	106	1	73	1	12	1	1	1
Conflicting Peds, #/hr	4	0	1	1	0	4	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	1	-	-	2	-	-	-5	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	1	11	7	1	0	0	0	0	0	0	0
Mvmt Flow	1	89	88	16	125	1	86	1	14	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	130	0	0	178	0	0	295	298	136	307	342	130
Stage 1	-	-	-	-	-	-	136	136	-	162	162	-
Stage 2	-	-	-	-	-	-	159	162	-	145	180	-
Critical Hdwy	4.1	-	-	4.17	-	-	7.5	6.9	6.4	6.1	5.5	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.9	-	5.1	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.9	-	5.1	4.5	-
Follow-up Hdwy	2.2	-	-	2.263	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1468	-	-	1368	-	-	640	597	911	707	642	942
Stage 1	-	-	-	-	-	-	859	776	-	884	803	-
Stage 2	-	-	-	-	-	-	833	754	-	898	793	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1463	-	-	1367	-	-	631	586	909	684	630	939
Mov Cap-2 Maneuver	-	-	-	-	-	-	631	586	-	684	630	-
Stage 1	-	-	-	-	-	-	857	774	-	880	790	-
Stage 2	-	-	-	-	-	-	820	742	-	880	791	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.9	11.2	10
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	630	909	1463	-	-	1367	-	-	729
HCM Lane V/C Ratio	0.138	0.016	0.001	-	-	0.012	-	-	0.005
HCM Control Delay (s)	11.6	9	7.5	0	-	7.7	0	-	10
HCM Lane LOS	B	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.5	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	83	104	136	44	47	67
Future Vol, veh/h	83	104	136	44	47	67
Conflicting Peds, #/hr	1	0	0	1	0	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-3	1	-	-5	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	6	1	1	0	17	0
Mvmt Flow	98	122	160	52	55	79

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	213	0	-	0	505	189
Stage 1	-	-	-	-	187	-
Stage 2	-	-	-	-	318	-
Critical Hdwy	4.16	-	-	-	5.57	5.7
Critical Hdwy Stg 1	-	-	-	-	4.57	-
Critical Hdwy Stg 2	-	-	-	-	4.57	-
Follow-up Hdwy	2.254	-	-	-	3.653	3.3
Pot Cap-1 Maneuver	1334	-	-	-	577	881
Stage 1	-	-	-	-	853	-
Stage 2	-	-	-	-	770	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1333	-	-	-	530	879
Mov Cap-2 Maneuver	-	-	-	-	530	-
Stage 1	-	-	-	-	785	-
Stage 2	-	-	-	-	769	-

Approach	EB	WB	SB
HCM Control Delay, s	3.5	0	11.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1333	-	-	-	691
HCM Lane V/C Ratio	0.073	-	-	-	0.194
HCM Control Delay (s)	7.9	-	-	-	11.5
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.7

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	38	156	152	51	31	19
Future Vol, veh/h	38	156	152	51	31	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	75	-	-	-	0	50
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-5	3	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	4	1	0	0	0
Mvmt Flow	45	184	179	60	36	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	239	0	-	0	483	209
Stage 1	-	-	-	-	209	-
Stage 2	-	-	-	-	274	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1340	-	-	-	546	836
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	777	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1340	-	-	-	527	836
Mov Cap-2 Maneuver	-	-	-	-	527	-
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	777	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	11.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1340	-	-	-	527	836
HCM Lane V/C Ratio	0.033	-	-	-	0.069	0.027
HCM Control Delay (s)	7.8	-	-	-	12.3	9.4
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	0.1

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	1	64	1	106	1	407	98	95	355	1
Future Vol, veh/h	1	1	1	64	1	106	1	407	98	95	355	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	0	90	-	130	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-2	-	-	4	-	-	2	-	-	3	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	0	1	0	6	1	5	5	0
Mvmt Flow	1	1	1	75	1	125	1	479	115	112	418	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	885	1239	210	915	1124	240	419	0	0	594	0	0
Stage 1	643	643	-	481	481	-	-	-	-	-	-	-
Stage 2	242	596	-	434	643	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.1	6.7	8.3	7.3	7.32	4.1	-	-	4.2	-	-
Critical Hdwy Stg 1	6.1	5.1	-	7.3	6.3	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.1	-	7.3	6.3	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.31	2.2	-	-	2.25	-	-
Pot Cap-1 Maneuver	268	203	811	188	161	744	1151	-	-	958	-	-
Stage 1	465	506	-	486	501	-	-	-	-	-	-	-
Stage 2	766	529	-	523	409	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	202	179	811	170	142	744	1151	-	-	958	-	-
Mov Cap-2 Maneuver	202	179	-	170	142	-	-	-	-	-	-	-
Stage 1	465	447	-	486	500	-	-	-	-	-	-	-
Stage 2	636	528	-	460	361	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.3	23	0	1.9
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1151	-	-	255	169	744	958	-	-
HCM Lane V/C Ratio	0.001	-	-	0.014	0.452	0.168	0.117	-	-
HCM Control Delay (s)	8.1	-	-	19.3	42.8	10.8	9.3	-	-
HCM Lane LOS	A	-	-	C	E	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	2.1	0.6	0.4	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	3	5	1	18	13	488	10	15	401	3
Future Vol, veh/h	1	1	3	5	1	18	13	488	10	15	401	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	150	-	135	110	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	5	-	-	3	-	-	4	-	-	-2	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	0	6	0	5	0	0	4	0
Mvmt Flow	1	1	4	6	1	21	15	574	12	18	472	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	828	1126	238	877	1116	287	476	0	0	586	0	0
Stage 1	510	510	-	604	604	-	-	-	-	-	-	-
Stage 2	318	616	-	273	512	-	-	-	-	-	-	-
Critical Hdwy	8.5	7.5	7.4	8.1	7.1	7.32	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.36	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	212	151	744	212	174	681	1097	-	-	999	-	-
Stage 1	451	469	-	413	444	-	-	-	-	-	-	-
Stage 2	616	409	-	684	496	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	199	146	744	205	168	681	1097	-	-	999	-	-
Mov Cap-2 Maneuver	199	146	-	205	168	-	-	-	-	-	-	-
Stage 1	445	461	-	407	438	-	-	-	-	-	-	-
Stage 2	587	403	-	667	487	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.7	13.8	0.2	0.3
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1097	-	-	314	205	587	999	-	-
HCM Lane V/C Ratio	0.014	-	-	0.019	0.029	0.038	0.018	-	-
HCM Control Delay (s)	8.3	-	-	16.7	23.1	11.4	8.7	-	-
HCM Lane LOS	A	-	-	C	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	119	17	71	2	3	3	111	389	31	7	352	50
Future Vol, veh/h	119	17	71	2	3	3	111	389	31	7	352	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	100	-	230	0	-	-	160	-	175	160	-	125
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	3	-	-	-3	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	0	3	0	0	33	1	5	0	0	3	8
Mvmt Flow	140	20	84	2	4	4	131	458	36	8	414	59

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	923	1186	207	953	1209	229	473	0	0	494	0	0
Stage 1	430	430	-	720	720	-	-	-	-	-	-	-
Stage 2	493	756	-	233	489	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.5	6.96	7.5	6.5	7.56	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4	3.33	3.5	4	3.63	2.21	-	-	2.2	-	-
Pot Cap-1 Maneuver	225	190	796	217	184	687	1092	-	-	1080	-	-
Stage 1	574	587	-	390	435	-	-	-	-	-	-	-
Stage 2	526	419	-	755	553	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	199	166	796	159	161	687	1092	-	-	1080	-	-
Mov Cap-2 Maneuver	199	166	-	159	161	-	-	-	-	-	-	-
Stage 1	505	583	-	343	383	-	-	-	-	-	-	-
Stage 2	456	369	-	648	549	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	38.8	21.4	1.8	0.1
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1092	-	-	199	166	796	159	261	1080	-	-
HCM Lane V/C Ratio	0.12	-	-	0.704	0.12	0.105	0.015	0.027	0.008	-	-
HCM Control Delay (s)	8.7	-	-	57.3	29.6	10.1	28	19.2	8.4	-	-
HCM Lane LOS	A	-	-	F	D	B	D	C	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	4.4	0.4	0.3	0	0.1	0	-	-

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	275	869	68	1119	110	119	99	70	161	166	402
v/c Ratio	0.74	0.54	0.51	0.77	0.12	0.67	0.54	0.19	0.55	0.55	0.70
Control Delay	76.6	31.9	101.5	23.6	3.3	83.1	74.3	3.8	64.7	64.4	40.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.6	31.9	101.5	23.6	3.3	83.1	74.3	3.8	64.7	64.4	40.0
Queue Length 50th (ft)	140	356	58	582	38	119	97	0	152	156	257
Queue Length 95th (ft)	193	428	m119	192	m15	188	160	17	251	257	417
Internal Link Dist (ft)		1315		334			509			538	
Turn Bay Length (ft)	250		130		200	250		125	215		
Base Capacity (vph)	412	1607	218	1486	922	222	232	465	301	311	581
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.54	0.31	0.75	0.12	0.54	0.43	0.15	0.53	0.53	0.69

Intersection Summary

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

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	2	262	794	40	10	56	1074	106	114	95	67	231
Future Volume (vph)	2	262	794	40	10	56	1074	106	114	95	67	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			0%				-1%			2%		
Total Lost time (s)		7.8	5.2			6.9	5.8	9.4	8.3	8.3	6.9	9.4
Lane Util. Factor		0.97	0.95			1.00	0.95	1.00	1.00	1.00	1.00	0.95
Frpb, ped/bikes		1.00	1.00			1.00	1.00	0.99	1.00	1.00	0.98	1.00
Flpb, ped/bikes		1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.99			1.00	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)		3400	3512			1814	3557	1570	1787	1862	1563	1715
Flt Permitted		0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (perm)		3400	3512			1814	3557	1570	1787	1862	1563	1715
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	2	273	827	42	10	58	1119	110	119	99	70	241
RTOR Reduction (vph)	0	0	2	0	0	0	0	37	0	0	58	0
Lane Group Flow (vph)	0	275	867	0	0	68	1119	73	119	99	12	161
Confl. Peds. (#/hr)				3				5	2		6	6
Heavy Vehicles (%)	0%	3%	2%	0%	0%	0%	2%	2%	0%	1%	0%	1%
Turn Type	Prot	Prot	NA		Prot	Prot	NA	pm+ov	Split	NA	custom	Split
Protected Phases	5	5	2		1	1	6	4	3	3		4
Permitted Phases								6			1 3	
Actuated Green, G (s)		16.5	68.6			11.1	61.7	87.3	14.9	14.9	26.0	25.6
Effective Green, g (s)		16.5	68.6			11.1	61.7	87.3	14.9	14.9	26.0	25.6
Actuated g/C Ratio		0.11	0.46			0.07	0.41	0.58	0.10	0.10	0.17	0.17
Clearance Time (s)		7.8	5.2			6.9	5.8	9.4	8.3	8.3		9.4
Vehicle Extension (s)		3.0	3.0			3.0	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)		374	1606			134	1463	913	177	184	270	292
v/s Ratio Prot		0.08	c0.25			0.04	c0.31	0.01	c0.07	0.05		0.09
v/s Ratio Perm								0.03			0.01	
v/c Ratio		0.74	0.54			0.51	0.76	0.08	0.67	0.54	0.04	0.55
Uniform Delay, d1		64.6	29.3			66.8	37.9	13.7	65.2	64.3	51.7	56.9
Progression Factor		1.00	1.00			1.36	0.51	1.22	1.00	1.00	1.00	1.00
Incremental Delay, d2		7.3	1.3			2.6	3.3	0.0	9.6	3.0	0.1	2.2
Delay (s)		72.0	30.6			93.8	22.7	16.8	74.8	67.3	51.7	59.2
Level of Service		E	C			F	C	B	E	E	D	E
Approach Delay (s)			40.6				25.9			66.6		
Approach LOS			D				C			E		

Intersection Summary			
HCM 2000 Control Delay	39.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	31.3
Intersection Capacity Utilization	98.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	83	386
Future Volume (vph)	83	386
Ideal Flow (vphpl)	1900	1900
Grade (%)	-2%	
Total Lost time (s)	9.4	9.4
Lane Util. Factor	0.95	1.00
Frpb, ped/bikes	1.00	0.99
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.98	1.00
Satd. Flow (prot)	1772	1545
Flt Permitted	0.98	1.00
Satd. Flow (perm)	1772	1545
Peak-hour factor, PHF	0.96	0.96
Adj. Flow (vph)	86	402
RTOR Reduction (vph)	0	60
Lane Group Flow (vph)	166	342
Confl. Peds. (#/hr)		2
Heavy Vehicles (%)	0%	4%
Turn Type	NA	custom
Protected Phases	4	
Permitted Phases		4 5
Actuated Green, G (s)	25.6	51.5
Effective Green, g (s)	25.6	51.5
Actuated g/C Ratio	0.17	0.34
Clearance Time (s)	9.4	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	302	530
v/s Ratio Prot	0.09	
v/s Ratio Perm		c0.22
v/c Ratio	0.55	0.64
Uniform Delay, d1	56.9	41.5
Progression Factor	1.00	1.00
Incremental Delay, d2	2.0	2.7
Delay (s)	59.0	44.2
Level of Service	E	D
Approach Delay (s)	50.9	
Approach LOS	D	

Intersection Summary

HCM 6th Edition methodology expects strict NEMA phasing.

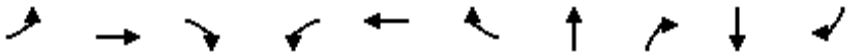
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑	↱			↱			↱
Traffic Vol, veh/h	0	1019	83	0	1167	102	0	0	25	0	0	79
Future Vol, veh/h	0	1019	83	0	1167	102	0	0	25	0	0	79
Conflicting Peds, #/hr	0	0	0	0	0	4	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	110	-	-	300	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	3	-	-	3	-	-	-11	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	2	0	0	2	0	0	0	4	0	0	0
Mvmt Flow	0	1096	89	0	1255	110	0	0	27	0	0	85

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	548	-	-	632
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.28	-	-	5.8
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.34	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	454	0	0	519
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	454	-	-	517
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	13.4	13.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	454	-	-	-	-	517
HCM Lane V/C Ratio	0.059	-	-	-	-	0.164
HCM Control Delay (s)	13.4	-	-	-	-	13.3
HCM Lane LOS	B	-	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	147	949	2	68	1160	88	36	79	165	148
v/c Ratio	0.72	0.44	0.00	0.54	0.63	0.10	0.31	0.30	0.76	0.44
Control Delay	87.4	12.5	0.0	82.0	28.6	0.2	72.2	3.0	85.8	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.4	12.5	0.0	82.0	28.6	0.2	72.2	3.0	85.8	10.0
Queue Length 50th (ft)	157	212	0	68	427	0	36	0	164	0
Queue Length 95th (ft)	225	226	m0	123	610	0	73	0	249	53
Internal Link Dist (ft)		457			1504		131		565	
Turn Bay Length (ft)	240		330	150		150		60		
Base Capacity (vph)	260	2159	993	157	1853	907	202	327	250	363
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	0.57	0.44	0.00	0.43	0.63	0.10	0.18	0.24	0.66	0.41

Intersection Summary

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

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	9	131	902	2	65	1102	84	17	17	75	139	18
Future Volume (vph)	9	131	902	2	65	1102	84	17	17	75	139	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			-4%			2%			0%			-1%
Total Lost time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.6	6.6		7.5
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00
Frpb, ped/bikes		1.00	1.00	0.97	1.00	1.00	0.98		1.00	1.00		1.00
Flpb, ped/bikes		1.00	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	0.85		1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (prot)		1807	3682	1602	1787	3504	1558		1854	1615		1813
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (perm)		1807	3682	1602	1787	3504	1558		1854	1615		1813
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)	9	138	949	2	68	1160	88	18	18	79	146	19
RTOR Reduction (vph)	0	0	0	1	0	0	41	0	0	74	0	0
Lane Group Flow (vph)	0	147	949	1	68	1160	47	0	36	5	0	165
Confl. Peds. (#/hr)				2			2					
Heavy Vehicles (%)	0%	2%	0%	0%	0%	2%	1%	0%	0%	0%	1%	0%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA
Protected Phases	1	1	6		5	2		4	4		3	3
Permitted Phases				6			2			4		
Actuated Green, G (s)		17.1	86.7	86.7	9.3	79.4	79.4		9.5	9.5		17.9
Effective Green, g (s)		17.1	86.7	86.7	9.3	79.4	79.4		9.5	9.5		17.9
Actuated g/C Ratio		0.11	0.58	0.58	0.06	0.53	0.53		0.06	0.06		0.12
Clearance Time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.6	6.6		7.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)		205	2128	925	110	1854	824		117	102		216
v/s Ratio Prot		c0.08	0.26		0.04	c0.33			c0.02			c0.09
v/s Ratio Perm				0.00			0.03			0.00		
v/c Ratio		0.72	0.45	0.00	0.62	0.63	0.06		0.31	0.05		0.76
Uniform Delay, d1		64.1	18.0	13.4	68.6	24.8	17.1		67.1	66.0		64.0
Progression Factor		1.10	0.61	1.00	1.00	1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2		10.2	0.6	0.0	9.9	1.6	0.1		1.5	0.2		14.8
Delay (s)		80.8	11.6	13.4	78.5	26.4	17.3		68.6	66.2		78.8
Level of Service		F	B	B	E	C	B		E	E		E
Approach Delay (s)			20.9			28.5			67.0			69.4
Approach LOS			C			C			E			E

Intersection Summary			
HCM 2000 Control Delay	31.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	26.6
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	141
Future Volume (vph)	141
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	7.5
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1607
Flt Permitted	1.00
Satd. Flow (perm)	1607
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	148
RTOR Reduction (vph)	130
Lane Group Flow (vph)	18
Confl. Peds. (#/hr)	
Heavy Vehicles (%)	1%
Turn Type	Perm
Protected Phases	
Permitted Phases	3
Actuated Green, G (s)	17.9
Effective Green, g (s)	17.9
Actuated g/C Ratio	0.12
Clearance Time (s)	7.5
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	191
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.09
Uniform Delay, d1	58.8
Progression Factor	1.00
Incremental Delay, d2	0.2
Delay (s)	59.0
Level of Service	E
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition methodology expects strict NEMA phasing.

Intersection	
Int Delay, s/veh	8.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	77	116	45	50	41	94	43	12	48	39	32
Future Vol, veh/h	17	77	116	45	50	41	94	43	12	48	39	32
Conflicting Peds, #/hr	0	0	14	14	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-8	-	-	-2	-	-	1	-	-	-1	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	2	0	2	5	0	2	0	0	3	0
Mvmt Flow	18	80	121	47	52	43	98	45	13	50	41	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	403	412	51	423	422	29	74	0	0	58	0	0
Stage 1	158	158	-	248	248	-	-	-	-	-	-	-
Stage 2	245	254	-	175	174	-	-	-	-	-	-	-
Critical Hdwy	5.9	4.9	6.14	7.1	6.14	6.8	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	4.9	3.9	-	6.1	5.14	-	-	-	-	-	-	-
Critical Hdwy Stg 2	4.9	3.9	-	6.1	5.14	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.32	3.5	4.02	3.35	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	642	640	1018	545	547	1031	1538	-	-	1559	-	-
Stage 1	895	827	-	760	720	-	-	-	-	-	-	-
Stage 2	828	784	-	832	769	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	524	577	1006	392	493	1031	1538	-	-	1559	-	-
Mov Cap-2 Maneuver	524	577	-	392	493	-	-	-	-	-	-	-
Stage 1	836	799	-	710	672	-	-	-	-	-	-	-
Stage 2	684	732	-	629	743	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.8	14.2	4.7	3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1538	-	-	747	531	1559	-	-
HCM Lane V/C Ratio	0.064	-	-	0.293	0.267	0.032	-	-
HCM Control Delay (s)	7.5	0	-	11.8	14.2	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.2	1.1	0.1	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↱		↕	
Traffic Vol, veh/h	3	106	86	28	112	2	62	2	37	1	5	1
Future Vol, veh/h	3	106	86	28	112	2	62	2	37	1	5	1
Conflicting Peds, #/hr	4	0	0	0	0	4	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	1	-	-	2	-	-	-5	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	3	0	4	1	0	3	0	3	0	0	0
Mvmt Flow	3	119	97	31	126	2	70	2	42	1	6	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	132	0	0	216	0	0	367	368	170	391	415	131
Stage 1	-	-	-	-	-	-	174	174	-	193	193	-
Stage 2	-	-	-	-	-	-	193	194	-	198	222	-
Critical Hdwy	4.1	-	-	4.14	-	-	7.53	6.9	6.43	6.1	5.5	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.9	-	5.1	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.9	-	5.1	4.5	-
Follow-up Hdwy	2.2	-	-	2.236	-	-	3.527	4	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1466	-	-	1342	-	-	564	542	863	637	596	941
Stage 1	-	-	-	-	-	-	810	744	-	858	786	-
Stage 2	-	-	-	-	-	-	789	728	-	854	769	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1461	-	-	1342	-	-	548	526	862	589	578	938
Mov Cap-2 Maneuver	-	-	-	-	-	-	548	526	-	589	578	-
Stage 1	-	-	-	-	-	-	808	743	-	854	764	-
Stage 2	-	-	-	-	-	-	763	708	-	807	767	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.5	11.4	10.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	547	862	1461	-	-	1342	-	-	613
HCM Lane V/C Ratio	0.131	0.048	0.002	-	-	0.023	-	-	0.013
HCM Control Delay (s)	12.6	9.4	7.5	0	-	7.7	0	-	10.9
HCM Lane LOS	B	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.5	0.2	0	-	-	0.1	-	-	0

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	42	128	160	14	67	52
Future Vol, veh/h	42	128	160	14	67	52
Conflicting Peds, #/hr	1	0	0	1	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-3	1	-	-5	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	0	0	2
Mvmt Flow	49	151	188	16	79	61

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	205	0	-	0	448	197
Stage 1	-	-	-	-	197	-
Stage 2	-	-	-	-	251	-
Critical Hdwy	4.12	-	-	-	5.4	5.72
Critical Hdwy Stg 1	-	-	-	-	4.4	-
Critical Hdwy Stg 2	-	-	-	-	4.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.318
Pot Cap-1 Maneuver	1366	-	-	-	648	868
Stage 1	-	-	-	-	888	-
Stage 2	-	-	-	-	853	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1365	-	-	-	621	867
Mov Cap-2 Maneuver	-	-	-	-	621	-
Stage 1	-	-	-	-	852	-
Stage 2	-	-	-	-	852	-

Approach	EB	WB	SB
HCM Control Delay, s	1.9	0	11.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1365	-	-	-	709
HCM Lane V/C Ratio	0.036	-	-	-	0.197
HCM Control Delay (s)	7.7	-	-	-	11.3
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	159	210	2	11	27
Future Vol, veh/h	5	159	210	2	11	27
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	75	-	-	-	0	50
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-5	3	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	3	2	0	0	0
Mvmt Flow	6	187	247	2	13	32

