Erickson Avenue Area Study
Existing Conditions

FINAL REPORT

January 14, 2025

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Introduction

The City of Harrisonburg is completing a small area plan for the Erickson Avenue corridor and adjacent areas between S High Street and S Main Street. The City intends to evaluate future land use conditions that align with the currently anticipated needs of the community in this area of the City. This report details the existing conditions for the study area, the extents of which are shown in **Figure 1**. Future conditions analysis and reporting will follow in subsequent submittals.

STUDY AREA

The study area contains four signalized intersections and ten unsignalized intersections, along with the corridors between those intersections. The study area intersections are the following:

1. S High Street and Erickson Avenue (Signalized)
2. S High Street and Pear Street (Unsignalized)
3. Pleasant Hill Road and Pear Street (Unsignalized)
4. Pleasant Hill Road and Willow Hill Drive (Unsignalized)
5. Pleasant Hill Road and Central Avenue (Unsignalized)
6. Pear Street and Erickson Avenue (Unsignalized)
7. Pear Street and Russell Drive (Unsignalized)
8. Pear Street and Cobblers Court (Unsignalized)
9. Pear Street and Ruby Drive (Unsignalized)
10. Pear Street and W Mosby Road (Unsignalized)
11. W Mosby Road and Mosby Court (Unsignalized)
12. S Main Street and W Mosby Road (Signalized)
13. S Main Street and Erickson Avenue/Stone Spring Road (Signalized)
14. S Main Street and Pleasant Hill Road (Signalized)

S Main Street is co-labeled US Route 11, classified by VDOT as a minor arterial. Erickson Avenue connects S Main Street to S High Street and currently has no access points between Pear Street and S High Street. Erickson Avenue is classified as a minor arterial for most of the study area, but changes to a major collector north of S High Street. S High Street is co-labeled State Route 42, a principal arterial. Pear Street, west of Erickson Avenue, and W Mosby Road are classified as major collectors, while Pleasant Hill Road and Pear Street, east of Erickson Avenue, are minor collectors.

This report assesses existing conditions using several metrics. A crash analysis evaluates safety, the traffic analysis details intersection operations, and a multimodal evaluation summarizes pedestrian, bicycle, and transit access in the study area. An access management evaluation was also performed to document sight distance and access points in the study area. Field observations are also noted to support the technical assessment.