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	250	0	-	0	448	249
Stage 1	-	-	-	-	249	-
Stage 2	-	-	-	-	199	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1327	-	-	-	572	795
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	839	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1326	-	-	-	568	794
Mov Cap-2 Maneuver	-	-	-	-	568	-
Stage 1	-	-	-	-	792	-
Stage 2	-	-	-	-	838	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1326	-	-	-	568	794
HCM Lane V/C Ratio	0.004	-	-	-	0.023	0.04
HCM Control Delay (s)	7.7	-	-	-	11.5	9.7
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0.1

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1	4	98	1	139	2	370	77	86	501	2
Future Vol, veh/h	2	1	4	98	1	139	2	370	77	86	501	2
Conflicting Peds, #/hr	0	0	0	0	0	0	4	0	1	1	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	0	90	-	130	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-2	-	-	4	-	-	2	-	-	3	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	1	0	2	0	3	4	1	4	0
Mvmt Flow	2	1	4	109	1	154	2	411	86	96	557	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	964	1256	284	887	1171	207	563	0	0	498	0	0
Stage 1	754	754	-	416	416	-	-	-	-	-	-	-
Stage 2	210	502	-	471	755	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.1	6.7	8.32	7.3	7.34	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.1	-	7.32	6.3	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.1	-	7.32	6.3	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.51	4	3.32	2.2	-	-	2.21	-	-
Pot Cap-1 Maneuver	237	199	730	197	150	781	1019	-	-	1069	-	-
Stage 1	404	457	-	535	543	-	-	-	-	-	-	-
Stage 2	797	577	-	491	355	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	175	180	728	181	136	780	1016	-	-	1068	-	-
Mov Cap-2 Maneuver	175	180	-	181	136	-	-	-	-	-	-	-
Stage 1	402	414	-	533	541	-	-	-	-	-	-	-
Stage 2	637	575	-	443	322	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.9	28	0	1.3
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1016	-	-	311	180	780	1068	-	-
HCM Lane V/C Ratio	0.002	-	-	0.025	0.611	0.198	0.089	-	-
HCM Control Delay (s)	8.6	-	-	16.9	52.2	10.8	8.7	-	-
HCM Lane LOS	A	-	-	C	F	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	3.4	0.7	0.3	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	1	17	33	1	38	15	401	15	41	556	6
Future Vol, veh/h	10	1	17	33	1	38	15	401	15	41	556	6
Conflicting Peds, #/hr	0	0	0	0	0	0	5	0	0	0	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	150	-	135	110	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	5	-	-	3	-	-	4	-	-	-2	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	5	0	3	0	0	3	0
Mvmt Flow	11	1	19	37	1	42	17	446	17	46	618	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	977	1216	318	882	1202	223	630	0	0	463	0	0
Stage 1	719	719	-	480	480	-	-	-	-	-	-	-
Stage 2	258	497	-	402	722	-	-	-	-	-	-	-
Critical Hdwy	8.5	7.5	7.4	8.1	7.1	7.3	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.35	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	159	130	654	211	152	757	962	-	-	1109	-	-
Stage 1	320	357	-	499	515	-	-	-	-	-	-	-
Stage 2	679	477	-	562	385	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	142	122	651	194	143	757	958	-	-	1109	-	-
Mov Cap-2 Maneuver	142	122	-	194	143	-	-	-	-	-	-	-
Stage 1	313	341	-	490	506	-	-	-	-	-	-	-
Stage 2	628	468	-	521	368	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.3	18.5	0.3	0.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	958	-	-	267	194	682	1109	-	-
HCM Lane V/C Ratio	0.017	-	-	0.117	0.189	0.064	0.041	-	-
HCM Control Delay (s)	8.8	-	-	20.3	27.8	10.6	8.4	-	-
HCM Lane LOS	A	-	-	C	D	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.7	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	8.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	96	61	164	43	27	25	76	310	77	7	493	106
Future Vol, veh/h	96	61	164	43	27	25	76	310	77	7	493	106
Conflicting Peds, #/hr	6	0	0	0	0	6	0	0	3	3	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	100	-	230	0	-	-	160	-	175	160	-	125
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	3	-	-	-3	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	0	1	0	0	0	1	3	0	0	4	1
Mvmt Flow	105	67	180	47	30	27	84	341	85	8	542	116

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	918	1155	271	833	1186	180	658	0	0	429	0	0
Stage 1	558	558	-	512	512	-	-	-	-	-	-	-
Stage 2	360	597	-	321	674	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.5	6.92	7.5	6.5	6.9	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4	3.31	3.5	4	3.3	2.21	-	-	2.2	-	-
Pot Cap-1 Maneuver	227	199	730	265	190	838	932	-	-	1141	-	-
Stage 1	482	515	-	518	540	-	-	-	-	-	-	-
Stage 2	631	495	-	671	457	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	176	179	730	131	171	832	932	-	-	1138	-	-
Mov Cap-2 Maneuver	176	179	-	131	171	-	-	-	-	-	-	-
Stage 1	439	511	-	470	490	-	-	-	-	-	-	-
Stage 2	519	449	-	436	454	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	28.4	33	1.5	0.1
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	932	-	-	176	179	730	131	277	1138	-	-
HCM Lane V/C Ratio	0.09	-	-	0.599	0.374	0.247	0.361	0.206	0.007	-	-
HCM Control Delay (s)	9.2	-	-	52.1	36.7	11.5	47.2	21.3	8.2	-	-
HCM Lane LOS	A	-	-	F	E	B	E	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	3.3	1.6	1	1.5	0.8	0	-	-

G. Background Development and Roadway Improvement Excerpts

TOWN OF WARRENTON
CAPITAL IMPROVEMENT PROGRAM

2023 - 2028

Adopted June 16, 2022

TABLE OF CONTENTS

Mission Statement

In Cooperation With, And For Our Citizens...

...The Mayor, Town Council and the Staff of Warrenton are dedicated to providing public safety, economic opportunity, and quality public services in an attractive, well-planned community with historic character for the benefit, enjoyment and accessibility of all.

Affirmed by Town Council
August 28, 2018

Vision and Value Statement

To Achieve Our Mission, We Strive To...

...

Provide high level services in a cost-effective manner; display honesty, respectfulness, and fairness in all relationships; support the health and economic well-being of our citizens and businesses; preserve our historic small-town character; encourage opportunities, services and infrastructure that allow people of all means to live, work and visit here; and address public concerns and opportunities promptly and effectively.

We recognize our Mission can be achieved only by the exchange of information and that through teamwork we can maintain an environment in which we can maximize our potential.

Affirmed by Town Council August 28, 2018

INTRODUCTION

The Capital Improvement Program (CIP) provides for an orderly implementation of short and long range plans for construction of Capital Improvement Projects and Land Acquisition. It further provides for the scheduling of the associated expenditures over a period of many years. The first year of the program represents the proposed Capital Budget for the Fiscal Year. In addition, consideration is given to the project's relations to other improvements and plans, and the Town's current and anticipated financial capabilities. The CIP is updated annually, at which time the schedule and the projects reevaluated, new or deferred projects are added, and the time frame is extended by one additional fiscal year.

The Town of Warrenton continues to enhance the structure of the budget and provide a greater understanding of funding commitments. Projects are presented under topical categories to help the community understand the investments that are being proposed and the tie in to priorities of the Town. Next, a Capital Asset Replacement Program (CARP) includes projects that cover standard operating and maintenance items. Unlike items listed in the capital project and acquisition program, these are items necessary for the ongoing operations of the Town and its facilities. Finally, the Town created dedicated Utilities and Stormwater Funds. These modifications to the CIP help move it towards a clearer document that works in conjunction with the budget and stated needs of the community.

POLICY

The following policies guide the development of the CIP:

1. The CIP should be realistic relative to the projected source of revenue.
2. A reserve fund should be established, as required, to reduce the fiscal impact of major projects in a single year.
3. Projects undertaken in the Enterprise Fund and Stormwater Fund are to be considered separate from the general Fund.

BENEFITS

A carefully planned CIP will enable the Town to realize several benefits:

1. Major improvements can be anticipated in advance, rather than addressed at the time the need arises.
2. The implementation strategy of the Comprehensive Plan is used as a guide for future needs and investments.
3. The Town Council and Planning Commission are better able to evaluate the needs of the entire community, instead of special projects.
4. Projects can be scheduled when revenue is available and when the community's anticipated ability to finance is determined.
5. Capital programming improves the Town's ability to vitalize state and federal aid. Applications can be timed to fit the development schedule.

DEFINING CAPITAL IMPROVEMENT PROJECTS

A capital improvement is defined as a major expenditure, beyond maintenance and operating costs, for the acquisition or construction of a needed facility. Salaries, supplies and other overhead expenditures are considered maintenance and operating costs, not provided for the CIP. Capital improvements include such things as utility systems, public buildings, land acquisitions, streets and sidewalks. The improvements are items that will have a significant impact on the community and are too expensive to be financed in the annual operating budget. Cost and frequency are two criteria that will be used to distinguish between a capital expenditure and a capital asset.

1. COST - A capital improvement project shall be $10,000 or more.
2. FREQUENCY - Capital improvement projects should be non-recurring. An interval of three years between expenditures is recommended.

DEFINING CAPITAL ASSET REPLACEMENT PROGRAM (CARP)

Capital assets, which include property, plant, equipment, and infrastructure assets, are assets with an initial, individual cost of more than $5,000 and a useful life of more than one year. Infrastructure assets capitalized have an original cost of $25,000 or more. Such assets are recorded at historical cost or estimated historical cost if purchased or constructed. Donated capital assets are recorded at acquisition value at the date of donation. The costs of normal maintenance and repairs that do not add to the value of the asset or materially extend asset lives are not capitalized.

* *Development of planning and regulatory documents are typically captured in a budget's operating expense; however, Warrenton recognizes these types of documents here as they do not occur annually and can have a substantial impact on the budget.*

CATEGORIES

Starting the FY22, CIP projects are being classified around stated priorities of the Town. Projects are numbered under specific topical areas. The CIP further states how projects meet the Comprehensive Plan goals and objectives within the individual project sheets. Below is a general description of the categories.

The CIP programs are coded using the following information:

Economic Development and Tourism (E) – Economic development and tourism projects position Warrenton to leverage and promote the location of jobs, revenue-generating businesses, and attracting tourism through complementary place-based economic development that encourages local economic growth.

General Government (G) – General government projects relate to ensuring the efficiency and needs to run a government that meets the needs of its citizens in a responsive, safe, and transparent fashion.

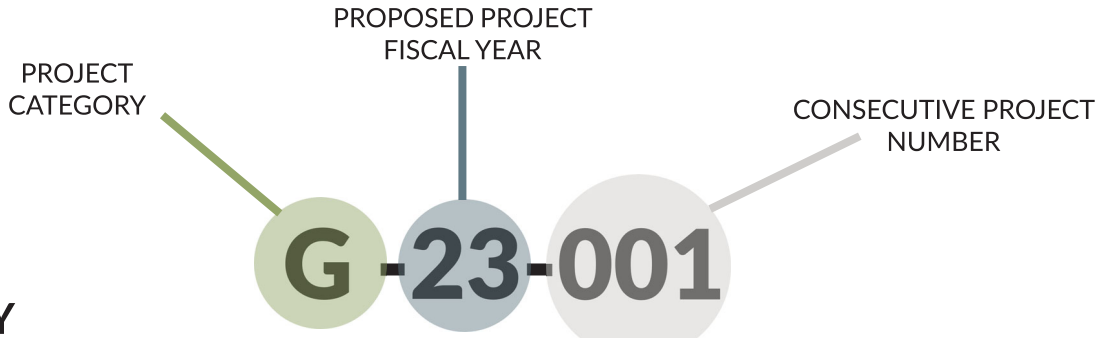
Public Safety (P) - Public safety projects relate to the Town of Warrenton's Police Department and Warrenton Volunteer Fire Company needs to ensure the ongoing safety and security of the community.

Recreation and Quality of Life (R) – Recreation and quality of life projects are recognized as opportunities for additional cultural, arts, and recreational activities in the Town. These type of investments are an important factor for long term economic sustainability.

Transportation and Walkability (T) – Transportation and walkability projects provide for improved multimodal safety by enacting access management strategies, incorporating pedestrian and bike friendly strategies, and deconflicting through-travel and local traffic movements.

Utilities and Stormwater (U) – Utilities and stormwater projects locate, maintain, and build community facilities to ensure the service needs of the Town and Federal and state mandates are met.

EXAMPLE PROJECT NUMBER



SUMMARY

The CIP is a planning and scheduling document. It does not represent authorization to expend Town funds. It does provide an orderly implementation of proposed short and long range plans for land acquisition and construction. Projects are authorized for implementation only after Town Council adopts and appropriates the Capital Budget. The impact of FY23 capital projects, for both improvement and asset projects, on the Town of Warrenton General Fund is $1,281,289. The impact of FY23 capital projects, for both improvement and asset projects, on the Town of Warrenton Water and Sewer Fund is $4,111,102. The impact of the FY23 capital projects on the Stormwater Utility Fund is $94,918. The Town is also using $976,500 in ARPA funds on projects in FY23. The CIP is an annual process and requires close review by both the Planning Commission and the Town Council.

CAPITAL IMPROVEMENT PROJECTS

PROJECT SHEETS

TRANSPORTATION & WALKABILITY

PROJECT NUMBER: T-28-003 **PROJECT TITLE:** Inters. Improv.: Broadview/W. Lee Hwy/Winchester

CATEGORY (check one):

- ☐ Economic Development & Tourism (E)
- ☐ General Government (G)
- ☐ Public Safety (P)
- ☐ Recreation & Quality of Life (R)
- ☐ Stormwater & Utilities (U)
- ☑ Transportation & Walkability (T)

PROGRAM TYPE (check one):

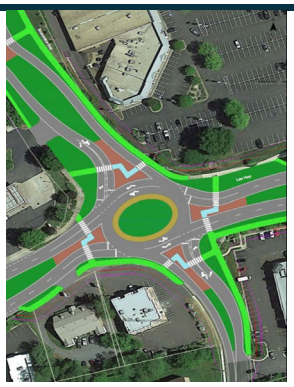
- ☐ CARP
- ☑ CIP

PROGRAM DESCRIPTION

The Town of Warrenton is interested in creating an improvement plan for this important transportation connection between two key arterial corridors. It is also key to the economic development potential of the surrounding area. Therefore, the Town is working with VDOT on a "pipeline project" for the Lee Highway corridor. This project will be updated upon completion of the study in spring 2022.

GOAL ADDRESSED

Plan Warrenton 2040 Transportation and Circulation Near Turn Recommendations page 38.



ESTIMATED COSTS	FY23 2022-23	FY24 2023-24	FY25 2024-25	FY26 2025-26	FY27 2026-27	FY28 & Beyond	Total
Land Acquisition						$2,325,000	**$2,325,000**
Architecture/Engineering						$1,299,486	**$1,299,486**
Construction/Purchase						$3,641,809	**$3,641,809**
Other							**$0**
TOTAL	**$0**	**$0**	**$0**	**$0**	**$0**	**$7,266,295**	**$7,266,295**

FUNDING SOURCES							
General Fund						$7,266,295	**$7,266,295**
Water and Sewer Fund							**$0**
Stormwater Fund							**$0**
ARPA							**$0**
Grant- Federal							**$0**
Proffer							**$0**
Other							**$0**
TOTAL	**$0**	**$0**	**$0**	**$0**	**$0**	**$7,266,295**	**$7,266,295**

OPERATING IMPACT							
Ongoing maintenance							**$0**
Other							**$0**
TOTAL	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

PROJECT NUMBER: T-28-004 **PROJECT TITLE:** Route 17 (Broadview) Roebling Roundabout

CATEGORY (check one):

- ☐ Economic Development & Tourism (E)
- ☐ General Government (G)
- ☐ Public Safety (P)
- ☐ Recreation & Quality of Life (R)
- ☐ Stormwater & Utilities (U)
- ☑ Transportation & Walkability (T)

PROGRAM TYPE (check one):

- ☐ CARP
- ☑ CIP

PROGRAM DESCRIPTION

The intersection at Route 17 (Broadview Avenue) and Roebling Street is subjected to safety issues. As the area around it redevelops, the intersection will need improvements. In 2020 the Town applied for an unsuccessful VDOT Smartscale grant. This application included an assessment of costs associated with a roundabout included below. Therefore, the Town is working with VDOT on a "pipeline project" for the Lee Higway corridor. This project will be updated upon completion of the study in spring of 2022.

GOAL ADDRESSED

Plan Warrenton 2040 Transportation and Circulation Near Turn Recommendations page 38.

ESTIMATED COSTS	FY23 2022-23	FY24 2023-24	FY25 2024-25	FY26 2025-26	FY27 2026-27	FY28 & Beyond	Total
Land Acquisition						$1,987,500	**$1,987,500**
Architecture/Engineering						$1,291,020	**$1,291,020**
Construction/Purchase						$3,921,045	**$3,921,045**
Other							**$0**
TOTAL	**$0**	**$0**	**$0**	**$0**	**$0**	**$7,199,565**	**$7,199,565**

FUNDING SOURCES							
General Fund						$7,199,565	**$7,199,565**
Water and Sewer Fund							**$0**
Stormwater Fund							**$0**
ARPA							**$0**
Grant- Commonwealth							**$0**
Proffer							**$0**
Other							**$0**
TOTAL	**$0**	**$0**	**$0**	**$0**	**$0**	**$7,199,565**	**$7,199,565**

OPERATING IMPACT							
Ongoing maintenance							**$0**
Other							**$0**
TOTAL	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

PROJECT NUMBER: T-28-005 **PROJECT TITLE:** Bear Wallow Road/ Roebling Intersection

CATEGORY (check one):

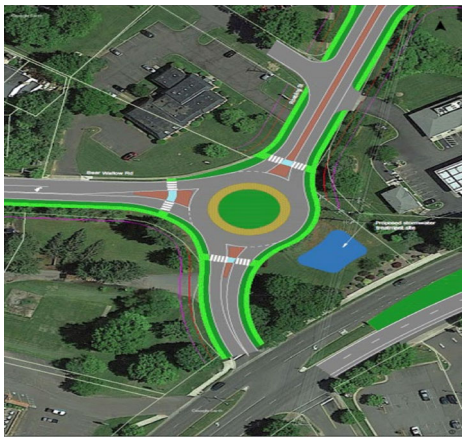
- ☐ Economic Development & Tourism (E)
- ☐ General Government (G)
- ☐ Public Safety (P)
- ☐ Recreation & Quality of Life (R)
- ☐ Stormwater & Utilities (U)
- ☑ Transportation & Walkability (T)

PROGRAM TYPE (check one):

- ☐ CARP
- ☑ CIP

PROGRAM DESCRIPTION

The intersection at Bear Wallow Road and Roebling Street is subjected to safety issues and an awkward configuration. As the area around it redevelops, the intersection will need improvements. In 2020 the Town applied for an unsuccessful VDOT Smartscale grant. This application included an assessment of costs associated with a roundabout included below.



GOAL ADDRESSED

Plan Warrenton 2040 Transportation and Circulation Near Turn Recommendations page 38.

ESTIMATED COSTS	FY23 2022-23	FY24 2023-24	FY25 2024-25	FY26 2025-26	FY27 2026-27	FY28 & Beyond	Total
Land Acquisition						$1,200,000	$1,200,000
Architecture/Engineering						$1,200,000	$1,200,000
Construction/Purchase						$3,600,000	$3,600,000
Other							$0
TOTAL	$0	$0	$0	$0	$0	$6,000,000	$6,000,000
FUNDING SOURCES							
General Fund						$6,000,000	$6,000,000
Water and Sewer Fund							$0
Stormwater Fund							$0
ARPA							$0
Grant- Commonwealth							$0
Proffer							$0
Other							$0
TOTAL	$0	$0	$0	$0	$0	$6,000,000	$6,000,000
OPERATING IMPACT							
Ongoing maintenance							$0
Other							$0
TOTAL	$0	$0	$0	$0	$0	$0	$0

https://www.fauquiernow.com/news/business/warrenton-town-council-greenlights-mixed-use-development-next-to-obriens-pub/article_5e6c8aca-611c-11ed-8421-2751bb1fb016.html

FEATURED

Warrenton Town Council greenlights mixed-use development next to O'Brien's Pub

James Jarvis, jjarvis@FauquierNow.com
Nov 10, 2022

Rendering of a proposed mixed-use development, dubbed Waterloo Junction, that would be built between Broadview Avenue and Bear Wallow Road.

Farrish Properties & Acquisitions LLC

The Warrenton Town Council voted unanimously Wednesday to approve the construction of a mixed-use development -- including 47 townhomes, six apartments, one retail building and a small park -- on the corner of Lee Highway and Broadview Avenue.

The 4.81-acre development, dubbed Waterloo Junction, will consist of 47 1,800-square-foot townhomes, 3,600 square feet of new retail space, six apartments, parking and a small park with a community play area and benches. One townhome and five apartments – 10% of the proposed units – will be designated as affordable housing for individuals or families whose gross annual income does not exceed 80% of the current Fauquier County area median family income.

Rendering of proposed 47 townhomes that could be built as part of the Waterloo Junction development. Each townhome would be 1,800 square-feet and 45 feet high.

Dan Ryan Builders

According to the application, the townhomes will not exceed the town's zoning ordinance of 45 feet. They'll be priced somewhere between $400,000 and $500,000.

For the project to move forward, the council had to approve a zoning map amendment, special-use permit and Comprehensive Plan amendment.

The Warrenton Planning Commission previously voted 5-1 recommending the council approve the project. Commissioner Ali Zarabi cast the only dissenting vote, noting concerns about traffic mitigation, among other issues.

During the council meeting, Ward 2 representative William Semple urged his colleagues to delay the project. Semple said that while he supported the creation of more affordable housing, he argued it may create a "precedent" in which other developers would be incentivized to propose similar projects along Broadview Avenue that do not align with the 2040 Comprehensive Plan guidelines which the council approved in April 2021.

"I think that we should consider those issues before we adopt this one, because this is going to be what I call the lead horse in a variety of potential development down the road," Semple said.

The Comprehensive Plan states the Experience Broadview District "will allow for mixed-use residential at lower density, but nodal development with mixed-use anchors and improved edges to adjacent single-family neighborhoods. Current commercial uses will be maintained."

Semple moved to table the project, but it was rejected 6-1, with Semple casting the only supporting vote.

The rest of the council, including Mayor Carter Nevill, praised the project, saying it will be a positive addition to the town.

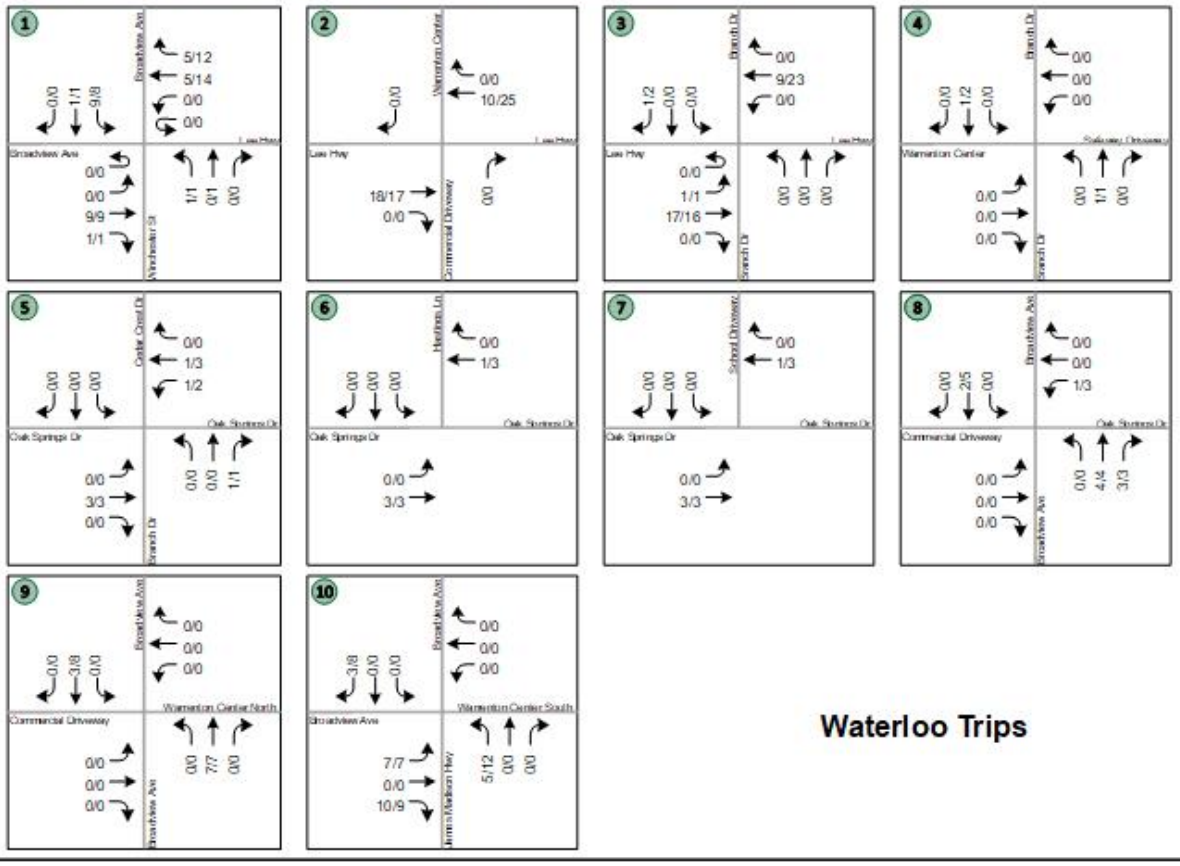
"I think this has been pointed out that the importance of ... bringing people into residential spaces that are close to commercial and entertainment spaces ... it recreates the same sense of community that you see in downtown, where you have people ... walking to restaurants, walking to shops, and I think the more we are able to bring that closer to our neighborhoods, the better we create our built environment to better serve the well-being of our residents," Nevill said.

The renovation of O'Brien's and the apartments above the restaurant – currently vacant – is estimated to take four months. The townhome construction could be completed within 18 months.

James Jarvis

Legend

- Existing Number
- Existing Roadway
- Recommended Improvement
- One Way Travel Lane
- AM/PM Peak Hour Traffic

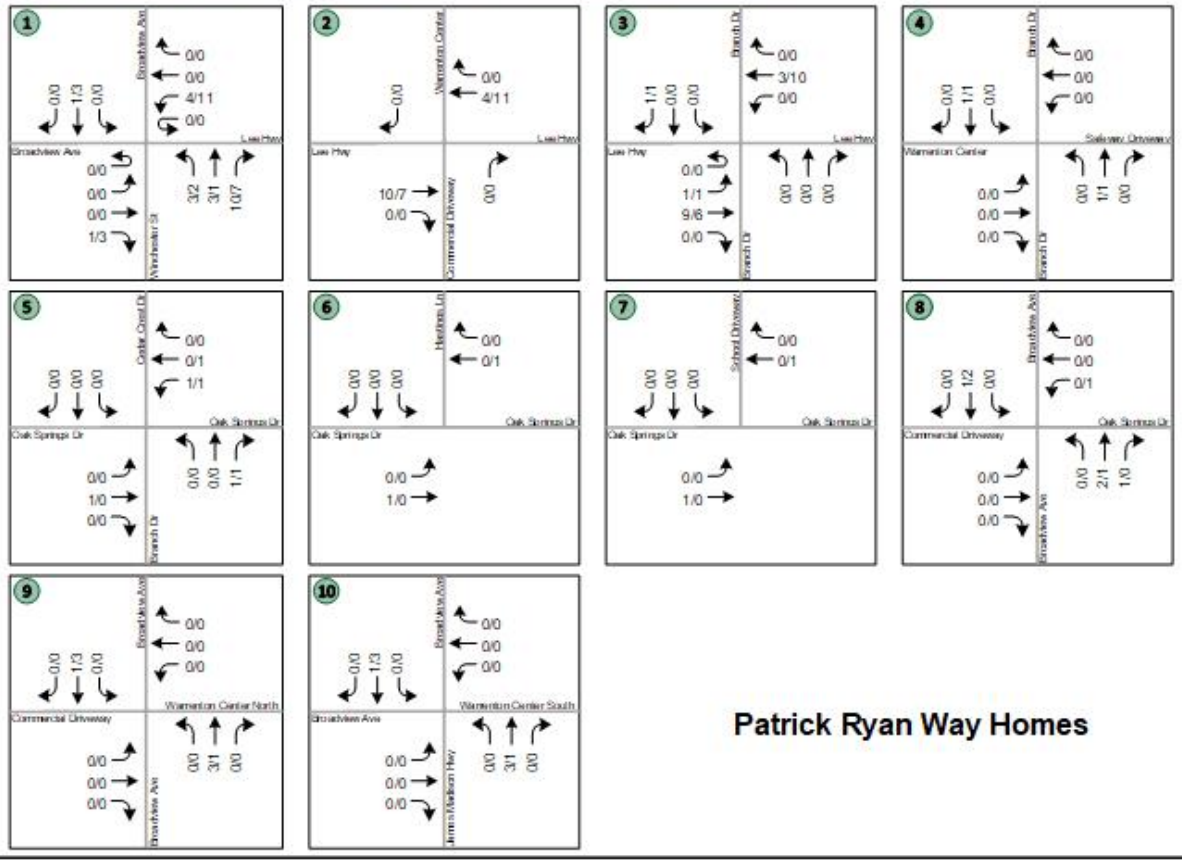


Waterloo Trips

-9479-
-7404-
250
535
-1450-
254
253
-3454-
-3379-
249
-3394-
-2306-
-2331-
-7006-
-5332-
-7227-
-8218-
-7258-
-3392-
-3291-
-7282-
-2255-
241
-4225-
-2149-
-1145-
-4119-
239
-0194-
-0132-
56
-2133-
-4103-
-9220-
-3191-
-8077-
48
-9181-
-9039-
-3098-
-3082-
-7376-
-8067-
-3091-
-8014-
-1928-
-2011-
-8032-
-7935-
-7060-
-0914-
-2904-
-8927-
-0978-
-8913-
-6904-
-7819-
-9862-
-1899-
-3965-
-4847-
-9809-
-8863-
-3950-
-6824-
-1884-
-3844-
-8737-
-3739-
-1778-
-7783-
-9797-
-3723-
-6629-
-4649-
-7720-
-1762-
-1656-
-6621-
-4548-
-4593-
-4457-
415
-7481-
-4307-

Legend

- Existing Number
- Existing Roadway
- Recommended Improvement
- One Way Travel Lane
- AM/PM Peak Hour Traffic



Patrick Ryan Way Homes

H. 2027 Future Conditions without Development – Capacity Analysis Worksheet

LANE LEVEL OF SERVICE

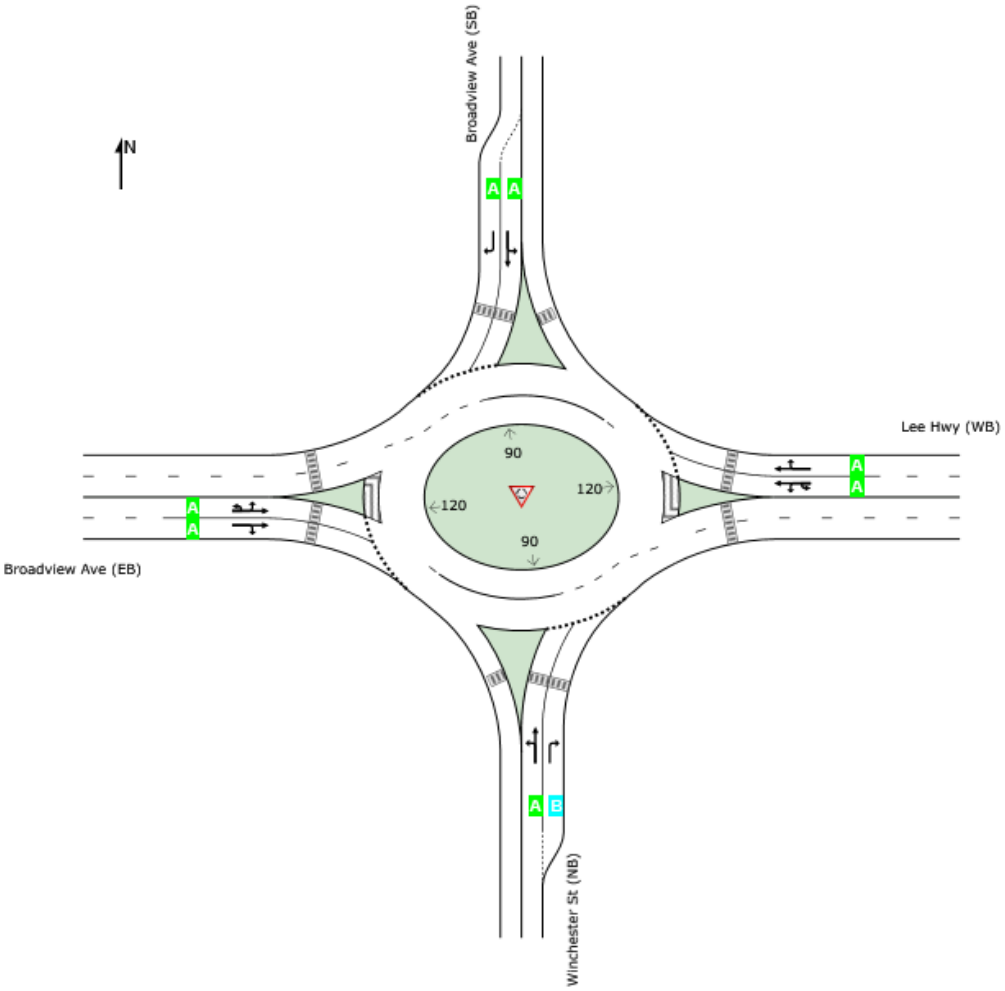
Lane Level of Service

Site: 101 [Broadview/Winchester/Lee - 2027 FB AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Warrenton Village Center
2027 Future Background Condtions
AM Peak Hour
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 101 [Broadview/Winchester/Lee - 2027 FB AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Warrenton Village Center
2027 Future Background Condtions
AM Peak Hour
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Winchester St (NB)															
Lane 1[d]	199	4.5	199	4.5	664	0.300	100	9.2	LOS A	1.4	35.5	Full	1600	0.0	0.0
Lane 2	87	4.0	87	4.0	475	0.183	100	10.2	LOS B	0.7	18.8	Short	250	0.0	NA
Approach	286	4.4	286	4.4		0.300		9.5	LOS A	1.4	35.5				
East: Lee Hwy (WB)															
Lane 1	430	7.2	430	7.2	1024	0.420	100	8.0	LOS A	3.0	78.4	Full	1600	0.0	0.0
Lane 2[d]	504	6.5	504	6.5	1201	0.420	100	7.2	LOS A	3.1	80.8	Full	1600	0.0	0.0
Approach	934	6.8	934	6.8		0.420		7.6	LOS A	3.1	80.8				
North: Broadview Ave (SB)															
Lane 1[d]	240	3.7	240	3.7	750	0.320	100	8.6	LOS A	1.5	39.3	Short	215	0.0	NA
Lane 2	234	3.0	234	3.0	682	0.343	100	9.7	LOS A	1.7	42.6	Full	1600	0.0	0.0
Approach	474	3.4	474	3.4		0.343		9.1	LOS A	1.7	42.6				
West: Broadview Ave (EB)															
Lane 1	448	4.1	448	4.1	1048	0.427	100	8.0	LOS A	3.1	79.7	Full	1600	0.0	0.0
Lane 2[d]	523	3.9	523	3.9	1224	0.427	100	7.2	LOS A	3.2	82.8	Full	1600	0.0	0.0
Approach	971	4.0	971	4.0		0.427		7.6	LOS A	3.2	82.8				
All Vehicles	2664	4.9	2664	4.9		0.427		8.1	LOS A	3.2	82.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Winchester St (NB)

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	84	115	-	199	4.5		664	0.300	100	NA	NA
Lane 2	-	-	87	87	4.0		475	0.183	100	0.0	1
Approach	84	115	87	286	4.4			0.300			
East: Lee Hwy (WB)											
Mov. From E To Exit:	U E	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	3	38	389	-	430	7.2	1024	0.420	100	NA	NA
Lane 2	-	-	313	191	504	6.5	1201	0.420	100	NA	NA
Approach	3	38	701	191	934	6.8		0.420			
North: Broadview Ave (SB)											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	137	103	-	240	3.7		750	0.320	100	0.0	2
Lane 2	-	-	234	234	3.0		682	0.343	100	NA	NA
Approach	137	103	234	474	3.4			0.343			
West: Broadview Ave (EB)											
Mov. From W To Exit:	U W	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	5	62	380	-	448	4.1	1048	0.427	100	NA	NA
Lane 2	-	-	487	36	523	3.9	1224	0.427	100	NA	NA
Approach	5	62	867	36	971	4.0		0.427			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2664	4.9	0.427

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Winchester St (NB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Lee Hwy (WB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: Broadview Ave (SB)				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0
West: Broadview Ave (EB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

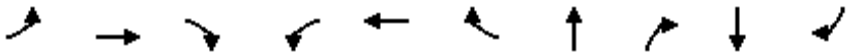
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑	↱			↱			↱
Traffic Vol, veh/h	0	944	63	0	839	31	0	0	29	0	0	20
Future Vol, veh/h	0	944	63	0	839	31	0	0	29	0	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	110	-	-	300	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	3	-	-	3	-	-	-11	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	4	3	0	7	0	0	0	3	0	0	0
Mvmt Flow	0	1026	68	0	912	34	0	0	32	0	0	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	513	-	-	456
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.26	-	-	5.8
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.33	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	483	0	0	640
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	483	-	-	640
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	13	10.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	483	-	-	-	-	640
HCM Lane V/C Ratio	0.065	-	-	-	-	0.034
HCM Control Delay (s)	13	-	-	-	-	10.8
HCM Lane LOS	B	-	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	42	1015	1	48	871	55	23	41	46	57
v/c Ratio	0.37	0.43	0.00	0.41	0.39	0.05	0.15	0.16	0.40	0.29
Control Delay	71.3	17.3	0.0	72.4	16.0	0.1	57.5	1.4	71.9	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.3	17.3	0.0	72.4	16.0	0.1	57.5	1.4	71.9	3.6
Queue Length 50th (ft)	39	246	0	44	198	0	21	0	43	0
Queue Length 95th (ft)	80	485	0	88	400	0	44	0	86	0
Internal Link Dist (ft)		457			1504		131		565	
Turn Bay Length (ft)	240		330	150		150		60		
Base Capacity (vph)	199	2364	1143	227	2281	1124	279	352	185	248
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	0.21	0.43	0.00	0.21	0.38	0.05	0.08	0.12	0.25	0.23

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	7	31	934	1	44	801	51	10	11	38	34	8
Future Volume (vph)	7	31	934	1	44	801	51	10	11	38	34	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			-4%			2%			0%			-1%
Total Lost time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.0	6.0		7.5
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (prot)		1793	3541	1647	1752	3372	1599		1856	1615		1792
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (perm)		1793	3541	1647	1752	3372	1599		1856	1615		1792
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)	8	34	1015	1	48	871	55	11	12	41	37	9
RTOR Reduction (vph)	0	0	0	0	0	0	20	0	0	38	0	0
Lane Group Flow (vph)	0	42	1015	1	48	871	35	0	23	3	0	46
Heavy Vehicles (%)	14%	0%	4%	0%	2%	6%	0%	0%	0%	0%	3%	0%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA
Protected Phases	1	1	6		5	2		4	4		3	3
Permitted Phases				6			2			4		
Actuated Green, G (s)		7.7	87.8	87.8	8.1	88.7	88.7		10.2	10.2		7.9
Effective Green, g (s)		7.7	87.8	87.8	8.1	88.7	88.7		10.2	10.2		7.9
Actuated g/C Ratio		0.06	0.63	0.63	0.06	0.63	0.63		0.07	0.07		0.06
Clearance Time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.0	6.0		7.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)		98	2220	1032	101	2136	1013		135	117		101
v/s Ratio Prot		0.02	c0.29		c0.03	0.26			c0.01			c0.03
v/s Ratio Perm				0.00			0.02			0.00		
v/c Ratio		0.43	0.46	0.00	0.48	0.41	0.03		0.17	0.03		0.46
Uniform Delay, d1		64.0	13.6	9.7	63.9	12.7	9.6		60.9	60.3		64.0
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	0.7	0.0	3.5	0.6	0.1		0.6	0.1		3.2
Delay (s)		67.0	14.3	9.7	67.4	13.3	9.7		61.5	60.4		67.2
Level of Service		E	B	A	E	B	A		E	E		E
Approach Delay (s)			16.4			15.7			60.8			64.7
Approach LOS			B			B			E			E

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	26.0
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)	52
Future Volume (vph)	52
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	7.5
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1375
Flt Permitted	1.00
Satd. Flow (perm)	1375
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	57
RTOR Reduction (vph)	54
Lane Group Flow (vph)	3
Heavy Vehicles (%)	18%
Turn Type	Perm
Protected Phases	
Permitted Phases	3
Actuated Green, G (s)	7.9
Effective Green, g (s)	7.9
Actuated g/C Ratio	0.06
Clearance Time (s)	7.5
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	77
v/s Ratio Prot	
v/s Ratio Perm	0.00
v/c Ratio	0.04
Uniform Delay, d1	62.5
Progression Factor	1.00
Incremental Delay, d2	0.2
Delay (s)	62.7
Level of Service	E
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition methodology expects strict NEMA phasing.

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Traffic Vol, veh/h	6	15	38	14	11	14	23	67	7	18	69	5
Future Vol, veh/h	6	15	38	14	11	14	23	67	7	18	69	5
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-8	-	-	-2	-	-	1	-	-	-1	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	9	0	0	0	0	0	13	0
Mvmt Flow	7	16	41	15	12	15	25	73	8	20	75	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	211	249	42	215	247	41	80	0	0	81	0	0
Stage 1	118	118	-	127	127	-	-	-	-	-	-	-
Stage 2	93	131	-	88	120	-	-	-	-	-	-	-
Critical Hdwy	5.9	4.9	6.1	7.1	6.28	6.7	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	4.9	3.9	-	6.1	5.28	-	-	-	-	-	-	-
Critical Hdwy Stg 2	4.9	3.9	-	6.1	5.28	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4.09	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	805	734	1036	746	656	1030	1531	-	-	1529	-	-
Stage 1	927	845	-	882	785	-	-	-	-	-	-	-
Stage 2	948	839	-	925	790	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	763	711	1034	686	636	1030	1531	-	-	1529	-	-
Mov Cap-2 Maneuver	763	711	-	686	636	-	-	-	-	-	-	-
Stage 1	911	833	-	867	772	-	-	-	-	-	-	-
Stage 2	904	825	-	857	779	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	10	1.8	1.4
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1531	-	-	898	760	1529	-	-
HCM Lane V/C Ratio	0.016	-	-	0.071	0.056	0.013	-	-
HCM Control Delay (s)	7.4	0	-	9.3	10	7.4	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.2	0	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	80	75	16	107	1	73	1	14	1	1	1
Future Vol, veh/h	1	80	75	16	107	1	73	1	14	1	1	1
Conflicting Peds, #/hr	4	0	1	1	0	4	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	1	-	-	2	-	-	-5	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	11	7	1	0	0	0	0	0	0	0
Mvmt Flow	1	87	82	17	116	1	79	1	15	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	121	0	0	170	0	0	283	286	131	295	327	121
Stage 1	-	-	-	-	-	-	131	131	-	155	155	-
Stage 2	-	-	-	-	-	-	152	155	-	140	172	-
Critical Hdwy	4.1	-	-	4.17	-	-	7.5	6.9	6.4	6.1	5.5	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.9	-	5.1	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.9	-	5.1	4.5	-
Follow-up Hdwy	2.2	-	-	2.263	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1479	-	-	1378	-	-	652	607	917	718	651	952
Stage 1	-	-	-	-	-	-	865	780	-	890	807	-
Stage 2	-	-	-	-	-	-	841	760	-	902	797	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1474	-	-	1377	-	-	643	596	915	694	639	949
Mov Cap-2 Maneuver	-	-	-	-	-	-	643	596	-	694	639	-
Stage 1	-	-	-	-	-	-	863	778	-	886	794	-
Stage 2	-	-	-	-	-	-	828	748	-	883	795	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1	11	9.9
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	642	915	1474	-	-	1377	-	-	739
HCM Lane V/C Ratio	0.125	0.017	0.001	-	-	0.013	-	-	0.004
HCM Control Delay (s)	11.4	9	7.4	0	-	7.6	0	-	9.9
HCM Lane LOS	B	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.4	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	83	108	137	44	47	67
Future Vol, veh/h	83	108	137	44	47	67
Conflicting Peds, #/hr	1	0	0	1	0	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-3	1	-	-5	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	1	1	0	17	0
Mvmt Flow	90	117	149	48	51	73

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	198	0	-	0	471	176
Stage 1	-	-	-	-	174	-
Stage 2	-	-	-	-	297	-
Critical Hdwy	4.16	-	-	-	5.57	5.7
Critical Hdwy Stg 1	-	-	-	-	4.57	-
Critical Hdwy Stg 2	-	-	-	-	4.57	-
Follow-up Hdwy	2.254	-	-	-	3.653	3.3
Pot Cap-1 Maneuver	1351	-	-	-	598	894
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	783	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1350	-	-	-	554	892
Mov Cap-2 Maneuver	-	-	-	-	554	-
Stage 1	-	-	-	-	800	-
Stage 2	-	-	-	-	782	-

Approach	EB	WB	SB
HCM Control Delay, s	3.4	0	11.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1350	-	-	-	713
HCM Lane V/C Ratio	0.067	-	-	-	0.174
HCM Control Delay (s)	7.9	-	-	-	11.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.6

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	38	160	153	51	31	19
Future Vol, veh/h	38	160	153	51	31	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	75	-	-	-	0	50
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-5	3	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	4	1	0	0	0
Mvmt Flow	41	174	166	55	34	21