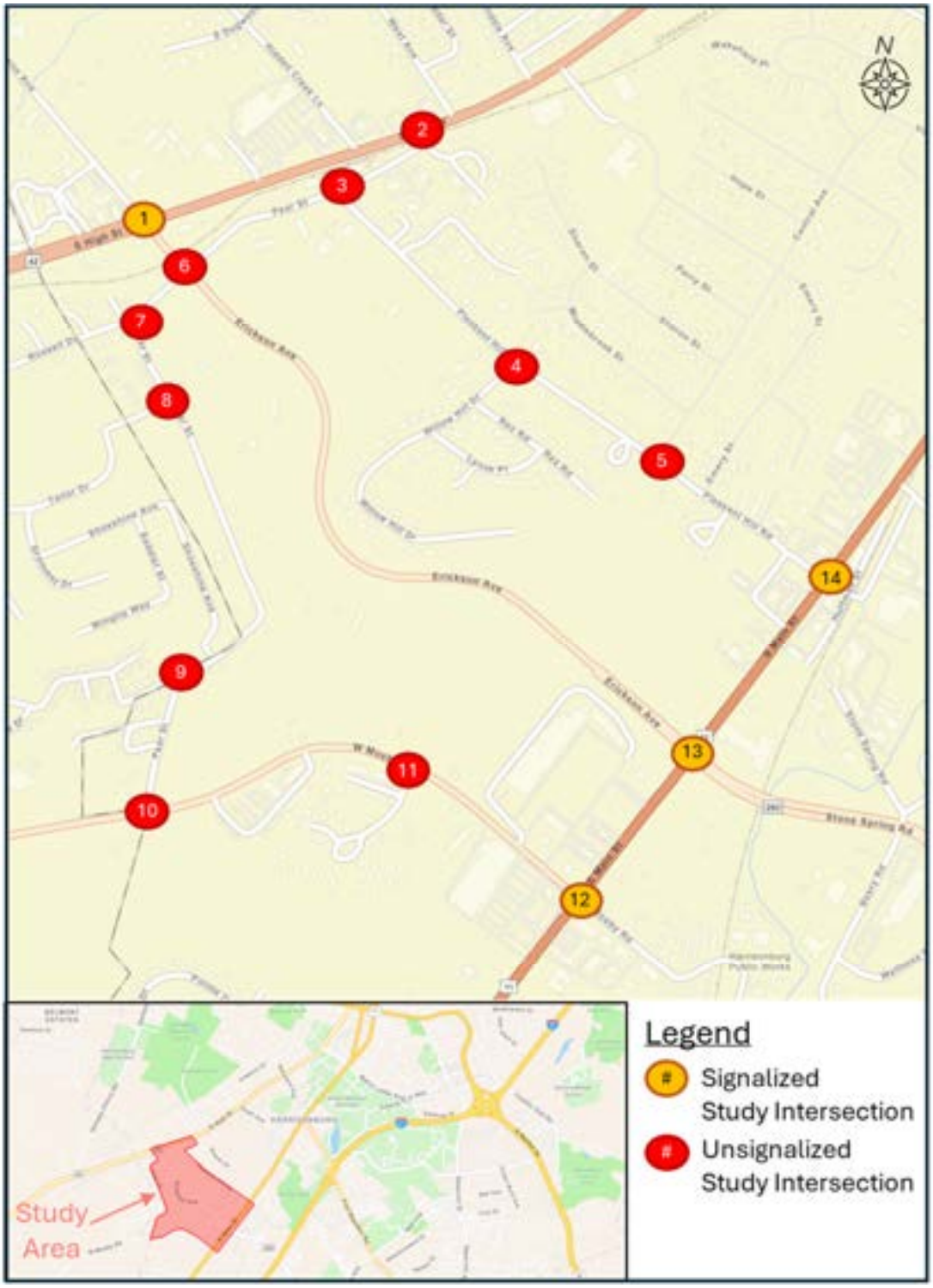


Figure 1: Study Area Map (Not to scale)

FUNDED TRANSPORTATION PROJECTS

Independent of this study, there are two transportation projects programmed for this study area. The following summarizes the scope and anticipated schedule of each project.

South Main Street: Mosby Road to Stone Spring Road

On S Main Street between W Mosby Road and Stone Spring Road, a three-foot-wide concrete median is being installed. Dedicated left-turn lanes for commercial access points will replace the existing two-way-left-turn lane. A five-foot-wide sidewalk will be installed on the east side of the corridor, and existing bike lanes will be removed to accommodate the median. Construction is anticipated in 2025.

Pear Street & Erickson Avenue Intersection Safety Improvements

At the intersection of Pear Street and Erickson Avenue, a modified Restricted Crossing U-Turn (RCUT) has been identified to improve safety and operations. Three of the four left-turns and both minor street through movements will be redirected to signalized U-turns. Pedestrian crossing enhancements will also be incorporated. This project is projected for preliminary engineering in 2025 and construction in 2029-2030.

Data Collection

TURNING MOVEMENT COUNTS

Turning movement count (TMC) data was collected Tuesday, October 29, 2024 from 7:00 AM to 7:00 PM for the study area intersections listed in the prior section. Based upon a review of the collected TMC data, the network AM and PM peak hours for the study area were determined to be 7:30 AM to 8:30 AM and 3:30 PM to 4:30 PM, respectively. However, the PM peak hour was selected to be 4:30 PM to 5:30 PM. Many intersections' peak hour began at 4:30 PM, with volumes that were comparable to the 3:30 PM to 4:30 PM timeframe. The intersection of S High Street and Erickson Avenue tilted the network to a 3:30 PM peak hour with a school that releases at 3:45 PM. It is anticipated that any new trips for future land uses will have a more traditional commuter peak hour. Based on a review of the network peak hour volumes in Synchro, collected traffic volumes were fairly balanced along the corridor and no adjustments were made to the source volumes. The network peak hours were used to evaluate the existing traffic conditions. Peak hour turning movement count data is summarized in **Figure 2**.