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	221	0	-	0	450	194
Stage 1	-	-	-	-	194	-
Stage 2	-	-	-	-	256	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1360	-	-	-	571	853
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	791	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1360	-	-	-	554	853
Mov Cap-2 Maneuver	-	-	-	-	554	-
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	791	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1360	-	-	-	554	853
HCM Lane V/C Ratio	0.03	-	-	-	0.061	0.024
HCM Control Delay (s)	7.7	-	-	-	11.9	9.3
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	0.1

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	1	65	1	106	1	413	102	95	358	1
Future Vol, veh/h	1	1	1	65	1	106	1	413	102	95	358	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	0	90	-	130	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-2	-	-	4	-	-	2	-	-	3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	1	0	6	1	5	5	0
Mvmt Flow	1	1	1	71	1	115	1	449	111	103	389	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	823	1158	195	852	1047	225	390	0	0	560	0	0
Stage 1	596	596	-	451	451	-	-	-	-	-	-	-
Stage 2	227	562	-	401	596	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.1	6.7	8.3	7.3	7.32	4.1	-	-	4.2	-	-
Critical Hdwy Stg 1	6.1	5.1	-	7.3	6.3	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.1	-	7.3	6.3	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.31	2.2	-	-	2.25	-	-
Pot Cap-1 Maneuver	295	225	829	212	182	762	1180	-	-	987	-	-
Stage 1	494	529	-	509	520	-	-	-	-	-	-	-
Stage 2	780	546	-	551	434	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	229	201	829	194	163	762	1180	-	-	987	-	-
Mov Cap-2 Maneuver	229	201	-	194	163	-	-	-	-	-	-	-
Stage 1	494	474	-	508	519	-	-	-	-	-	-	-
Stage 2	660	545	-	492	389	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.8	19.7	0	1.9
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1180	-	-	284	193	762	987	-	-
HCM Lane V/C Ratio	0.001	-	-	0.011	0.372	0.151	0.105	-	-
HCM Control Delay (s)	8.1	-	-	17.8	34.3	10.6	9.1	-	-
HCM Lane LOS	A	-	-	C	D	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	1.6	0.5	0.3	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	3	5	1	18	13	498	10	15	405	3
Future Vol, veh/h	1	1	3	5	1	18	13	498	10	15	405	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	150	-	135	110	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	5	-	-	3	-	-	4	-	-	-2	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	6	0	5	0	0	4	0
Mvmt Flow	1	1	3	5	1	20	14	541	11	16	440	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	773	1054	222	822	1044	271	443	0	0	552	0	0
Stage 1	474	474	-	569	569	-	-	-	-	-	-	-
Stage 2	299	580	-	253	475	-	-	-	-	-	-	-
Critical Hdwy	8.5	7.5	7.4	8.1	7.1	7.32	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.36	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	236	170	764	235	194	699	1128	-	-	1028	-	-
Stage 1	478	492	-	436	463	-	-	-	-	-	-	-
Stage 2	636	428	-	704	518	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	223	165	764	228	189	699	1128	-	-	1028	-	-
Mov Cap-2 Maneuver	223	165	-	228	189	-	-	-	-	-	-	-
Stage 1	472	484	-	431	457	-	-	-	-	-	-	-
Stage 2	609	423	-	689	510	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.6	13.2	0.2	0.3
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1128	-	-	346	228	612	1028	-	-
HCM Lane V/C Ratio	0.013	-	-	0.016	0.024	0.034	0.016	-	-
HCM Control Delay (s)	8.2	-	-	15.6	21.2	11.1	8.6	-	-
HCM Lane LOS	A	-	-	C	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	126	17	81	2	3	3	116	392	31	7	353	53
Future Vol, veh/h	126	17	81	2	3	3	116	392	31	7	353	53
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	100	-	230	0	-	-	160	-	175	160	-	125
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	3	-	-	-3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	0	3	0	0	33	1	5	0	0	3	8
Mvmt Flow	137	18	88	2	3	3	126	426	34	8	384	58

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	867	1112	192	895	1136	213	442	0	0	460	0	0
Stage 1	400	400	-	678	678	-	-	-	-	-	-	-
Stage 2	467	712	-	217	458	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.5	6.96	7.5	6.5	7.56	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4	3.33	3.5	4	3.63	2.21	-	-	2.2	-	-
Pot Cap-1 Maneuver	247	211	814	239	204	705	1122	-	-	1112	-	-
Stage 1	597	605	-	413	455	-	-	-	-	-	-	-
Stage 2	545	439	-	771	570	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	221	186	814	179	180	705	1122	-	-	1112	-	-
Mov Cap-2 Maneuver	221	186	-	179	180	-	-	-	-	-	-	-
Stage 1	530	601	-	367	404	-	-	-	-	-	-	-
Stage 2	478	390	-	662	566	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30.7	19.7	1.9	0.1
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1122	-	-	221	186	814	179	287	1112	-	-
HCM Lane V/C Ratio	0.112	-	-	0.62	0.099	0.108	0.012	0.023	0.007	-	-
HCM Control Delay (s)	8.6	-	-	44.6	26.5	10	25.4	17.8	8.3	-	-
HCM Lane LOS	A	-	-	E	D	B	D	C	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	3.6	0.3	0.4	0	0.1	0	-	-

LANE SUMMARY

Site: 101 [Broadview/Winchester/Lee - 2027 FB PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Warrenton Village Center
2027 Future Background Conditions
PM Peak Hour
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Winchester St (NB)															
Lane 1[d]	223	0.5	223	0.5	570	0.391	100	12.2	LOS B	2.2	55.7	Full	1600	0.0	0.0
Lane 2	77	0.0	77	0.0	376	0.205	100	13.0	LOS B	0.9	22.4	Short	250	0.0	NA
Approach	300	0.3	300	0.3		0.391		12.4	LOS B	2.2	55.7				
East: Lee Hwy (WB)															
Lane 1	625	1.7	625	1.7	888	0.703	100	16.2	LOS B	10.0	252.3	Full	1600	0.0	0.0
Lane 2[d]	758	2.0	758	2.0	1078	0.703	100	14.0	LOS B	10.5	267.5	Full	1600	0.0	0.0
Approach	1382	1.9	1382	1.9		0.703		15.0	LOS B	10.5	267.5				
North: Broadview Ave (SB)															
Lane 1	340	0.7	340	0.7	435	0.780	100	35.1	LOS D	6.4	161.1	Short	215	0.0	NA
Lane 2[d]	402	4.0	402	4.0	498	0.808	100	34.4	LOS C	7.4	190.7	Full	1600	0.0	0.0
Approach	742	2.5	742	2.5		0.808		34.7	LOS C	7.4	190.7				
West: Broadview Ave (EB)															
Lane 1	538	2.5	538	2.5	923	0.583	100	11.9	LOS B	6.2	158.2	Full	1600	0.0	0.0
Lane 2[d]	652	1.9	652	1.9	1118	0.583	100	10.4	LOS B	6.2	158.3	Full	1600	0.0	0.0
Approach	1191	2.1	1191	2.1		0.583		11.1	LOS B	6.2	158.3				
All Vehicles	3615	2.0	3615	2.0		0.808		17.6	LOS B	10.5	267.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Winchester St (NB)

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	122	101	-	223	0.5		570	0.391	100	NA	NA
Lane 2	-	-	77	77	0.0		376	0.205	100	0.0	1
Approach	122	101	77	300	0.3			0.391			
East: Lee Hwy (WB)											
Mov. From E To Exit:	U E	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	10	70	544	-	625	1.7	888	0.703	100	NA	NA
Lane 2	-	-	635	123	758	2.0	1078	0.703	100	NA	NA
Approach	10	70	1179	123	1382	1.9		0.703			
North: Broadview Ave (SB)											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	249	91	-	340	0.7		435	0.780	100	0.0	2
Lane 2	-	-	402	402	4.0		498	0.808	100	NA	NA
Approach	249	91	402	742	2.5			0.808			
West: Broadview Ave (EB)											
Mov. From W To Exit:	U W	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	2	273	263	-	538	2.5	923	0.583	100	NA	NA
Lane 2	-	-	606	46	652	1.9	1118	0.583	100	NA	NA
Approach	2	273	870	46	1191	2.1		0.583			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	3615	2.0	0.808

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Winchester St (NB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Lee Hwy (WB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: Broadview Ave (SB)				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0
West: Broadview Ave (EB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

LANE LEVEL OF SERVICE

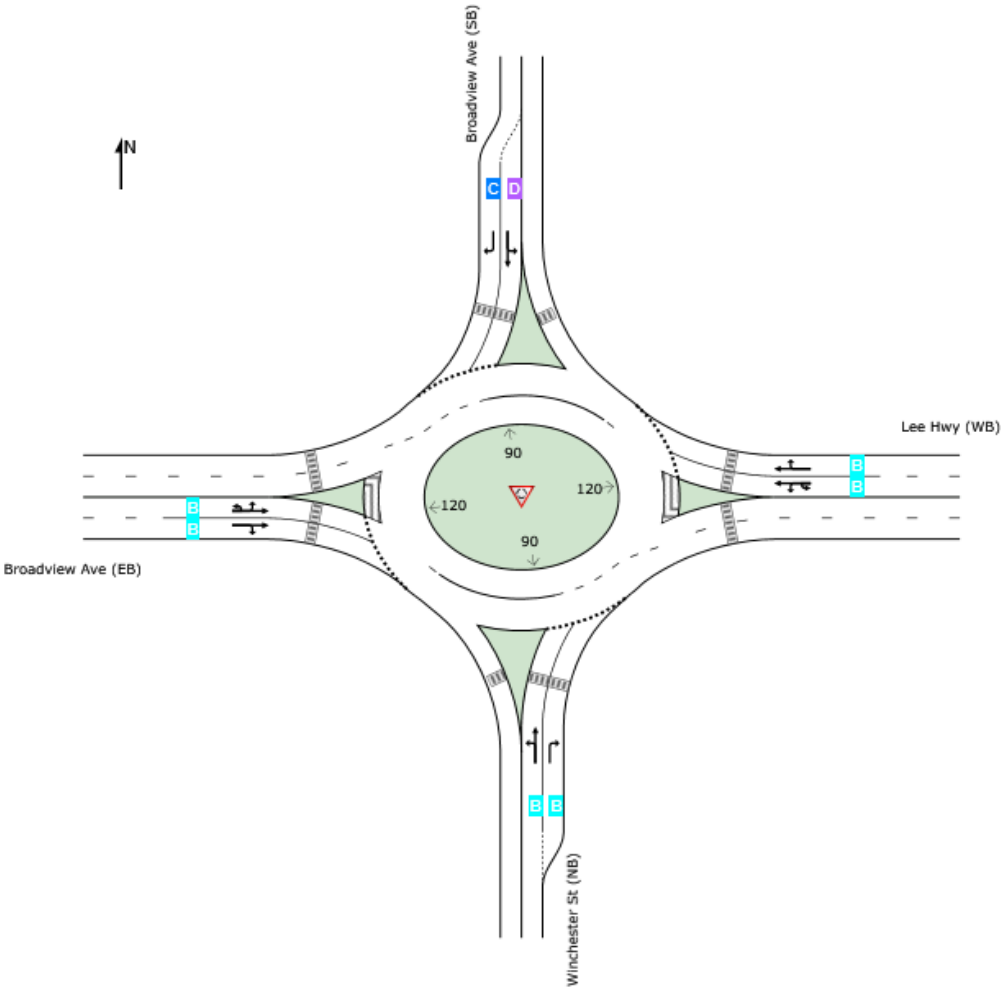
Lane Level of Service

Site: 101 [Broadview/Winchester/Lee - 2027 FB PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Warrenton Village Center
2027 Future Background Conditions
PM Peak Hour
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	B	B	C	B	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

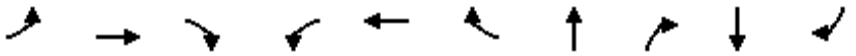
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑	↱			↱			↱
Traffic Vol, veh/h	0	1075	83	0	1247	102	0	0	25	0	0	79
Future Vol, veh/h	0	1075	83	0	1247	102	0	0	25	0	0	79
Conflicting Peds, #/hr	0	0	0	0	0	4	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	110	-	-	300	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	3	-	-	3	-	-	-11	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	2	0	0	2	0	0	0	4	0	0	0
Mvmt Flow	0	1156	89	0	1341	110	0	0	27	0	0	85

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	578	-	-	675
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.28	-	-	5.8
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.34	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	433	0	0	493
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	433	-	-	491
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	13.9	13.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	433	-	-	-	-	491
HCM Lane V/C Ratio	0.062	-	-	-	-	0.173
HCM Control Delay (s)	13.9	-	-	-	-	13.9
HCM Lane LOS	B	-	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	149	1006	2	68	1241	88	36	79	165	152
v/c Ratio	0.72	0.47	0.00	0.54	0.67	0.10	0.31	0.30	0.76	0.45
Control Delay	82.8	20.6	0.0	82.0	30.0	0.2	72.2	3.0	85.8	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.8	20.6	0.0	82.0	30.0	0.2	72.2	3.0	85.8	10.8
Queue Length 50th (ft)	148	310	0	68	475	0	36	0	164	0
Queue Length 95th (ft)	224	441	0	123	675	0	73	0	249	58
Internal Link Dist (ft)		457			1504		131		565	
Turn Bay Length (ft)	240		330	150		150		60		
Base Capacity (vph)	260	2159	993	157	1850	906	202	327	250	363
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	0.57	0.47	0.00	0.43	0.67	0.10	0.18	0.24	0.66	0.42

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	9	133	956	2	65	1179	84	17	17	75	139	18
Future Volume (vph)	9	133	956	2	65	1179	84	17	17	75	139	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			-4%			2%			0%			-1%
Total Lost time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.6	6.6		7.5
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00
Frpb, ped/bikes		1.00	1.00	0.97	1.00	1.00	0.98		1.00	1.00		1.00
Flpb, ped/bikes		1.00	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	0.85		1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (prot)		1807	3682	1602	1787	3504	1558		1854	1615		1813
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (perm)		1807	3682	1602	1787	3504	1558		1854	1615		1813
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)	9	140	1006	2	68	1241	88	18	18	79	146	19
RTOR Reduction (vph)	0	0	0	1	0	0	41	0	0	74	0	0
Lane Group Flow (vph)	0	149	1006	1	68	1241	47	0	36	5	0	165
Confl. Peds. (#/hr)				2			2					
Heavy Vehicles (%)	0%	2%	0%	0%	0%	2%	1%	0%	0%	0%	1%	0%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA
Protected Phases	1	1	6		5	2		4	4		3	3
Permitted Phases				6			2			4		
Actuated Green, G (s)		17.2	86.7	86.7	9.3	79.3	79.3		9.5	9.5		17.9
Effective Green, g (s)		17.2	86.7	86.7	9.3	79.3	79.3		9.5	9.5		17.9
Actuated g/C Ratio		0.11	0.58	0.58	0.06	0.53	0.53		0.06	0.06		0.12
Clearance Time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.6	6.6		7.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)		207	2128	925	110	1852	823		117	102		216
v/s Ratio Prot		c0.08	0.27		0.04	c0.35			c0.02			c0.09
v/s Ratio Perm				0.00			0.03			0.00		
v/c Ratio		0.72	0.47	0.00	0.62	0.67	0.06		0.31	0.05		0.76
Uniform Delay, d1		64.1	18.4	13.4	68.6	25.8	17.2		67.1	66.0		64.0
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2		11.4	0.8	0.0	9.9	1.9	0.1		1.5	0.2		14.8
Delay (s)		75.4	19.1	13.4	78.5	27.8	17.3		68.6	66.2		78.8
Level of Service		E	B	B	E	C	B		E	E		E
Approach Delay (s)			26.4			29.6			67.0			69.3
Approach LOS			C			C			E			E

Intersection Summary			
HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	26.6
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
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)	7.5
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1607
Flt Permitted	1.00
Satd. Flow (perm)	1607
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	152
RTOR Reduction (vph)	134
Lane Group Flow (vph)	18
Confl. Peds. (#/hr)	
Heavy Vehicles (%)	1%
Turn Type	Perm
Protected Phases	
Permitted Phases	3
Actuated Green, G (s)	17.9
Effective Green, g (s)	17.9
Actuated g/C Ratio	0.12
Clearance Time (s)	7.5
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	191
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.09
Uniform Delay, d1	58.8
Progression Factor	1.00
Incremental Delay, d2	0.2
Delay (s)	59.1
Level of Service	E
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition methodology expects strict NEMA phasing.

Intersection	
Int Delay, s/veh	8.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	77	116	45	50	41	94	45	12	48	42	32
Future Vol, veh/h	17	77	116	45	50	41	94	45	12	48	42	32
Conflicting Peds, #/hr	0	0	14	14	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-8	-	-	-2	-	-	1	-	-	-1	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	2	0	2	5	0	2	0	0	3	0
Mvmt Flow	18	80	121	47	52	43	98	47	13	50	44	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	407	417	53	426	427	30	77	0	0	60	0	0
Stage 1	161	161	-	250	250	-	-	-	-	-	-	-
Stage 2	246	256	-	176	177	-	-	-	-	-	-	-
Critical Hdwy	5.9	4.9	6.14	7.1	6.14	6.8	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	4.9	3.9	-	6.1	5.14	-	-	-	-	-	-	-
Critical Hdwy Stg 2	4.9	3.9	-	6.1	5.14	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.32	3.5	4.02	3.35	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	639	637	1015	542	544	1030	1535	-	-	1556	-	-
Stage 1	893	826	-	759	718	-	-	-	-	-	-	-
Stage 2	827	784	-	831	767	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	521	575	1003	390	491	1030	1535	-	-	1556	-	-
Mov Cap-2 Maneuver	521	575	-	390	491	-	-	-	-	-	-	-
Stage 1	834	798	-	709	671	-	-	-	-	-	-	-
Stage 2	683	732	-	628	741	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.8	14.3	4.7	2.9
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1535	-	-	744	529	1556	-	-
HCM Lane V/C Ratio	0.064	-	-	0.294	0.268	0.032	-	-
HCM Control Delay (s)	7.5	0	-	11.8	14.3	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.2	1.1	0.1	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↱		↕	
Traffic Vol, veh/h	3	109	86	31	116	2	62	2	39	1	5	1
Future Vol, veh/h	3	109	86	31	116	2	62	2	39	1	5	1
Conflicting Peds, #/hr	4	0	0	0	0	4	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	1	-	-	2	-	-	-5	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	3	0	4	1	0	3	0	3	0	0	0
Mvmt Flow	3	118	93	34	126	2	67	2	42	1	5	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	132	0	0	211	0	0	369	371	167	394	416	131
Stage 1	-	-	-	-	-	-	171	171	-	199	199	-
Stage 2	-	-	-	-	-	-	198	200	-	195	217	-
Critical Hdwy	4.1	-	-	4.14	-	-	7.53	6.9	6.43	6.1	5.5	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.9	-	5.1	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.9	-	5.1	4.5	-
Follow-up Hdwy	2.2	-	-	2.236	-	-	3.527	4	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1466	-	-	1348	-	-	562	539	867	635	595	941
Stage 1	-	-	-	-	-	-	813	747	-	853	782	-
Stage 2	-	-	-	-	-	-	784	723	-	857	772	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1461	-	-	1348	-	-	545	522	866	585	576	938
Mov Cap-2 Maneuver	-	-	-	-	-	-	545	522	-	585	576	-
Stage 1	-	-	-	-	-	-	811	746	-	849	759	-
Stage 2	-	-	-	-	-	-	756	701	-	810	770	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.6	11.4	11
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	544	866	1461	-	-	1348	-	-	611
HCM Lane V/C Ratio	0.128	0.049	0.002	-	-	0.025	-	-	0.012
HCM Control Delay (s)	12.6	9.4	7.5	0	-	7.7	0	-	11
HCM Lane LOS	B	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0.2	0	-	-	0.1	-	-	0

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	42	131	164	14	67	52
Future Vol, veh/h	42	131	164	14	67	52
Conflicting Peds, #/hr	1	0	0	1	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-3	1	-	-5	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	0	0	2
Mvmt Flow	46	142	178	15	73	57

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	194	0	-	0	423	187
Stage 1	-	-	-	-	187	-
Stage 2	-	-	-	-	236	-
Critical Hdwy	4.12	-	-	-	5.4	5.72
Critical Hdwy Stg 1	-	-	-	-	4.4	-
Critical Hdwy Stg 2	-	-	-	-	4.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.318
Pot Cap-1 Maneuver	1379	-	-	-	665	878
Stage 1	-	-	-	-	895	-
Stage 2	-	-	-	-	863	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1378	-	-	-	640	877
Mov Cap-2 Maneuver	-	-	-	-	640	-
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	862	-

Approach	EB	WB	SB
HCM Control Delay, s	1.9	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1378	-	-	-	726
HCM Lane V/C Ratio	0.033	-	-	-	0.178
HCM Control Delay (s)	7.7	-	-	-	11
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	162	214	2	11	27
Future Vol, veh/h	5	162	214	2	11	27
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	75	-	-	-	0	50
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-5	3	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	3	2	0	0	0
Mvmt Flow	5	176	233	2	12	29

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	236	0	-	0	421	235
Stage 1	-	-	-	-	235	-
Stage 2	-	-	-	-	186	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1343	-	-	-	593	809
Stage 1	-	-	-	-	809	-
Stage 2	-	-	-	-	851	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1342	-	-	-	589	808
Mov Cap-2 Maneuver	-	-	-	-	589	-
Stage 1	-	-	-	-	805	-
Stage 2	-	-	-	-	850	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1342	-	-	-	589	808
HCM Lane V/C Ratio	0.004	-	-	-	0.02	0.036
HCM Control Delay (s)	7.7	-	-	-	11.2	9.6
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0.1