Roadways parallel to Interstate 81 are labeled as North-South, which includes S High Street, S Main Street, and Pear Street. Erickson Avenue, W Mosby Road, and Pleasant Hill Road are labeled as East-West. The only exception to this rule is that Pear Street is labeled East-West at its intersection with S High Street.

Figure 2: Study Area Peak Hour Traffic Volumes (7:30-8:30 AM, 4:30-5:30 PM)

AVERAGE DAILY TRAFFIC

In addition to TMC data collection, seven-day volume, speed, and vehicle classification data was collected at the following locations from October 29, 2024 to November 4, 2024, in 15-minute intervals:

A. S High Street (east of Erickson Avenue)
B. Pear Street (between Cobblers Court and Saddlers Street)
C. Erickson Avenue (between S High Street and S Main Street)
D. W Mosby Road (just south of Mosby Court)
E. S Main Street (between Erickson Avenue/Stone Springs Road and Pleasant Hill Road)
F. Pleasant Hill Road (in the vicinity of Affordable Suites/Smith Glass)

Figure 3 shows the average daily traffic for Tuesday through Thursday from the collected data for each roadway in the study area, with the exception of S Main Street south of W Mosby Road. Monday and Friday data were excluded as travel patterns on those days typically vary from mid-week conditions and are not necessarily representative of typical conditions. Significant outliers were removed from the dataset. The average weekday traffic (AWDT) volume for S Main Street south of W Mosby Road comes from a City speed study completed in September 2023 over two days (Tuesday, September 26, 2023, and Wednesday, September 28, 2023). As this data source is different, the AWDT for S Main Street south of W Mosby Road is shown with a dashed line. The average daily traffic is highest in the study area during the PM peak. Erickson Avenue, S High Street, and S Main Street all experience much greater volumes during the PM peak hours than the AM peak hours. S Main Street experiences a notable midday peak around 12:15 PM. In general, the AWDTs reflect the TMCs collected on October 29, 2024. S Main Street south of W Mosby Road has a consistently higher AWDT than S Main Street north of W Mosby Road, a difference of around 13 percent. This could be attributed to vehicles turning from Stone Spring Road or Erickson Avenue onto southbound S Main Street.

Speed and class were also collected and are summarized in **Table 1**. All 85th percentile speeds were within 7 MPH of the posted speed limit except on Pleasant Hill Road. On Pleasant Hill Road, the 85th percentile speed was 11 MPH faster than the posted speed limit. The percent of heavy vehicles ranges from 1.9% to 5.3% on study area roadways.

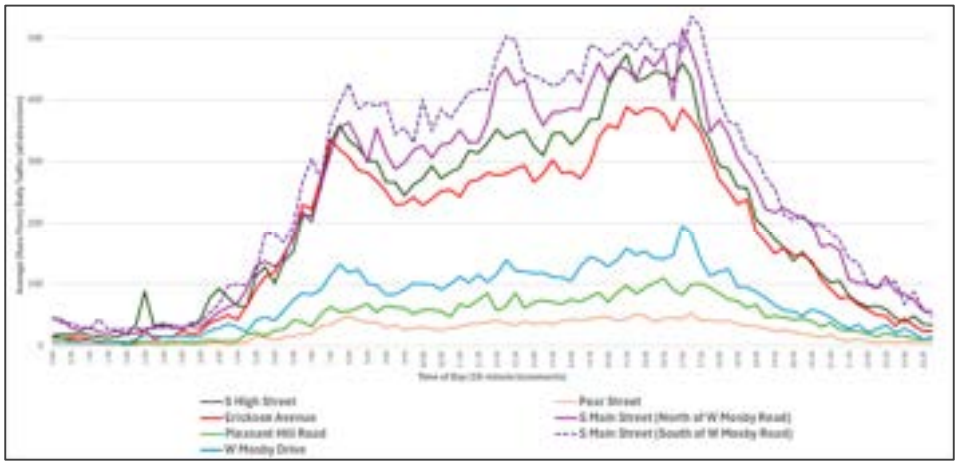


Figure 3: Average Weekday Traffic by Roadway (15-minute increments)