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1	4	102	1	139	2	375	80	86	508	2
Future Vol, veh/h	2	1	4	102	1	139	2	375	80	86	508	2
Conflicting Peds, #/hr	0	0	0	0	0	0	4	0	1	1	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	0	90	-	130	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-2	-	-	4	-	-	2	-	-	3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	1	0	2	0	3	4	1	4	0
Mvmt Flow	2	1	4	111	1	151	2	408	87	93	552	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	952	1243	281	876	1157	205	558	0	0	496	0	0
Stage 1	743	743	-	413	413	-	-	-	-	-	-	-
Stage 2	209	500	-	463	744	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.1	6.7	8.32	7.3	7.34	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.1	-	7.32	6.3	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.1	-	7.32	6.3	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.51	4	3.32	2.2	-	-	2.21	-	-
Pot Cap-1 Maneuver	241	202	733	201	153	784	1023	-	-	1071	-	-
Stage 1	410	461	-	538	545	-	-	-	-	-	-	-
Stage 2	798	578	-	497	360	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	180	183	731	185	139	783	1020	-	-	1070	-	-
Mov Cap-2 Maneuver	180	183	-	185	139	-	-	-	-	-	-	-
Stage 1	408	420	-	536	543	-	-	-	-	-	-	-
Stage 2	641	576	-	450	328	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.6	27.9	0	1.3
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1020	-	-	317	184	783	1070	-	-
HCM Lane V/C Ratio	0.002	-	-	0.024	0.608	0.193	0.087	-	-
HCM Control Delay (s)	8.5	-	-	16.6	51	10.7	8.7	-	-
HCM Lane LOS	A	-	-	C	F	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	3.4	0.7	0.3	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	1	17	33	1	38	15	409	15	41	567	6
Future Vol, veh/h	10	1	17	33	1	38	15	409	15	41	567	6
Conflicting Peds, #/hr	0	0	0	0	0	0	5	0	0	0	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	150	-	135	110	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	5	-	-	3	-	-	4	-	-	-2	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	5	0	3	0	0	3	0
Mvmt Flow	11	1	18	36	1	41	16	445	16	45	616	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	970	1208	317	876	1195	223	628	0	0	461	0	0
Stage 1	715	715	-	477	477	-	-	-	-	-	-	-
Stage 2	255	493	-	399	718	-	-	-	-	-	-	-
Critical Hdwy	8.5	7.5	7.4	8.1	7.1	7.3	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.35	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	161	132	655	213	154	757	964	-	-	1111	-	-
Stage 1	322	359	-	502	517	-	-	-	-	-	-	-
Stage 2	683	480	-	565	387	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	144	124	652	197	145	757	960	-	-	1111	-	-
Mov Cap-2 Maneuver	144	124	-	197	145	-	-	-	-	-	-	-
Stage 1	315	343	-	493	508	-	-	-	-	-	-	-
Stage 2	634	472	-	525	370	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20	18.3	0.3	0.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	960	-	-	270	197	683	1111	-	-
HCM Lane V/C Ratio	0.017	-	-	0.113	0.182	0.062	0.04	-	-
HCM Control Delay (s)	8.8	-	-	20	27.3	10.6	8.4	-	-
HCM Lane LOS	A	-	-	C	D	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.6	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	9.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	103	61	173	43	27	25	88	311	77	7	496	114
Future Vol, veh/h	103	61	173	43	27	25	88	311	77	7	496	114
Conflicting Peds, #/hr	6	0	0	0	0	6	0	0	3	3	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	100	-	230	0	-	-	160	-	175	160	-	125
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	3	-	-	-3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	0	1	0	0	0	1	3	0	0	4	1
Mvmt Flow	112	66	188	47	29	27	96	338	84	8	539	124

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	937	1172	270	852	1212	178	663	0	0	425	0	0
Stage 1	555	555	-	533	533	-	-	-	-	-	-	-
Stage 2	382	617	-	319	679	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.5	6.92	7.5	6.5	6.9	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4	3.31	3.5	4	3.3	2.21	-	-	2.2	-	-
Pot Cap-1 Maneuver	219	194	731	256	184	841	928	-	-	1145	-	-
Stage 1	484	516	-	503	528	-	-	-	-	-	-	-
Stage 2	612	484	-	673	454	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	167	172	731	122	164	835	928	-	-	1142	-	-
Mov Cap-2 Maneuver	167	172	-	122	164	-	-	-	-	-	-	-
Stage 1	434	512	-	450	473	-	-	-	-	-	-	-
Stage 2	495	433	-	432	451	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.9	35.5	1.7	0.1
HCM LOS	D	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	928	-	-	167	172	731	122	267	1142	-	-
HCM Lane V/C Ratio	0.103	-	-	0.67	0.385	0.257	0.383	0.212	0.007	-	-
HCM Control Delay (s)	9.3	-	-	62	38.5	11.6	51.8	22.1	8.2	-	-
HCM Lane LOS	A	-	-	F	E	B	F	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	3.9	1.7	1	1.6	0.8	0	-	-

I. 2027 Future Conditions with Development – Capacity Analysis Worksheets

LANE SUMMARY

Site: 101 [Broadview/Winchester/Lee - 2027 TF AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Warrenton Village Center
2027 Future with Development
AM Peak Hour
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Winchester St (NB)															
Lane 1[d]	203	4.5	203	4.5	569	0.357	100	11.5	LOS B	1.8	46.7	Full	1600	0.0	0.0
Lane 2	87	4.0	87	4.0	397	0.219	100	12.7	LOS B	0.9	22.9	Short	250	0.0	NA
Approach	290	4.3	290	4.3		0.357		11.9	LOS B	1.8	46.7				
East: Lee Hwy (WB)															
Lane 1	418	7.2	418	7.2	813	0.514	100	11.4	LOS B	4.4	115.6	Full	1600	0.0	0.0
Lane 2[d]	517	6.5	517	6.5	1005	0.514	100	9.8	LOS A	4.5	117.1	Full	1600	0.0	0.0
Approach	935	6.8	935	6.8		0.514		10.5	LOS B	4.5	117.1				
North: Broadview Ave (SB)															
Lane 1[d]	253	3.6	253	3.6	717	0.353	100	9.5	LOS A	1.8	47.0	Short	215	0.0	NA
Lane 2	251	3.0	251	3.0	653	0.385	100	10.8	LOS B	2.1	52.8	Full	1600	0.0	0.0
Approach	504	3.3	504	3.3		0.385		10.1	LOS B	2.1	52.8				
West: Broadview Ave (EB)															
Lane 1	549	4.5	549	4.5	1025	0.535	100	10.0	LOS A	4.3	111.1	Full	1600	0.0	0.0
Lane 2[d]	646	3.9	646	3.9	1207	0.535	100	8.9	LOS A	4.5	115.6	Full	1600	0.0	0.0
Approach	1195	4.2	1195	4.2		0.535		9.4	LOS A	4.5	115.6				
All Vehicles	2924	4.9	2924	4.9		0.535		10.1	LOS B	4.5	117.1				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Winchester St (NB)

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	84	120	-	203	4.5		569	0.357	100	NA	NA
Lane 2	-	-	87	87	4.0		397	0.219	100	0.0	1
Approach	84	120	87	290	4.3			0.357			

East: Lee Hwy (WB)

Mov. From E To Exit:	U E	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	3	38	377	-	418	7.2	813	0.514	100	NA	NA
Lane 2	-	-	326	191	517	6.5	1005	0.514	100	NA	NA
Approach	3	38	702	191	935	6.8		0.514			

North: Broadview Ave (SB)

Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	137	116	-	253	3.6	717	0.353	100	0.0	2
Lane 2	-	-	251	251	3.0	653	0.385	100	NA	NA
Approach	137	116	251	504	3.3		0.385			

West: Broadview Ave (EB)

Mov. From W To Exit:	U W	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	5	286	257	-	549	4.5	1025	0.535	100	NA	NA
Lane 2	-	-	610	36	646	3.9	1207	0.535	100	NA	NA
Approach	5	286	867	36	1195	4.2		0.535			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2924	4.9	0.535

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Winchester St (NB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Lee Hwy (WB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: Broadview Ave (SB)				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0
West: Broadview Ave (EB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

LANE LEVEL OF SERVICE

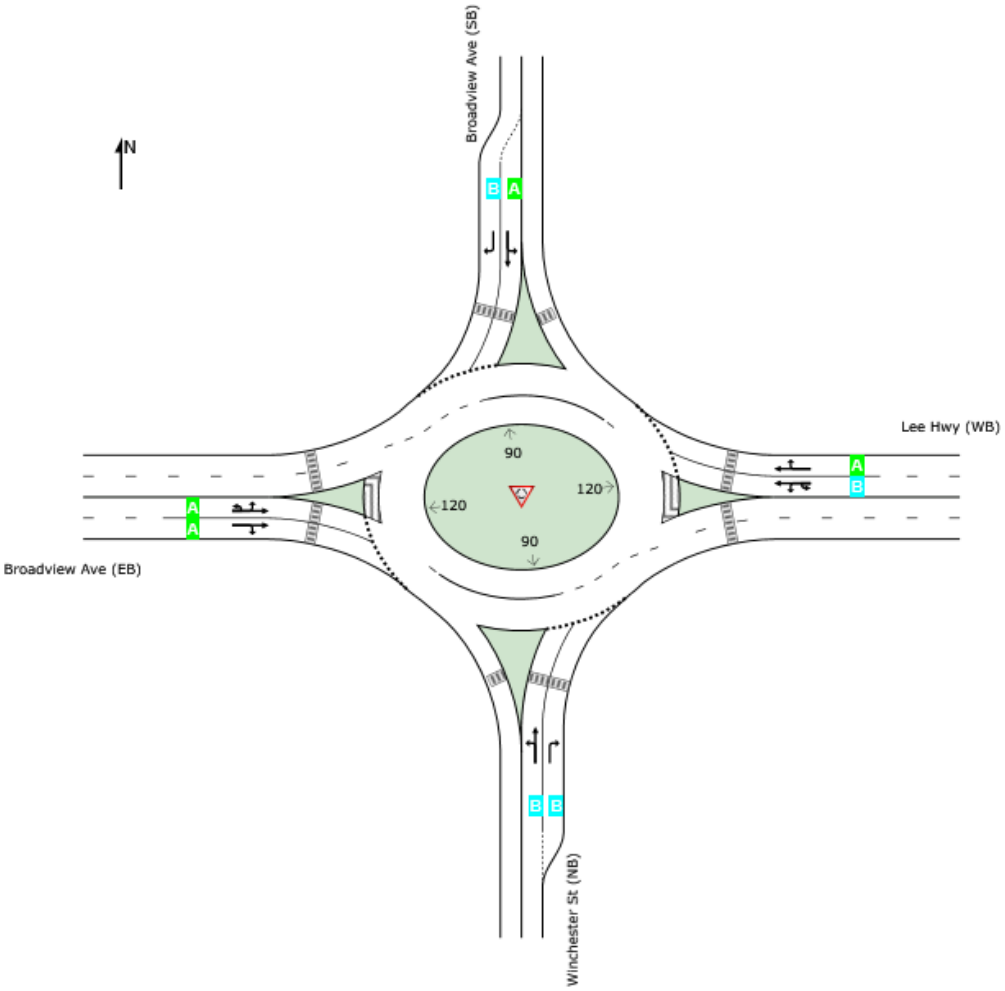
Lane Level of Service

Site: 101 [Broadview/Winchester/Lee - 2027 TF AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Warrenton Village Center
2027 Future with Development
AM Peak Hour
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	B	B	B	A	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

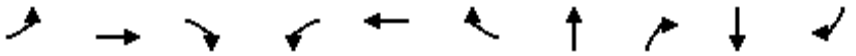
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑	↱			↱			↱
Traffic Vol, veh/h	0	944	63	0	839	32	0	0	29	0	0	21
Future Vol, veh/h	0	944	63	0	839	32	0	0	29	0	0	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	110	-	-	300	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	3	-	-	3	-	-	-11	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	4	3	0	7	0	0	0	3	0	0	0
Mvmt Flow	0	1026	68	0	912	35	0	0	32	0	0	23

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	513	-	-	456
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.26	-	-	5.8
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.33	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	483	0	0	640
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	483	-	-	640
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	13	10.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	483	-	-	-	-	640
HCM Lane V/C Ratio	0.065	-	-	-	-	0.036
HCM Control Delay (s)	13	-	-	-	-	10.8
HCM Lane LOS	B	-	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	42	1015	1	48	872	75	23	41	110	57
v/c Ratio	0.37	0.47	0.00	0.41	0.42	0.07	0.17	0.17	0.62	0.23
Control Delay	71.3	19.4	0.0	72.4	18.1	0.1	60.7	1.6	74.9	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.3	19.4	0.0	72.4	18.1	0.1	60.7	1.6	74.9	2.2
Queue Length 50th (ft)	39	273	0	44	221	0	21	0	102	0
Queue Length 95th (ft)	80	485	0	88	400	0	47	0	163	0
Internal Link Dist (ft)		457			1504		131		565	
Turn Bay Length (ft)	240		330	150		150		60		
Base Capacity (vph)	199	2178	1063	227	2104	1047	261	338	200	259
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	0.21	0.47	0.00	0.21	0.41	0.07	0.09	0.12	0.55	0.22

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	7	31	934	1	44	802	69	10	11	38	93	8
Future Volume (vph)	7	31	934	1	44	802	69	10	11	38	93	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			-4%			2%			0%			-1%
Total Lost time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.0	6.0		7.5
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (prot)		1793	3541	1647	1752	3372	1599		1856	1615		1777
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (perm)		1793	3541	1647	1752	3372	1599		1856	1615		1777
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)	8	34	1015	1	48	872	75	11	12	41	101	9
RTOR Reduction (vph)	0	0	0	0	0	0	30	0	0	38	0	0
Lane Group Flow (vph)	0	42	1015	1	48	872	45	0	23	3	0	110
Heavy Vehicles (%)	14%	0%	4%	0%	2%	6%	0%	0%	0%	0%	3%	0%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA
Protected Phases	1	1	6		5	2		4	4		3	3
Permitted Phases				6			2			4		
Actuated Green, G (s)		7.7	83.0	83.0	8.1	83.9	83.9		8.9	8.9		14.0
Effective Green, g (s)		7.7	83.0	83.0	8.1	83.9	83.9		8.9	8.9		14.0
Actuated g/C Ratio		0.06	0.59	0.59	0.06	0.60	0.60		0.06	0.06		0.10
Clearance Time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.0	6.0		7.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)		98	2099	976	101	2020	958		117	102		177
v/s Ratio Prot		0.02	c0.29		c0.03	0.26			c0.01			c0.06
v/s Ratio Perm				0.00			0.03			0.00		
v/c Ratio		0.43	0.48	0.00	0.48	0.43	0.05		0.20	0.03		0.62
Uniform Delay, d1		64.0	16.3	11.6	63.9	15.2	11.6		62.2	61.5		60.5
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2		3.0	0.8	0.0	3.5	0.7	0.1		0.8	0.1		6.6
Delay (s)		67.0	17.1	11.6	67.4	15.8	11.7		63.0	61.6		67.1
Level of Service		E	B	B	E	B	B		E	E		E
Approach Delay (s)			19.0			18.0			62.1			63.7
Approach LOS			B			B			E			E

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	52
Future Volume (vph)	52
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	7.5
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1375
Flt Permitted	1.00
Satd. Flow (perm)	1375
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	57
RTOR Reduction (vph)	51
Lane Group Flow (vph)	6
Heavy Vehicles (%)	18%
Turn Type	Perm
Protected Phases	
Permitted Phases	3
Actuated Green, G (s)	14.0
Effective Green, g (s)	14.0
Actuated g/C Ratio	0.10
Clearance Time (s)	7.5
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	137
v/s Ratio Prot	
v/s Ratio Perm	0.00
v/c Ratio	0.04
Uniform Delay, d1	56.9
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	57.1
Level of Service	E
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition methodology expects strict NEMA phasing.

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Traffic Vol, veh/h	6	15	44	14	11	14	24	84	7	18	122	5
Future Vol, veh/h	6	15	44	14	11	14	24	84	7	18	122	5
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-8	-	-	-2	-	-	1	-	-	-1	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	9	0	0	0	0	0	13	0
Mvmt Flow	7	16	48	15	12	15	26	91	8	20	133	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	280	327	71	264	325	50	138	0	0	99	0	0
Stage 1	176	176	-	147	147	-	-	-	-	-	-	-
Stage 2	104	151	-	117	178	-	-	-	-	-	-	-
Critical Hdwy	5.9	4.9	6.1	7.1	6.28	6.7	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	4.9	3.9	-	6.1	5.28	-	-	-	-	-	-	-
Critical Hdwy Stg 2	4.9	3.9	-	6.1	5.28	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4.09	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	743	688	999	693	597	1017	1458	-	-	1507	-	-
Stage 1	881	819	-	860	770	-	-	-	-	-	-	-
Stage 2	939	830	-	892	749	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	702	665	997	630	577	1017	1458	-	-	1507	-	-
Mov Cap-2 Maneuver	702	665	-	630	577	-	-	-	-	-	-	-
Stage 1	864	808	-	844	755	-	-	-	-	-	-	-
Stage 2	893	814	-	819	739	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	10.4	1.6	0.9
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1458	-	-	864	708	1507	-	-
HCM Lane V/C Ratio	0.018	-	-	0.082	0.06	0.013	-	-
HCM Control Delay (s)	7.5	0	-	9.5	10.4	7.4	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.2	0	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↗		↕	
Traffic Vol, veh/h	1	91	128	16	111	1	90	1	14	1	1	1
Future Vol, veh/h	1	91	128	16	111	1	90	1	14	1	1	1
Conflicting Peds, #/hr	4	0	1	1	0	4	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	1	-	-	2	-	-	-5	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	11	7	1	0	0	0	0	0	0	0
Mvmt Flow	1	99	139	17	121	1	98	1	15	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	126	0	0	239	0	0	329	332	172	341	401	126
Stage 1	-	-	-	-	-	-	172	172	-	160	160	-
Stage 2	-	-	-	-	-	-	157	160	-	181	241	-
Critical Hdwy	4.1	-	-	4.17	-	-	7.5	6.9	6.4	6.1	5.5	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.9	-	5.1	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.9	-	5.1	4.5	-
Follow-up Hdwy	2.2	-	-	2.263	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1473	-	-	1299	-	-	606	570	869	678	604	946
Stage 1	-	-	-	-	-	-	819	746	-	885	804	-
Stage 2	-	-	-	-	-	-	835	756	-	868	759	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1468	-	-	1298	-	-	597	559	867	654	593	943
Mov Cap-2 Maneuver	-	-	-	-	-	-	597	559	-	654	593	-
Stage 1	-	-	-	-	-	-	817	745	-	881	790	-
Stage 2	-	-	-	-	-	-	821	743	-	849	757	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1	11.8	10.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	597	867	1468	-	-	1298	-	-	702
HCM Lane V/C Ratio	0.166	0.018	0.001	-	-	0.013	-	-	0.005
HCM Control Delay (s)	12.2	9.2	7.5	0	-	7.8	0	-	10.2
HCM Lane LOS	B	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.6	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	83	170	1	2	156	44	5	1	2	47	1	67
Future Vol, veh/h	83	170	1	2	156	44	5	1	2	47	1	67
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-3	-	-	1	-	-	0	-	-	-5	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	6	1	2	2	1	0	2	2	2	17	2	0
Mvmt Flow	90	185	1	2	170	48	5	1	2	51	1	73

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	219	0	0	186	0	0	603	589	186	566	565	197
Stage 1	-	-	-	-	-	-	366	366	-	199	199	-
Stage 2	-	-	-	-	-	-	237	223	-	367	366	-
Critical Hdwy	4.16	-	-	4.12	-	-	7.12	6.52	6.22	6.27	5.52	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	5.27	4.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	5.27	4.52	-
Follow-up Hdwy	2.254	-	-	2.218	-	-	3.518	4.018	3.318	3.653	4.018	3.3
Pot Cap-1 Maneuver	1327	-	-	1388	-	-	411	421	856	483	508	873
Stage 1	-	-	-	-	-	-	653	623	-	813	778	-
Stage 2	-	-	-	-	-	-	766	719	-	690	689	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1326	-	-	1388	-	-	353	388	856	452	468	871
Mov Cap-2 Maneuver	-	-	-	-	-	-	353	388	-	452	468	-
Stage 1	-	-	-	-	-	-	603	576	-	750	776	-
Stage 2	-	-	-	-	-	-	698	717	-	635	637	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.6	0.1	13.8	12.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	419	1326	-	-	1388	-	-	628
HCM Lane V/C Ratio	0.021	0.068	-	-	0.002	-	-	0.199
HCM Control Delay (s)	13.8	7.9	0	-	7.6	0	-	12.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0	-	-	0.7

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	161	6	19	158	51	20	1	62	31	1	19
Future Vol, veh/h	38	161	6	19	158	51	20	1	62	31	1	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	75	-	-	-	-	-	-	-	-	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-5	-	-	3	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	4	2	2	1	0	2	2	2	0	2	0
Mvmt Flow	41	175	7	21	172	55	22	1	67	34	1	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	227	0	0	182	0	0	514	530	179	537	506	200
Stage 1	-	-	-	-	-	-	261	261	-	242	242	-
Stage 2	-	-	-	-	-	-	253	269	-	295	264	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.52	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.52	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4.018	3.3
Pot Cap-1 Maneuver	1353	-	-	1393	-	-	471	455	864	458	469	846
Stage 1	-	-	-	-	-	-	744	692	-	766	705	-
Stage 2	-	-	-	-	-	-	751	687	-	718	690	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1353	-	-	1393	-	-	442	434	864	406	447	846
Mov Cap-2 Maneuver	-	-	-	-	-	-	442	434	-	406	447	-
Stage 1	-	-	-	-	-	-	722	671	-	743	693	-
Stage 2	-	-	-	-	-	-	719	675	-	641	669	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	0.6	10.9	12.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	696	1353	-	-	1393	-	-	407	846
HCM Lane V/C Ratio	0.13	0.031	-	-	0.015	-	-	0.085	0.024
HCM Control Delay (s)	10.9	7.7	-	-	7.6	0	-	14.7	9.4
HCM Lane LOS	B	A	-	-	A	A	-	B	A
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.3	0.1

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	1	80	1	116	1	415	107	97	359	1
Future Vol, veh/h	1	1	1	80	1	116	1	415	107	97	359	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	0	90	-	130	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-2	-	-	4	-	-	2	-	-	3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	1	0	6	1	5	5	0
Mvmt Flow	1	1	1	87	1	126	1	451	116	105	390	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	829	1170	196	859	1054	226	391	0	0	567	0	0
Stage 1	601	601	-	453	453	-	-	-	-	-	-	-
Stage 2	228	569	-	406	601	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.1	6.7	8.3	7.3	7.32	4.1	-	-	4.2	-	-
Critical Hdwy Stg 1	6.1	5.1	-	7.3	6.3	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.1	-	7.3	6.3	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.31	2.2	-	-	2.25	-	-
Pot Cap-1 Maneuver	292	222	828	209	180	761	1179	-	-	981	-	-
Stage 1	491	527	-	507	518	-	-	-	-	-	-	-
Stage 2	779	542	-	546	431	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	223	198	828	191	161	761	1179	-	-	981	-	-
Mov Cap-2 Maneuver	223	198	-	191	161	-	-	-	-	-	-	-
Stage 1	491	471	-	506	517	-	-	-	-	-	-	-
Stage 2	648	541	-	486	385	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.1	22.3	0	1.9
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1179	-	-	279	191	761	981	-	-
HCM Lane V/C Ratio	0.001	-	-	0.012	0.461	0.166	0.107	-	-
HCM Control Delay (s)	8.1	-	-	18.1	39	10.7	9.1	-	-
HCM Lane LOS	A	-	-	C	E	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	2.2	0.6	0.4	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	3	17	1	20	13	503	14	16	420	3
Future Vol, veh/h	1	1	3	17	1	20	13	503	14	16	420	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	150	-	135	110	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	5	-	-	3	-	-	4	-	-	-2	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	6	0	5	0	0	4	0
Mvmt Flow	1	1	3	18	1	22	14	547	15	17	457	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	795	1083	230	838	1069	274	460	0	0	562	0	0
Stage 1	493	493	-	575	575	-	-	-	-	-	-	-
Stage 2	302	590	-	263	494	-	-	-	-	-	-	-
Critical Hdwy	8.5	7.5	7.4	8.1	7.1	7.32	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.36	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	226	162	754	228	187	696	1112	-	-	1019	-	-
Stage 1	464	480	-	432	460	-	-	-	-	-	-	-
Stage 2	633	423	-	694	506	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	213	157	754	221	181	696	1112	-	-	1019	-	-
Mov Cap-2 Maneuver	213	157	-	221	181	-	-	-	-	-	-	-
Stage 1	458	472	-	426	454	-	-	-	-	-	-	-
Stage 2	604	418	-	678	497	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16	16.3	0.2	0.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1112	-	-	332	221	613	1019	-	-
HCM Lane V/C Ratio	0.013	-	-	0.016	0.084	0.037	0.017	-	-
HCM Control Delay (s)	8.3	-	-	16	22.8	11.1	8.6	-	-
HCM Lane LOS	A	-	-	C	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	126	17	81	3	3	3	116	401	32	7	380	53
Future Vol, veh/h	126	17	81	3	3	3	116	401	32	7	380	53
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	100	-	230	0	-	-	160	-	175	160	-	125
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	3	-	-	-3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	0	3	0	0	33	1	5	0	0	3	8
Mvmt Flow	137	18	88	3	3	3	126	436	35	8	413	58

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	901	1152	207	920	1175	218	471	0	0	471	0	0
Stage 1	429	429	-	688	688	-	-	-	-	-	-	-
Stage 2	472	723	-	232	487	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.5	6.96	7.5	6.5	7.56	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4	3.33	3.5	4	3.63	2.21	-	-	2.2	-	-
Pot Cap-1 Maneuver	233	199	796	229	193	699	1094	-	-	1101	-	-
Stage 1	574	587	-	407	450	-	-	-	-	-	-	-
Stage 2	542	434	-	756	554	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	207	175	796	170	170	699	1094	-	-	1101	-	-
Mov Cap-2 Maneuver	207	175	-	170	170	-	-	-	-	-	-	-
Stage 1	508	583	-	360	398	-	-	-	-	-	-	-
Stage 2	473	384	-	646	550	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	34.5	21.2	1.8	0.1
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1094	-	-	207	175	796	170	273	1101	-	-
HCM Lane V/C Ratio	0.115	-	-	0.662	0.106	0.111	0.019	0.024	0.007	-	-
HCM Control Delay (s)	8.7	-	-	51	28	10.1	26.6	18.5	8.3	-	-
HCM Lane LOS	A	-	-	F	D	B	D	C	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	4	0.3	0.4	0.1	0.1	0	-	-

LANE LEVEL OF SERVICE

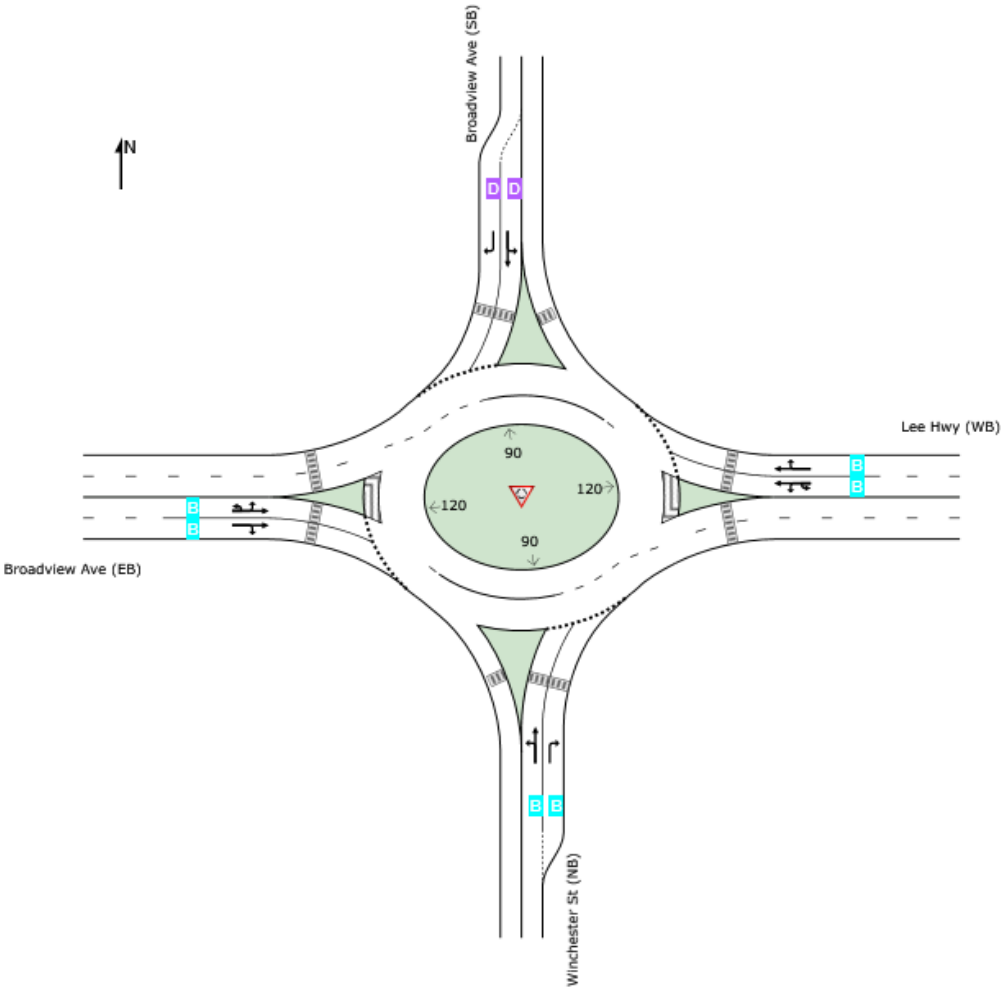
Lane Level of Service

Site: 101 [Broadview/Winchester/Lee - 2027 TF PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Warrenton Village Center
2027 Future with Development
PM Peak Hour
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	B	B	D	B	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 101 [Broadview/Winchester/Lee - 2027 TF PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Warrenton Village Center
2027 Future with Development
PM Peak Hour
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Winchester St (NB)															
Lane 1[d]	235	0.5	235	0.5	556	0.423	100	13.2	LOS B	2.5	62.1	Full	1600	0.0	0.0
Lane 2	77	0.0	77	0.0	361	0.214	100	13.7	LOS B	0.9	23.2	Short	250	0.0	NA
Approach	313	0.4	313	0.4		0.423		13.3	LOS B	2.5	62.1				
East: Lee Hwy (WB)															
Lane 1	623	1.7	623	1.7	857	0.726	100	17.7	LOS B	10.7	271.5	Full	1600	0.0	0.0
Lane 2[d]	761	2.0	761	2.0	1047	0.726	100	15.3	LOS B	11.5	291.4	Full	1600	0.0	0.0
Approach	1383	1.9	1383	1.9		0.726		16.3	LOS B	11.5	291.4				
North: Broadview Ave (SB)															
Lane 1	347	0.7	347	0.7	426	0.815	100	39.5	LOS D	7.1	177.8	Short	215	0.0	NA
Lane 2[d]	413	4.0	413	4.0	487	0.848	100	39.7	LOS D	8.4	216.0	Full	1600	0.0	0.0
Approach	759	2.5	759	2.5		0.848		39.6	LOS D	8.4	216.0				
West: Broadview Ave (EB)															
Lane 1	547	2.5	547	2.5	913	0.599	100	12.4	LOS B	6.7	169.7	Full	1600	0.0	0.0
Lane 2[d]	664	1.9	664	1.9	1108	0.599	100	10.8	LOS B	6.8	171.5	Full	1600	0.0	0.0
Approach	1210	2.2	1210	2.2		0.599		11.5	LOS B	6.8	171.5				
All Vehicles	3666	2.0	3666	2.0		0.848		19.3	LOS B	11.5	291.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Winchester St (NB)

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	122	114	-	235	0.5		556	0.423	100	NA	NA
Lane 2	-	-	77	77	0.0		361	0.214	100	0.0	1
Approach	122	114	77	313	0.4			0.423			
East: Lee Hwy (WB)											
Mov. From E To Exit:	U E	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	10	70	543	-	623	1.7	857	0.726	100	NA	NA
Lane 2	-	-	638	123	761	2.0	1047	0.726	100	NA	NA
Approach	10	70	1180	123	1383	1.9		0.726			
North: Broadview Ave (SB)											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	249	98	-	347	0.7		426	0.815	100	0.0	2
Lane 2	-	-	413	413	4.0		487	0.848	100	NA	NA
Approach	249	98	413	759	2.5			0.848			
West: Broadview Ave (EB)											
Mov. From W To Exit:	U W	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	2	293	252	-	547	2.5	913	0.599	100	NA	NA
Lane 2	-	-	618	46	664	1.9	1108	0.599	100	NA	NA
Approach	2	293	870	46	1210	2.2		0.599			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	3666	2.0	0.848

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Winchester St (NB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Lee Hwy (WB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: Broadview Ave (SB)				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0
West: Broadview Ave (EB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

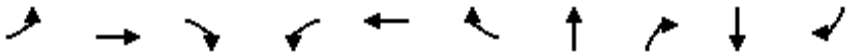
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑	↱			↱			↱
Traffic Vol, veh/h	0	1075	83	0	1247	104	0	0	25	0	0	80
Future Vol, veh/h	0	1075	83	0	1247	104	0	0	25	0	0	80
Conflicting Peds, #/hr	0	0	0	0	0	4	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	110	-	-	300	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	3	-	-	3	-	-	-11	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	2	0	0	2	0	0	0	4	0	0	0
Mvmt Flow	0	1156	89	0	1341	112	0	0	27	0	0	86

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	578	-	-	675
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.28	-	-	5.8
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.34	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	433	0	0	493
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	433	-	-	491
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	13.9	13.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	433	-	-	-	-	491
HCM Lane V/C Ratio	0.062	-	-	-	-	0.175
HCM Control Delay (s)	13.9	-	-	-	-	13.9
HCM Lane LOS	B	-	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	149	1006	2	68	1243	151	36	79	204	152
v/c Ratio	0.72	0.48	0.00	0.54	0.70	0.17	0.31	0.30	0.80	0.41
Control Delay	82.8	22.5	0.0	82.0	32.7	2.3	72.2	3.0	83.9	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.8	22.5	0.0	82.0	32.7	2.3	72.2	3.0	83.9	9.8
Queue Length 50th (ft)	148	333	0	68	508	0	36	0	201	0
Queue Length 95th (ft)	224	441	0	123	675	28	73	0	#344	58
Internal Link Dist (ft)		457			1504		131		565	
Turn Bay Length (ft)	240		330	150		150		60		
Base Capacity (vph)	260	2078	960	157	1773	876	202	327	268	377
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	0.57	0.48	0.00	0.43	0.70	0.17	0.18	0.24	0.76	0.40

Intersection Summary

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

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	9	133	956	2	65	1181	143	17	17	75	176	18
Future Volume (vph)	9	133	956	2	65	1181	143	17	17	75	176	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			-4%			2%			0%			-1%
Total Lost time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.6	6.6		7.5
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00
Frpb, ped/bikes		1.00	1.00	0.97	1.00	1.00	0.98		1.00	1.00		1.00
Flpb, ped/bikes		1.00	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	0.85		1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (prot)		1807	3682	1602	1787	3504	1558		1854	1615		1810
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (perm)		1807	3682	1602	1787	3504	1558		1854	1615		1810
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)	9	140	1006	2	68	1243	151	18	18	79	185	19
RTOR Reduction (vph)	0	0	0	1	0	0	74	0	0	74	0	0
Lane Group Flow (vph)	0	149	1006	1	68	1243	77	0	36	5	0	204
Confl. Peds. (#/hr)				2			2					
Heavy Vehicles (%)	0%	2%	0%	0%	0%	2%	1%	0%	0%	0%	1%	0%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA
Protected Phases	1	1	6		5	2		4	4		3	3
Permitted Phases				6			2			4		
Actuated Green, G (s)		17.2	83.4	83.4	9.3	76.0	76.0		9.5	9.5		21.2
Effective Green, g (s)		17.2	83.4	83.4	9.3	76.0	76.0		9.5	9.5		21.2
Actuated g/C Ratio		0.11	0.56	0.56	0.06	0.51	0.51		0.06	0.06		0.14
Clearance Time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.6	6.6		7.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)		207	2047	890	110	1775	789		117	102		255
v/s Ratio Prot		c0.08	0.27		0.04	c0.35			c0.02			c0.11
v/s Ratio Perm				0.00			0.05			0.00		
v/c Ratio		0.72	0.49	0.00	0.62	0.70	0.10		0.31	0.05		0.80
Uniform Delay, d1		64.1	20.3	14.8	68.6	28.3	19.2		67.1	66.0		62.3
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2		11.4	0.8	0.0	9.9	2.3	0.2		1.5	0.2		16.3
Delay (s)		75.4	21.2	14.8	78.5	30.6	19.4		68.6	66.2		78.6
Level of Service		E	C	B	E	C	B		E	E		E
Approach Delay (s)			28.2			31.7			67.0			69.1
Approach LOS			C			C			E			E

Intersection Summary			
HCM 2000 Control Delay	36.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	26.6
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
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)	7.5
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1607
Flt Permitted	1.00
Satd. Flow (perm)	1607
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	152
RTOR Reduction (vph)	131
Lane Group Flow (vph)	21
Confl. Peds. (#/hr)	
Heavy Vehicles (%)	1%
Turn Type	Perm
Protected Phases	
Permitted Phases	3
Actuated Green, G (s)	21.2
Effective Green, g (s)	21.2
Actuated g/C Ratio	0.14
Clearance Time (s)	7.5
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	227
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.09
Uniform Delay, d1	56.0
Progression Factor	1.00
Incremental Delay, d2	0.2
Delay (s)	56.2
Level of Service	E
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition methodology expects strict NEMA phasing.

Intersection	
Int Delay, s/veh	8.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	77	120	45	50	41	97	101	12	48	75	32
Future Vol, veh/h	17	77	120	45	50	41	97	101	12	48	75	32
Conflicting Peds, #/hr	0	0	14	14	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-8	-	-	-2	-	-	1	-	-	-1	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	2	0	2	5	0	2	0	0	3	0
Mvmt Flow	18	80	125	47	52	43	101	105	13	50	78	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	476	515	70	507	525	59	111	0	0	118	0	0
Stage 1	195	195	-	314	314	-	-	-	-	-	-	-
Stage 2	281	320	-	193	211	-	-	-	-	-	-	-
Critical Hdwy	5.9	4.9	6.14	7.1	6.14	6.8	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	4.9	3.9	-	6.1	5.14	-	-	-	-	-	-	-
Critical Hdwy Stg 2	4.9	3.9	-	6.1	5.14	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.32	3.5	4.02	3.35	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	589	586	994	479	483	988	1492	-	-	1483	-	-
Stage 1	866	810	-	701	678	-	-	-	-	-	-	-
Stage 2	802	756	-	813	744	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	471	524	982	336	432	988	1492	-	-	1483	-	-
Mov Cap-2 Maneuver	471	524	-	336	432	-	-	-	-	-	-	-
Stage 1	803	781	-	650	629	-	-	-	-	-	-	-
Stage 2	652	701	-	607	717	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	16	3.6	2.4
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1492	-	-	701	467	1483	-	-
HCM Lane V/C Ratio	0.068	-	-	0.318	0.303	0.034	-	-
HCM Control Delay (s)	7.6	0.1	-	12.5	16	7.5	0.1	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.4	1.3	0.1	-	-

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↱		↕	
Traffic Vol, veh/h	3	116	119	31	128	2	118	2	39	1	5	1
Future Vol, veh/h	3	116	119	31	128	2	118	2	39	1	5	1
Conflicting Peds, #/hr	4	0	0	0	0	4	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	1	-	-	2	-	-	-5	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	3	0	4	1	0	3	0	3	0	0	0
Mvmt Flow	3	126	129	34	139	2	128	2	42	1	5	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	145	0	0	255	0	0	408	410	193	433	473	144
Stage 1	-	-	-	-	-	-	197	197	-	212	212	-
Stage 2	-	-	-	-	-	-	211	213	-	221	261	-
Critical Hdwy	4.1	-	-	4.14	-	-	7.53	6.9	6.43	6.1	5.5	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.9	-	5.1	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.9	-	5.1	4.5	-
Follow-up Hdwy	2.2	-	-	2.236	-	-	3.527	4	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1450	-	-	1298	-	-	527	511	837	605	562	927
Stage 1	-	-	-	-	-	-	785	726	-	843	775	-
Stage 2	-	-	-	-	-	-	771	713	-	836	748	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1445	-	-	1298	-	-	511	494	836	557	543	924
Mov Cap-2 Maneuver	-	-	-	-	-	-	511	494	-	557	543	-
Stage 1	-	-	-	-	-	-	783	725	-	839	751	-
Stage 2	-	-	-	-	-	-	743	691	-	788	747	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.5	13.2	11.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	511	836	1445	-	-	1298	-	-	579
HCM Lane V/C Ratio	0.255	0.051	0.002	-	-	0.026	-	-	0.013
HCM Control Delay (s)	14.4	9.5	7.5	0	-	7.8	0	-	11.3
HCM Lane LOS	B	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1	0.2	0	-	-	0.1	-	-	0

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	42	170	5	6	226	14	3	1	1	67	1	52
Future Vol, veh/h	42	170	5	6	226	14	3	1	1	67	1	52
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-3	-	-	1	-	-	0	-	-	-5	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	0	2	2	2	0	2	2
Mvmt Flow	46	185	5	7	246	15	3	1	1	73	1	57

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	262	0	0	190	0	0	577	556	190	552	551	255
Stage 1	-	-	-	-	-	-	280	280	-	269	269	-
Stage 2	-	-	-	-	-	-	297	276	-	283	282	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	6.1	5.52	5.72
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	5.1	4.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	5.1	4.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4.018	3.318
Pot Cap-1 Maneuver	1302	-	-	1384	-	-	428	439	852	522	515	812
Stage 1	-	-	-	-	-	-	727	679	-	799	740	-
Stage 2	-	-	-	-	-	-	712	682	-	788	733	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1301	-	-	1384	-	-	383	418	851	501	491	811
Mov Cap-2 Maneuver	-	-	-	-	-	-	383	418	-	501	491	-
Stage 1	-	-	-	-	-	-	698	652	-	766	735	-
Stage 2	-	-	-	-	-	-	657	677	-	753	704	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	0.2	13.3	12.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	439	1301	-	-	1384	-	-	600
HCM Lane V/C Ratio	0.012	0.035	-	-	0.005	-	-	0.217
HCM Control Delay (s)	13.3	7.9	0	-	7.6	0	-	12.7
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.8

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	167	22	62	217	2	12	1	39	11	1	27
Future Vol, veh/h	5	167	22	62	217	2	12	1	39	11	1	27
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	75	-	-	-	-	-	-	-	-	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-5	-	-	3	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	3	2	2	2	0	2	2	2	0	2	0
Mvmt Flow	5	182	24	67	236	2	13	1	42	12	1	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	239	0	0	206	0	0	590	577	194	598	588	238
Stage 1	-	-	-	-	-	-	204	204	-	372	372	-
Stage 2	-	-	-	-	-	-	386	373	-	226	216	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.52	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.52	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4.018	3.3
Pot Cap-1 Maneuver	1340	-	-	1365	-	-	419	427	847	417	421	806
Stage 1	-	-	-	-	-	-	798	733	-	653	619	-
Stage 2	-	-	-	-	-	-	637	618	-	781	724	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1339	-	-	1365	-	-	384	401	847	377	395	805
Mov Cap-2 Maneuver	-	-	-	-	-	-	384	401	-	377	395	-
Stage 1	-	-	-	-	-	-	795	730	-	650	583	-
Stage 2	-	-	-	-	-	-	578	582	-	738	721	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1.7	11	11.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	652	1339	-	-	1365	-	-	378	805
HCM Lane V/C Ratio	0.087	0.004	-	-	0.049	-	-	0.035	0.036
HCM Control Delay (s)	11	7.7	-	-	7.8	0	-	14.9	9.6
HCM Lane LOS	B	A	-	-	A	A	-	B	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0.2	-	-	0.1	0.1

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1	4	111	1	145	2	376	96	97	510	2
Future Vol, veh/h	2	1	4	111	1	145	2	376	96	97	510	2
Conflicting Peds, #/hr	0	0	0	0	0	0	4	0	1	1	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	0	90	-	130	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-2	-	-	4	-	-	2	-	-	3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	1	0	2	0	3	4	1	4	0
Mvmt Flow	2	1	4	121	1	158	2	409	104	105	554	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	978	1287	282	902	1184	206	560	0	0	514	0	0
Stage 1	769	769	-	414	414	-	-	-	-	-	-	-
Stage 2	209	518	-	488	770	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.1	6.7	8.32	7.3	7.34	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.1	-	7.32	6.3	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.1	-	7.32	6.3	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.51	4	3.32	2.2	-	-	2.21	-	-
Pot Cap-1 Maneuver	232	191	732	192	147	782	1021	-	-	1055	-	-
Stage 1	397	450	-	537	544	-	-	-	-	-	-	-
Stage 2	798	568	-	478	348	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	169	171	730	175	132	781	1018	-	-	1054	-	-
Mov Cap-2 Maneuver	169	171	-	175	132	-	-	-	-	-	-	-
Stage 1	395	404	-	535	542	-	-	-	-	-	-	-
Stage 2	634	566	-	427	312	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.2	33.7	0	1.4
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1018	-	-	302	174	781	1054	-	-
HCM Lane V/C Ratio	0.002	-	-	0.025	0.7	0.202	0.1	-	-
HCM Control Delay (s)	8.5	-	-	17.2	63.4	10.8	8.8	-	-
HCM Lane LOS	A	-	-	C	F	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	4.2	0.8	0.3	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	1	17	40	1	39	15	425	28	43	576	6
Future Vol, veh/h	10	1	17	40	1	39	15	425	28	43	576	6
Conflicting Peds, #/hr	0	0	0	0	0	0	5	0	0	0	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	150	-	135	110	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	5	-	-	3	-	-	4	-	-	-2	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	5	0	3	0	0	3	0
Mvmt Flow	11	1	18	43	1	42	16	462	30	47	626	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	993	1253	322	902	1226	231	638	0	0	492	0	0
Stage 1	729	729	-	494	494	-	-	-	-	-	-	-
Stage 2	264	524	-	408	732	-	-	-	-	-	-	-
Critical Hdwy	8.5	7.5	7.4	8.1	7.1	7.3	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.35	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	154	123	650	203	147	748	956	-	-	1082	-	-
Stage 1	314	352	-	489	506	-	-	-	-	-	-	-
Stage 2	673	461	-	557	380	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	137	115	647	187	138	748	952	-	-	1082	-	-
Mov Cap-2 Maneuver	137	115	-	187	138	-	-	-	-	-	-	-
Stage 1	307	335	-	481	497	-	-	-	-	-	-	-
Stage 2	623	453	-	516	362	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.7	20.3	0.3	0.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	952	-	-	259	187	674	1082	-	-
HCM Lane V/C Ratio	0.017	-	-	0.118	0.233	0.065	0.043	-	-
HCM Control Delay (s)	8.8	-	-	20.7	30	10.7	8.5	-	-
HCM Lane LOS	A	-	-	C	D	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.9	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	10.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	103	61	173	44	27	25	88	340	79	7	512	114
Future Vol, veh/h	103	61	173	44	27	25	88	340	79	7	512	114
Conflicting Peds, #/hr	6	0	0	0	0	6	0	0	3	3	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	100	-	230	0	-	-	160	-	175	160	-	125
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	3	-	-	-3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	0	1	0	0	0	1	3	0	0	4	1
Mvmt Flow	112	66	188	48	29	27	96	370	86	8	557	124

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	971	1224	279	893	1262	194	681	0	0	459	0	0
Stage 1	573	573	-	565	565	-	-	-	-	-	-	-
Stage 2	398	651	-	328	697	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.5	6.92	7.5	6.5	6.9	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4	3.31	3.5	4	3.3	2.21	-	-	2.2	-	-
Pot Cap-1 Maneuver	207	181	721	239	171	821	914	-	-	1113	-	-
Stage 1	472	507	-	482	511	-	-	-	-	-	-	-
Stage 2	599	468	-	664	446	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	155	161	721	110	152	815	914	-	-	1110	-	-
Mov Cap-2 Maneuver	155	161	-	110	152	-	-	-	-	-	-	-
Stage 1	422	503	-	430	456	-	-	-	-	-	-	-
Stage 2	482	418	-	423	443	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	35.9	40.7	1.6	0.1
HCM LOS	E	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	914	-	-	155	161	721	110	250	1110	-	-
HCM Lane V/C Ratio	0.105	-	-	0.722	0.412	0.261	0.435	0.226	0.007	-	-
HCM Control Delay (s)	9.4	-	-	72.8	42.2	11.7	60.8	23.6	8.3	-	-
HCM Lane LOS	A	-	-	F	E	B	F	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	4.3	1.8	1	1.9	0.8	0	-	-

J. Turn Lane Warrant Tables and Charts

Left Turn Lane Warrant Assessment

Two-Lane Highways

Based on AASHTO / VDOT RDM Appendix F

Background:

Warrants for left-turn storage lanes on two-lane highways at unsignalized intersections are based on Figure 3-4 to Figure 3-21 in Appendix F of the Virginia Department of Transportation's (VDOT) ***Road Design Manual*** (RDM). The figures provide a graphical representation for determining the necessity of a left turn lane by comparing the advancing volumes of a given approach and the respective opposing volumes and are differentiated by design speed and percent left turning volume.