Table 1: AWDT, 85th Percentile Speed, and Class

Data Collection Point		AWDT (Tues, Wed, Thurs)	Speed Limit	Average Weekday (Tues, Wed, Thurs)	
Roadway	Segment			85th Percentile Speed (Both Directions)	Percent Heavy Vehicles
S High Street	Erickson Avenue to Pear Street	19,900	35	41	4.7%
Pear Street	Cobblers Court to W Mosby Road	2,250	25	31	4.0%
Erickson Avenue	Pear Street to S Main Street	17,320	35	42	5.3%
W Mosby Road	Mosby Court to S Main Street	7,240	25	30	4.0%
S Main Street	Erickson Avenue to Pleasant Hill Road	22,580	35	40	5.1%
S Main Street	South of W Mosby Road	25,536*	35	38	N/A**
Pleasant Hill Road	Central Avenue to S Main Street	4,420***	25	36	1.9%

*Only two days of available data.

**No available data.

***Only Tuesday and Wednesday data used, as Thursday was a significant outlier.

FIELD OBSERVATIONS

On November 6, 2024, during both the AM and PM peak hours, field observations were completed at the study intersections. These observations documented traffic operations, queuing, travel patterns, and geometric deficiencies that may be relevant to identifying future recommendations or understanding existing crash patterns. The study area appeared to be operating at what would be considered typical volume for that time of day. The following points detail field observations:

- Erickson Avenue presents significant vertical and horizontal curve challenges. Pear Street also presents vertical and horizontal curve challenges, especially given that it is only two lanes. An example of such challenges on Pear Street is shown in **Figure 4**. The eastbound

approach of Pleasant Hill Road and S Main Street also has poor stopping sight distance due to a vertical curve in the road.

Figure 4: Pear Street vertical and horizontal curves

- There is poor visibility to the right (looking west) for the southbound left turn movement from Pear Street onto Erickson Avenue due to queued vehicles in the downstream westbound lanes on Erickson Avenue approaching S High Street. Additionally, significant delay was experienced in making a left turn from both Pear Street approaches onto Erickson Avenue. During the PM peak hour, there was a seven-vehicle queue on the northbound Pear Street approach.
- There was consistent traffic on eastbound Erickson Avenue west of S High Street during both the AM and PM peak hour, leaving few gaps for left turns into access points. At the eastbound approach to Erickson Avenue and S High Street, the lane utilization is poor, with most vehicles in the right lane, even if not turning right.
- The left-turn movement at westbound Stone Spring Road and S Main Street queued during the AM peak hour with 10 to 15 unserved vehicles. The queue was consistent, and was usually within the storage lane and served within one cycle. However, at times, the queue backed up to the upstream intersection. During the PM peak hour, the westbound left-turn queue exceeds storage lane capacity, extending up over the hill. The northbound and southbound left-turn queues are also lengthy. This queuing is captured in **Figure 5**.

Figure 5: Stone Spring Road westbound approach during the AM (left) and PM (right) peak hours

- No bicycles were observed in the study area, but there are bike lanes on Erickson Avenue, S Main Street, and S High Street. Examples are shown in **Figure 6**. The bike lanes end going west and south at the intersection of Erickson Avenue and S High Street.

Figure 6: Bike lanes on southbound S Main Street (left) and westbound Erickson Avenue (right)

- One pedestrian was observed walking southbound on S Main Street. One pedestrian was observed walking eastbound on Erickson Avenue. There is sidewalk only on the north side of Erickson Avenue. Additionally, most intersections have crosswalks on only three legs.
- The center running two-way left turn lanes (TWLTLs) are heavily used in both directions on both S Main Street and S High Street.
- The speed limit on W Mosby Road changes from 25 MPH west of S Main Street to 35 MPH west of Mosby Court to 45 MPH just west of Pear Street. No issues with compliance with this change in speed limit were observed.
- Willow Hill Drive does not connect to Pleasant Hill Road at Central Avenue but is intended to when the Willow Ridge development is complete.
- Central Avenue has curbside parallel parking pavement markings, but no centerline.