Project Information:

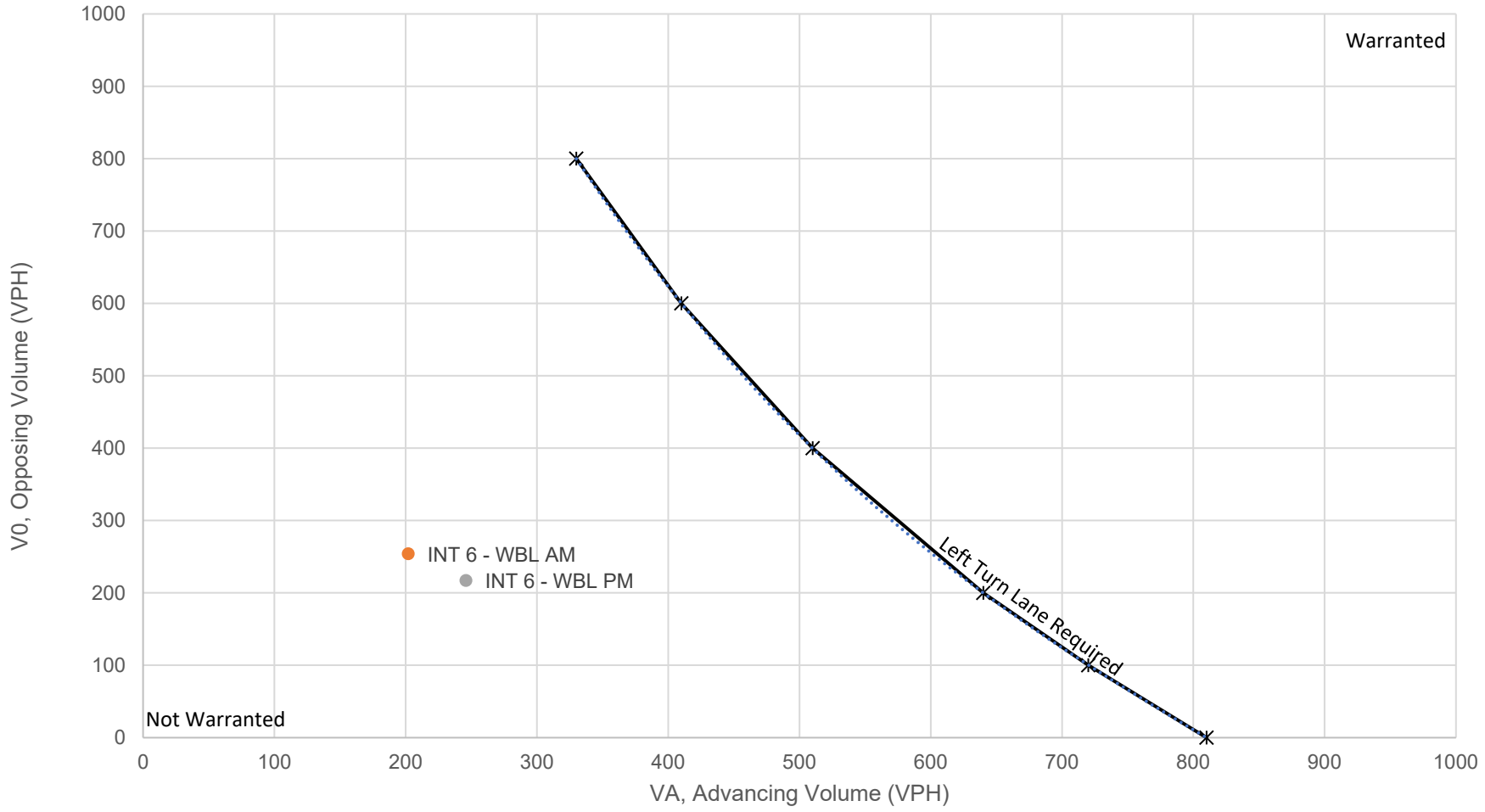
Project:	Warrenton Village
Project ID:	
Intersection(s) and Movement(s):	6 - Oak Springs Drive at Hastings Lane / Future Access (WB) 7 - Oak Springs Drive at High School Driveway / Future Garage Access (WB)
Scenario:	2027 Future Conditions with Development
Analysis:	Gorove Slade

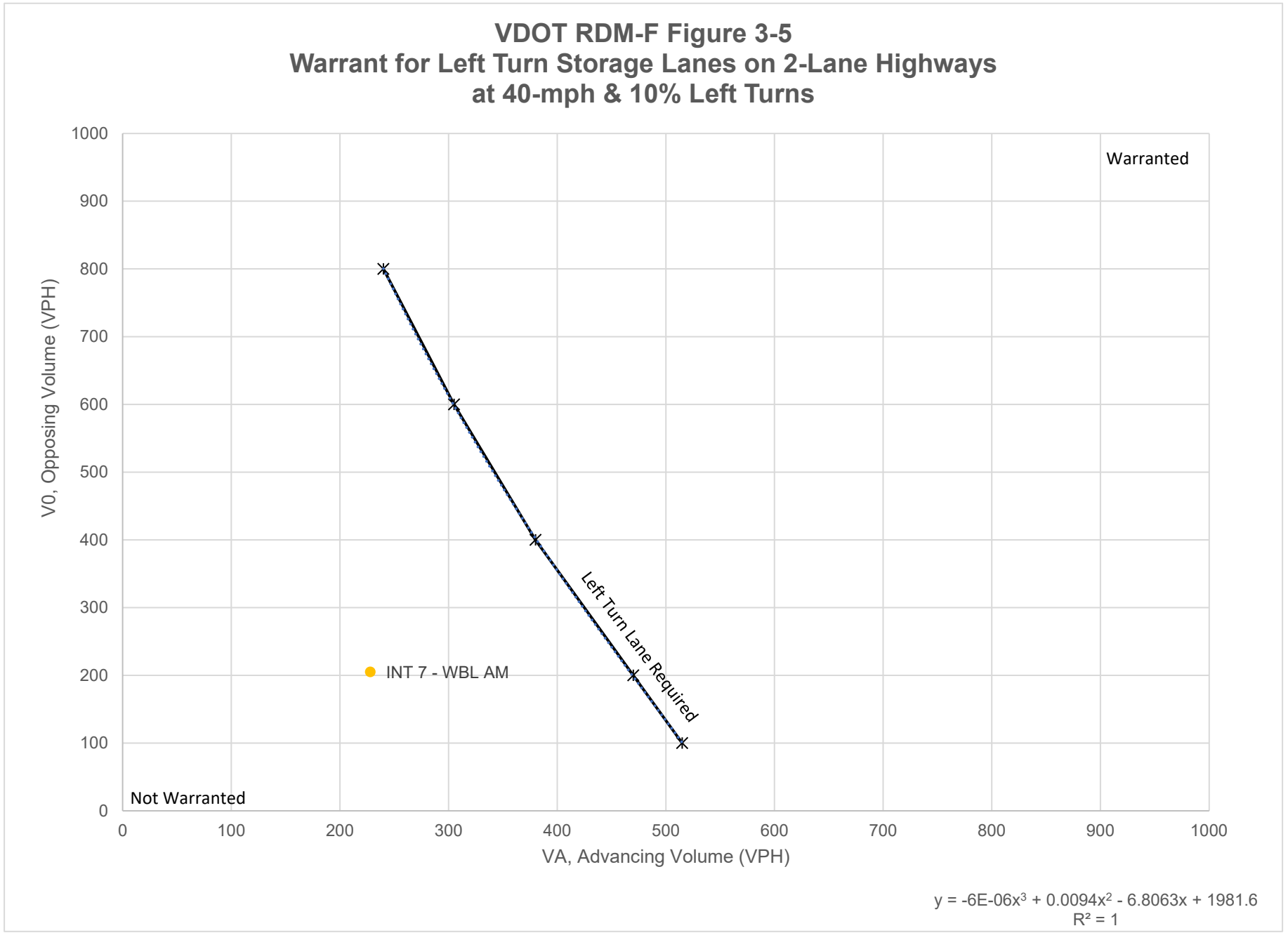
Design Speed (mph):	**40**	**(40, 50, or 60?)**

Assessment Summary:

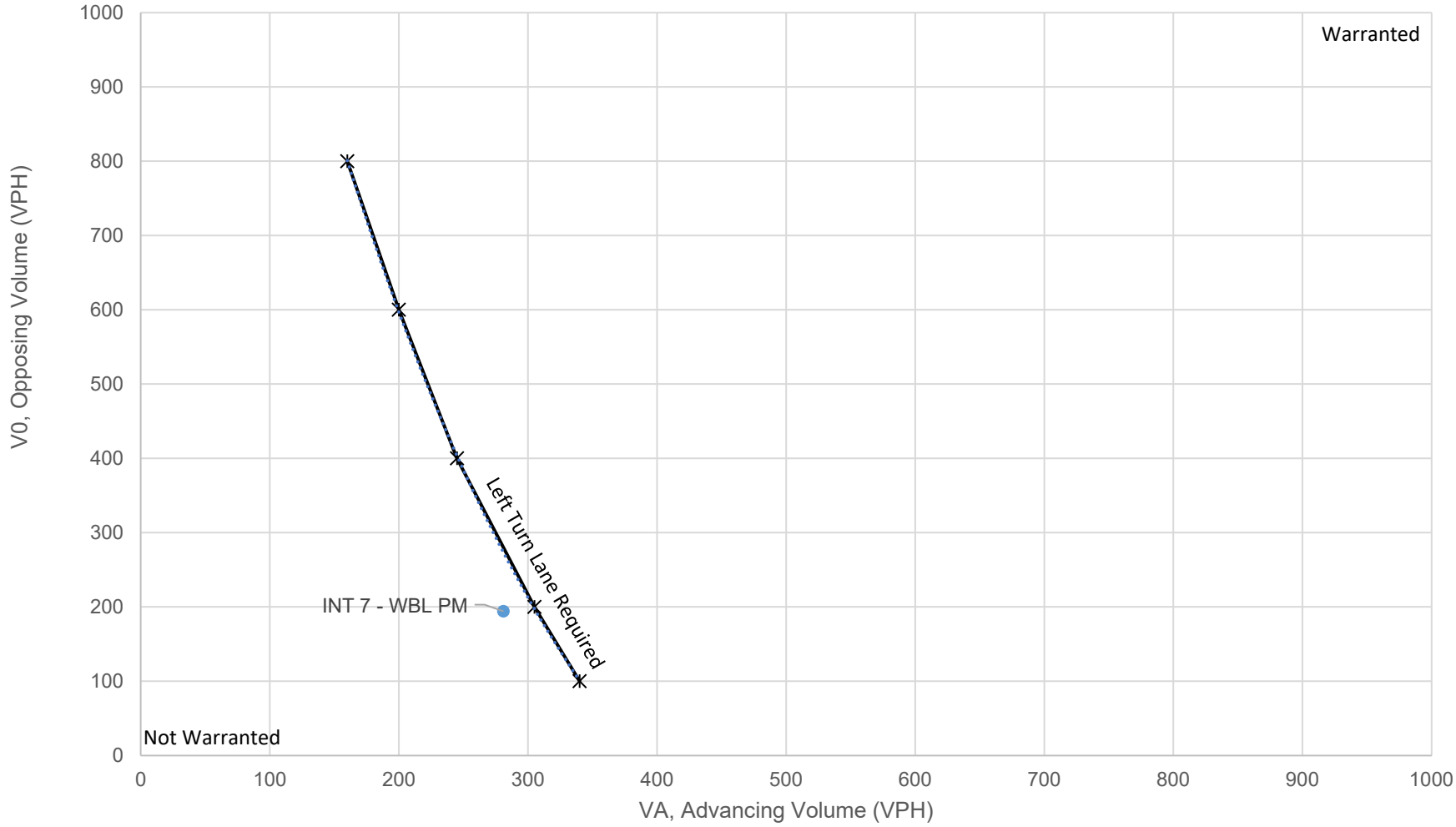
Input				VDOT Calculated Thesholds			
Study Scenario	**Opposing Vol. (VPH)**	**Advancing Vol. (VPH)**	**Left Turn Vol. (VPH)**	**Left Turn %**	**Minimum Opposing Threshold (VPH)**	**VDOT RDM F Figure**	**Treatment**
INT 6 - WBL AM	254	202	2	0.99%	1,208	Fig. 3-4	Not Warranted
INT 6 - WBL PM	217	246	6	2.44%	1,054	Fig. 3-4	Not Warranted
INT 7 - WBL AM	205	228	19	8.33%	841	Fig. 3-5	Not Warranted
INT 7 - WBL PM	194	281	62	22.06%	274	Fig. 3-8	Not Warranted

VDOT RDM-F Figure 3-4
Warrant for Left Turn Storage Lanes on 2-Lane Highways at 40-mph & 5% Left Turns




VDOT RDM-F Figure 3-5
Warrant for Left Turn Storage Lanes on 2-Lane Highways
at 40-mph & 10% Left Turns
Warranted
Not Warranted
Left Turn Lane Required
INT 7 - WBL AM
V0, Opposing Volume (VPH)
VA, Advancing Volume (VPH)
0
100
200
300
400
500
600
700
800
900
1000
y = -6E-06x³ + 0.0094x² - 6.8063x + 1981.6
R² = 1

VDOT RDM-F Figure 3-8
Warrant for Left Turn Storage Lanes on 2-Lane Highways at 40-mph & 30% Left Turns



$y = -8E\text{-}06x^3 + 0.0143x^2 - 9.4443x + 1979.9$
$R^2 = 0.9999$

Left Turn Lane Warrant Assessment
Four-Lane Highways

Background:

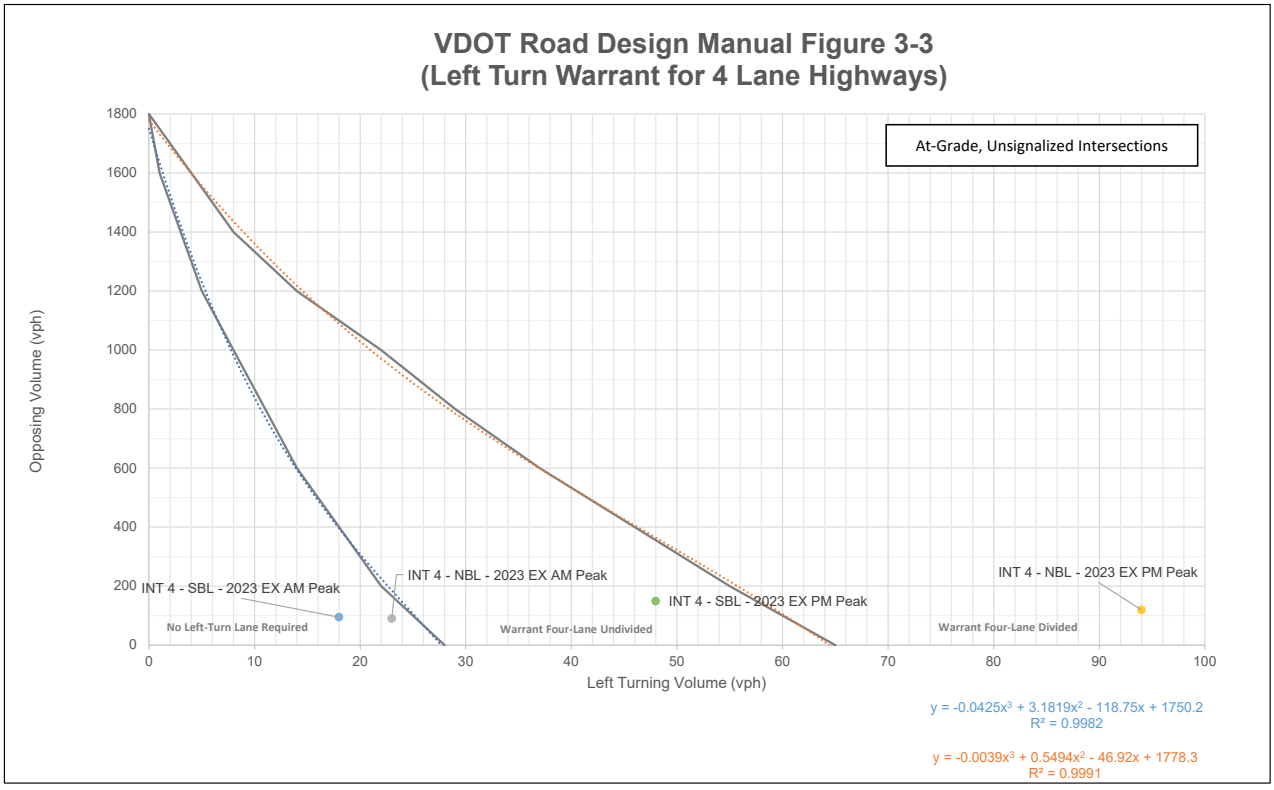
Warrants for left-turn storage lanes on four-lane highways at unsignalized intersections are based on Figure 3-3 in Appendix F of the Virginia Department of Transportation's (VDOT) ***Road Design Manual*** (RDM). The figure provides a graphical representation for determining the necessity of a left turn lane for divided and undivied roadway conditions by comparing the left turning volumes of a given approach and the respective opposing traffic volume.

Project Information:

Project:	
Project ID:	
Intersection(s) and Movement(s):	4 - Branch Drive at Warrenton Village Center Driveway / Safeway Driveway (NBL & SBL)
Scenario:	2023 Existing Conditions
Analysis:	Gorove Slade

Assessment Summary:

Input				Result	
Study Scenario	**Opposing Vol. (VPH)**	**Advancing Vol. (VPH)**	**Left Turning Vol. (VPH)**	**Left Turn %**	**Treatment**
INT 4 - NBL - 2023 EX AM Peak	90	95	23	24.2%	Not Warranted
INT 4 - NBL - 2023 EX PM Peak	119	149	94	63.1%	Full-width Turn Lane and Taper Warranted (for Undivided and Divided)
INT 4 - SBL - 2023 EX AM Peak	95	90	18	20.0%	Not Warranted
INT 4 - SBL - 2023 EX PM Peak	149	119	48	40.3%	Full-width Turn Lane and Taper Warranted (for Undivided)



Left Turn Lane Warrant Assessment
Four-Lane Highways

Background:

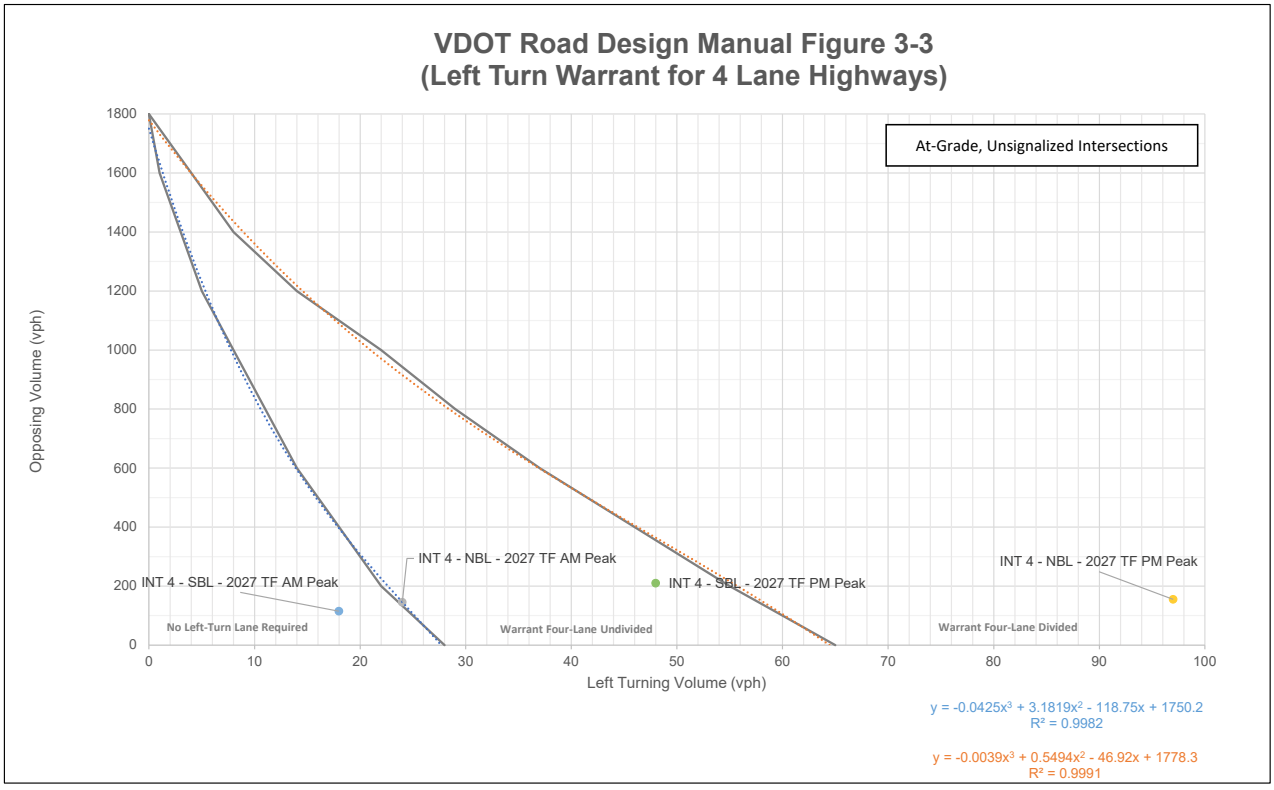
Warrants for left-turn storage lanes on four-lane highways at unsignalized intersections are based on Figure 3-3 in Appendix F of the Virginia Department of Transportation's (VDOT) ***Road Design Manual*** (RDM). The figure provides a graphical representation for determining the necessity of a left turn lane for divided and undivied roadway conditions by comparing the left turning volumes of a given approach and the respective opposing traffic volume.

Project Information:

Project:	Warrenton Village Center
Project ID:	
Intersection(s) and Movement(s):	4 - Branch Drive at Warrenton Village Center Driveway / Safeway Driveway (NBL & SBL)
Scenario:	2027 Future Conditions with Development
Analysis:	Gorove Slade

Assessment Summary:

Input				Result	
Study Scenario	**Opposing Vol. (VPH)**	**Advancing Vol. (VPH)**	**Left Turning Vol. (VPH)**	**Left Turn %**	**Treatment**
INT 4 - NBL - 2027 TF AM Peak	145	115	24	20.9%	Not Warranted
INT 4 - NBL - 2027 TF PM Peak	155	210	97	46.2%	Full-width Turn Lane and Taper Warranted (for Undivided and Divided)
INT 4 - SBL - 2027 TF AM Peak	115	145	18	12.4%	Not Warranted
INT 4 - SBL - 2027 TF PM Peak	210	155	48	31.0%	Full-width Turn Lane and Taper Warranted (for Undivided)



Right Turn Lane Warrant Assessment

Two-Lane Highways

Based on NCHRP Report 279 / VDOT RDM Appendix F
"Intersection Channelization Guide"

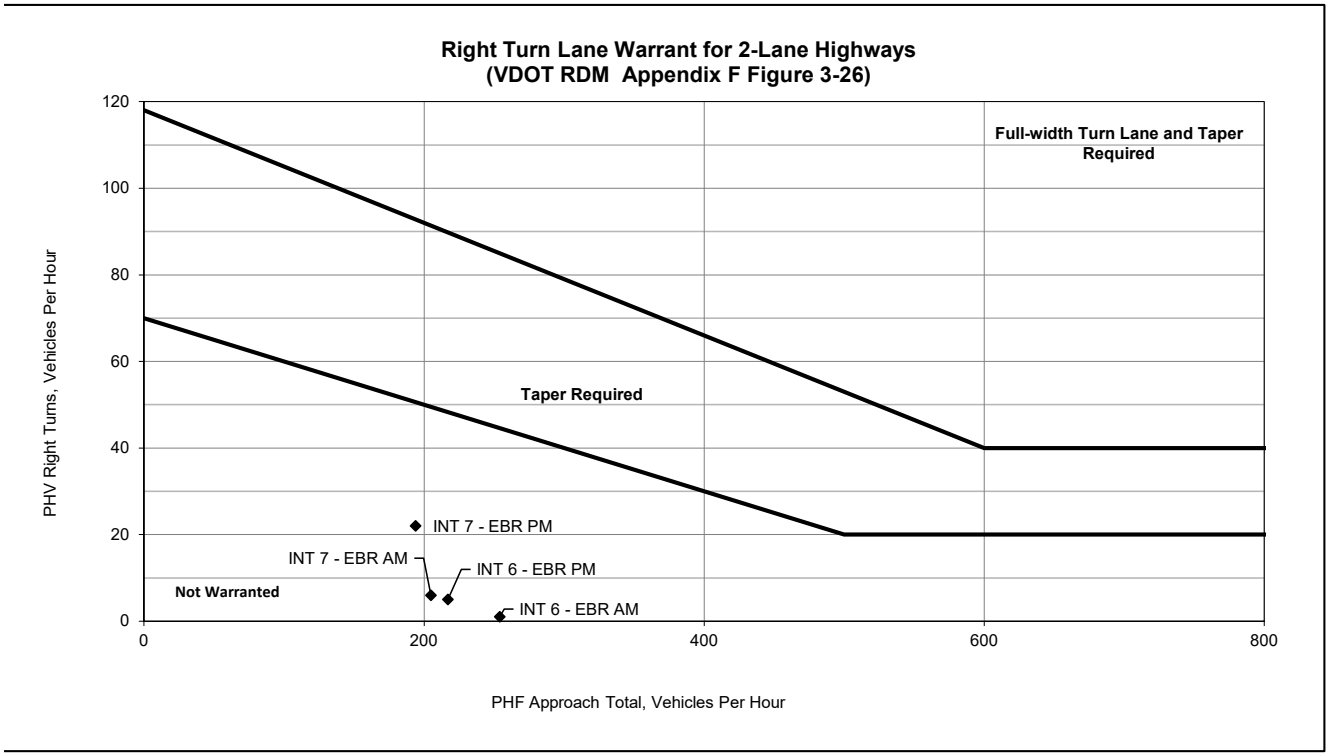
Background:

Warrants for right-turn storage lanes on two-lane highways at unsignalized intersections are based on Figure 3-26 in Appendix F of the Virginia Department of Transportation's (VDOT) ***Road Design Manual*** (RDM). This figure provides a graphical representation for determining the necessity of a right turn lane and / or taper by comparing the total volumes of a given approach with their respective right turn volumes.

Project Information:

Project:	Warrenton Village Center
Project ID:	
Intersection(s) and Movement(s):	6 - Oak Springs Drive at Hastings Lane / Future Access (EB)
	7 - Oak Springs Drive at High School Driveway / Future Garage Access (EB)
Scenario:	2027 Future Condtitions with Development
Analyst:	Gorove Slade

Study Scenario	Approach Volume	Right Turn Volume	Minimum Right Turn Taper Threshold	Minimum Right Turn Full Lane Threshold	Treatment
INT 6 - EBR AM	254	1	45	85	Not Warranted
INT 6 - EBR PM	217	5	48	90	Not Warranted
INT 7 - EBR AM	205	6	50	91	Not Warranted
INT 7 - EBR PM	194	22	51	93	Not Warranted



Right Turn Lane Warrant Assessment

Four-Lane Highways

Based on NCHRP Report 279 / VDOT RDM Appendix F
"Intersection Channelization Guide"

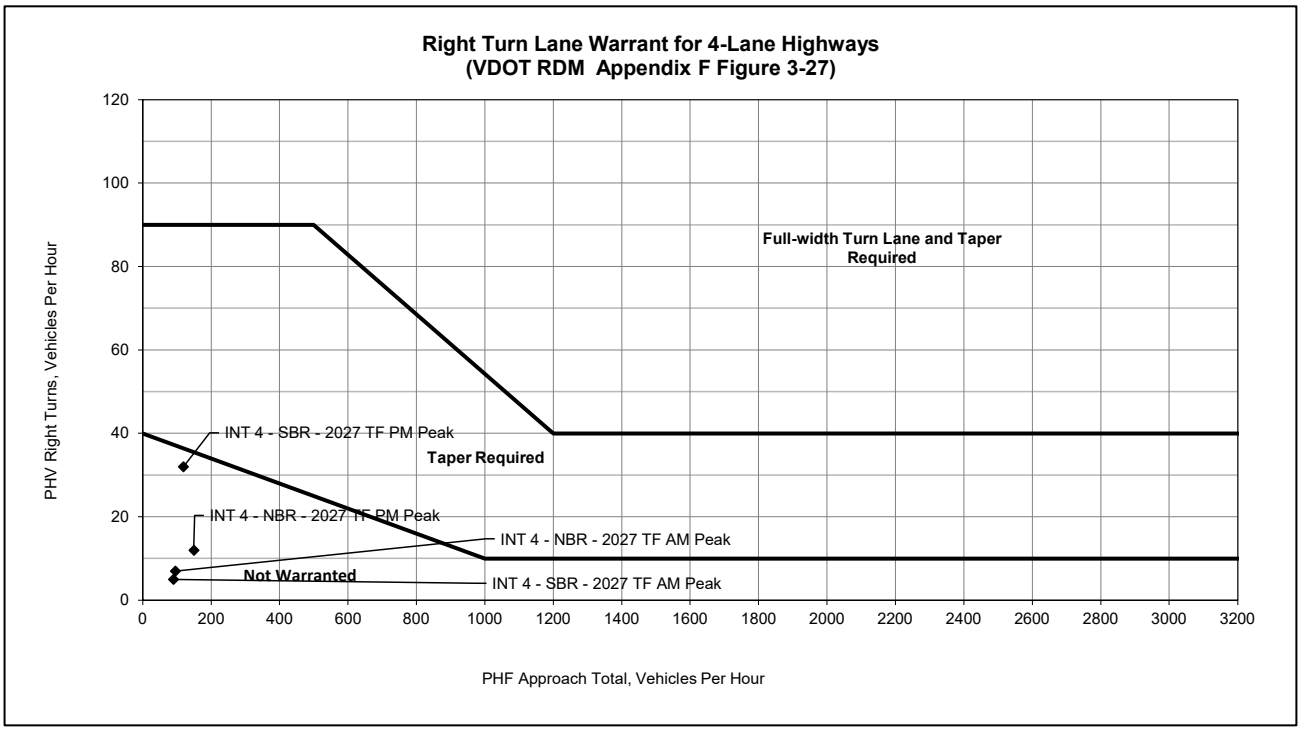
Background:

Warrants for right-turn storage lanes on four-lane highways at unsignalized intersections are based on Figure 3-27 in Appendix F of the Virginia Department of Transportation's (VDOT) ***Road Design Manual*** (RDM). This figure provides a graphical representation for determining the necessity of a right turn lane and / or taper by comparing the total volumes of a given approach with their respective right turn volumes.

Project Information:

Project:	
Project ID:	
Intersection(s) and Movement(s):	4 -Branch Drive at Warrenton Village Center Driveway / Safeway Driveway (NBR & SBR)
Scenario:	2027 Future Conditions with Development
Analyst:	Gorove Slade

Study Scenario	Approach Volume	Right Turn Volume	Minimum Right Turn Taper Threshold	Minimum Right Turn Full Lane Threshold	Treatment
INT 4 - NBR - 2027 TF AM Peak	95	7	37	90	Not Warranted
INT 4 - NBR - 2027 TF PM Peak	149	12	36	90	Not Warranted
INT 4 - SBR - 2027 TF AM Peak	90	5	37	90	Not Warranted
INT 4 - SBR - 2027 TF PM Peak	119	32	36	90	Not Warranted



K. MUTCD 4-Hour Warrant

CHAPTER 4C. TRAFFIC CONTROL SIGNAL NEEDS STUDIES

Section 4C.01 Studies and Factors for Justifying Traffic Control Signals

Standard:

01 **An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location.**

02 **The investigation of the need for a traffic control signal shall include an analysis of factors related to the existing operation and safety at the study location and the potential to improve these conditions, and the applicable factors contained in the following traffic signal warrants:**

Warrant 1, Eight-Hour Vehicular Volume
Warrant 2, Four-Hour Vehicular Volume
Warrant 3, Peak Hour
Warrant 4, Pedestrian Volume
Warrant 5, School Crossing
Warrant 6, Coordinated Signal System
Warrant 7, Crash Experience
Warrant 8, Roadway Network
Warrant 9, Intersection Near a Grade Crossing

03 **The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.**

Support:

04 Sections 8C.09 and 8C.10 contain information regarding the use of traffic control signals instead of gates and/or flashing-light signals at highway-rail grade crossings and highway-light rail transit grade crossings, respectively.

Guidance:

05 *A traffic control signal should not be installed unless one or more of the factors described in this Chapter are met.*

06 *A traffic control signal should not be installed unless an engineering study indicates that installing a traffic control signal will improve the overall safety and/or operation of the intersection.*

07 *A traffic control signal should not be installed if it will seriously disrupt progressive traffic flow.*

08 *The study should consider the effects of the right-turn vehicles from the minor-street approaches. Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count when evaluating the count against the signal warrants listed in Paragraph 2.*

09 *Engineering judgment should also be used in applying various traffic signal warrants to cases where approaches consist of one lane plus one left-turn or right-turn lane. The site-specific traffic characteristics should dictate whether an approach is considered as one lane or two lanes. For example, for an approach with one lane for through and right-turning traffic plus a left-turn lane, if engineering judgment indicates that it should be considered a one-lane approach because the traffic using the left-turn lane is minor, the total traffic volume approaching the intersection should be applied against the signal warrants as a one-lane approach. The approach should be considered two lanes if approximately half of the traffic on the approach turns left and the left-turn lane is of sufficient length to accommodate all left-turn vehicles.*

10 *Similar engineering judgment and rationale should be applied to a street approach with one through/left-turn lane plus a right-turn lane. In this case, the degree of conflict of minor-street right-turn traffic with traffic on the major street should be considered. Thus, right-turn traffic should not be included in the minor-street volume if the movement enters the major street with minimal conflict. The approach should be evaluated as a one-lane approach with only the traffic volume in the through/left-turn lane considered.*

11 *At a location that is under development or construction and where it is not possible to obtain a traffic count that would represent future traffic conditions, hourly volumes should be estimated as part of an engineering study for comparison with traffic signal warrants. Except for locations where the engineering study uses the satisfaction of Warrant 8 to justify a signal, a traffic control signal installed under projected conditions should have an engineering study done within 1 year of putting the signal into stop-and-go operation to determine if the signal is justified. If not justified, the signal should be taken out of stop-and-go operation or removed.*

12 *For signal warrant analysis, a location with a wide median, even if the median width is greater than 30 feet, should be considered as one intersection.*

Option:

13 At an intersection with a high volume of left-turn traffic from the major street, the signal warrant analysis may be performed in a manner that considers the higher of the major-street left-turn volumes as the "minor-street" volume and the corresponding single direction of opposing traffic on the major street as the "major-street" volume.

14 For signal warrants requiring conditions to be present for a certain number of hours in order to be satisfied, any four sequential 15-minute periods may be considered as 1 hour if the separate 1-hour periods used in the warrant analysis do not overlap each other and both the major-street volume and the minor-street volume are for the same specific one-hour periods.

15 For signal warrant analysis, bicyclists may be counted as either vehicles or pedestrians.

Support:

16 When performing a signal warrant analysis, bicyclists riding in the street with other vehicular traffic are usually counted as vehicles and bicyclists who are clearly using pedestrian facilities are usually counted as pedestrians.

Option:

17 Engineering study data may include the following:

A. The number of vehicles entering the intersection in each hour from each approach during 12 hours of an average day. It is desirable that the hours selected contain the greatest percentage of the 24-hour traffic volume.
B. Vehicular volumes for each traffic movement from each approach, classified by vehicle type (heavy trucks, passenger cars and light trucks, public-transit vehicles, and, in some locations, bicycles), during each 15-minute period of the 2 hours in the morning and 2 hours in the afternoon during which total traffic entering the intersection is greatest.
C. Pedestrian volume counts on each crosswalk during the same periods as the vehicular counts in Item B and during hours of highest pedestrian volume. Where young, elderly, and/or persons with physical or visual disabilities need special consideration, the pedestrians and their crossing times may be classified by general observation.
D. Information about nearby facilities and activity centers that serve the young, elderly, and/or persons with disabilities, including requests from persons with disabilities for accessible crossing improvements at the location under study. These persons might not be adequately reflected in the pedestrian volume count if the absence of a signal restrains their mobility.
E. The posted or statutory speed limit or the 85th-percentile speed on the uncontrolled approaches to the location.
F. A condition diagram showing details of the physical layout, including such features as intersection geometrics, channelization, grades, sight-distance restrictions, transit stops and routes, parking conditions, pavement markings, roadway lighting, driveways, nearby railroad crossings, distance to nearest traffic control signals, utility poles and fixtures, and adjacent land use.
G. A collision diagram showing crash experience by type, location, direction of movement, severity, weather, time of day, date, and day of week for at least 1 year.

18 The following data, which are desirable for a more precise understanding of the operation of the intersection, may be obtained during the periods described in Item B of Paragraph 17:

A. Vehicle-hours of stopped time delay determined separately for each approach.
B. The number and distribution of acceptable gaps in vehicular traffic on the major street for entrance from the minor street.
C. The posted or statutory speed limit or the 85th-percentile speed on controlled approaches at a point near to the intersection but unaffected by the control.
D. Pedestrian delay time for at least two 30-minute peak pedestrian delay periods of an average weekday or like periods of a Saturday or Sunday.
E. Queue length on stop-controlled approaches.

Section 4C.02 Warrant 1, Eight-Hour Vehicular Volume

Support:

01 The Minimum Vehicular Volume, Condition A, is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

02 The Interruption of Continuous Traffic, Condition B, is intended for application at locations where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

03 It is intended that Warrant 1 be treated as a single warrant. If Condition A is satisfied, then Warrant 1 is satisfied and analyses of Condition B and the combination of Conditions A and B are not needed. Similarly, if Condition B is satisfied, then Warrant 1 is satisfied and an analysis of the combination of Conditions A and B is not needed.

Standard:

04 **The need for a traffic control signal shall be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:**

A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or

B. The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

In applying each condition the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours.

Option:

05 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns.

Guidance:

06 *The combination of Conditions A and B is intended for application at locations where Condition A is not satisfied and Condition B is not satisfied and should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.*

Standard:

07 **The need for a traffic control signal shall be considered if an engineering study finds that both of the following conditions exist for each of any 8 hours of an average day:**

A. The vehicles per hour given in both of the 80 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; and

B. The vehicles per hour given in both of the 80 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

These major-street and minor-street volumes shall be for the same 8 hours for each condition; however, the 8 hours satisfied in Condition A shall not be required to be the same 8 hours satisfied in Condition B. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume

Condition A—Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B—Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

[a] Basic minimum hourly volume

[b] Used for combination of Conditions A and B after adequate trial of other remedial measures

[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

[d] May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Option:

08 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

Section 4C.03 Warrant 2, Four-Hour Vehicular Volume

Support:

01 The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

Standard:

02 **The need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing combination of approach lanes. On the minor street, the higher volume shall not be required to be on the same approach during each of these 4 hours.**

Option:

03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-2 may be used in place of Figure 4C-1.

Section 4C.04 Warrant 3, Peak Hour

Support:

01 The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.

Standard:

02 **This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.**

03 **The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:**

A. If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:

1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach; and

2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes; and

3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.

B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

Option:

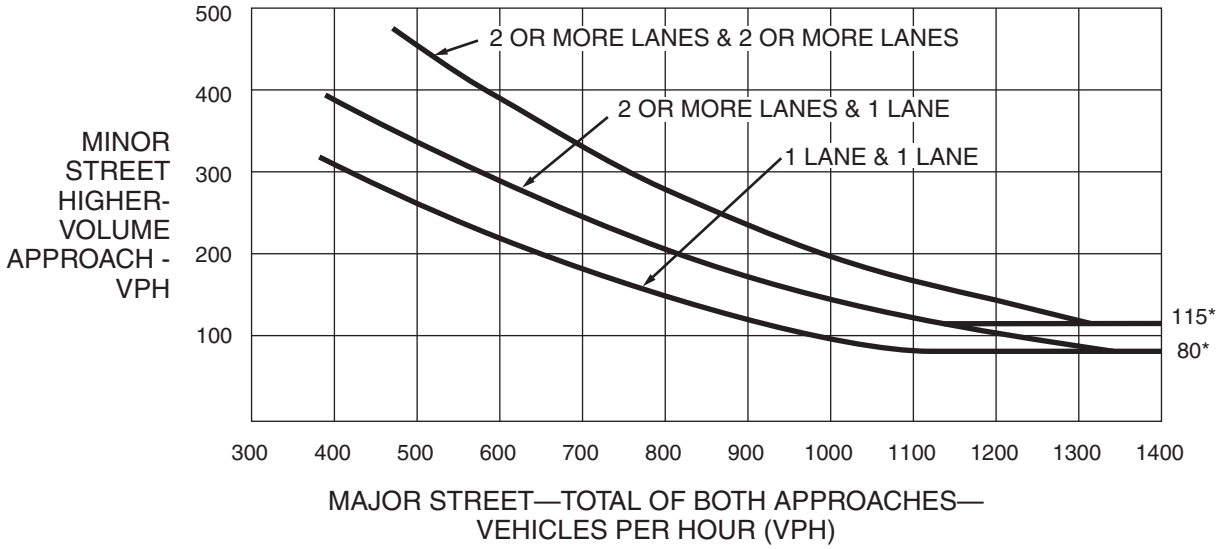
04 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-4 may be used in place of Figure 4C-3 to evaluate the criteria in the second category of the Standard.

05 If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the traffic control signal may be operated in the flashing mode during the hours that the volume criteria of this warrant are not met.

Guidance:

06 *If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the traffic control signal should be traffic-actuated.*

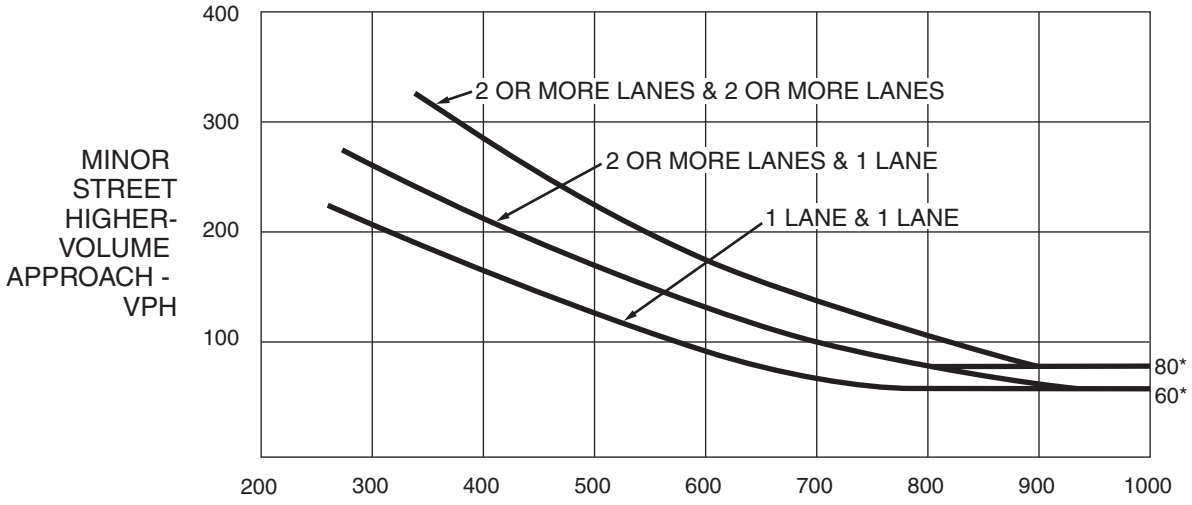
Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.