Crash Analysis

A crash analysis for the Erickson Avenue study area was conducted using the latest five years of crash data. The crash reports from September 1, 2019, through August 31, 2024 were obtained from the Virginia Department of Transportation database. Each study intersection was isolated to a 250-foot radius around the center of the intersection and analyzed individually. The crash data along the corridor segments, which includes roadway outside of each 250-foot intersection radius, was also collected and analyzed.

There were a total of 274 reported crashes between September 1, 2019 and August 31, 2024 in the study area. The majority of crashes resulted in property damage only, occurred during daylight, and were angle or rear end crashes. 205 of the crashes occurred at intersections while the remaining 69 occurred along corridor segments. Of the 205 intersection crashes, 63 were reported at the intersection of S Main Street and Erickson Avenue, 45 were reported at the intersection of S High Street and Erickson Avenue, 33 were reported at the intersection of S Main Street and W Mosby Road, 27 were reported at the intersection of Pear Street and Erickson Avenue, and 19 were reported at the intersection of S Main Street and Pleasant Hill Road. Six or fewer crashes occurred at the remaining study intersections. The majority of intersection crashes were angle or rear end crashes. Of the 69 corridor crashes, 37 were reported along S Main Street, and 11 each were reported along Erickson Avenue and W Mosby Road. The majority of these corridor crashes were angle or rear end crashes.

The findings from the crash analysis are summarized in **Appendix A**.

Multimodal and Access Management Evaluation

TRANSIT EVALUATION

The Harrisonburg Department of Public Transportation (HDPT) runs six City routes. Two routes, Route 3 and Route 4, run within the project study area. These routes operate between 6:30 a.m. and 6:30 p.m. on weekdays. **Figure 7** shows the average daily weekday ridership numbers by bus stop for the portions of Route 3 and portions of Route 4 that are within the project study area or within 100 feet of the project study area. The daily ridership data was collected during the month of September 2024. The ridership values shown were determined by taking the average of all weekday data within the data collection period for each bus stop.

The project study area consists of 12 bus stops. Four of the bus stops are along Route 3 and eight bus stops are along Route 4. Seven of the 12 bus stops have an average daily weekday ridership of approximately 2 passengers per day. The bus stops with the highest ridership are Pleasant Hill Road at Shenk Apartments and West Mosby Road at Sharp Shopper. The average daily weekday ridership for these bus stops are 4.9 and 5.0, respectively. The higher ridership at these bus stops may be due to their proximity to large trip generator developments like high density housing and a large shopping center.

Figure 8 shows the total average daily weekday ridership by route for all bus stops within the project study area. The ridership for both routes is similar. Route 3 had a total average ridership of 11.7 passengers per day, and Route 4 had a total average ridership of 17.6 passengers per day. The larger ridership value for Route 4 can be attributed to the greater number of bus stops for this route within the project study area.

Route 3 and Route 4 also operate on Saturdays between 8:30 a.m. and 5:30 p.m. Saturday ridership data was also collected in the month of September, and the reported ridership values were averaged across multiple weekends for this analysis. All bus stops except for West Mosby Road at Sharp Shopper had an average Saturday daily ridership between 1 and 2. Two bus stops, South Main Street at Pleasant Hill Road and South Main Street at Pueblo Grande Mexican Grill, did not have any riders at those bus stops on Saturdays. These two bus stops are also have the lowest ridership on weekdays. The remaining bus stop, West Mosby Road at Sharp Shopper, had the highest average Saturday daily ridership at 5. This bus stop had the highest ridership for both the weekday and Saturday averages.

On-time performance data for the entirety of both routes (including areas outside of the study area) was collected for the month of September. On-time performance measures how well a bus adheres to its scheduled arrival and departure times. Route 3 reported an on-time performance of 57.5%. The remaining percentage reported that the buses were no more than 5 minutes late. Route 4 reported an on-time performance of 64.9%. With the exception of the 1.5% of early arrivals, it was reported that the buses were no more than 5 minutes late.

Figure 7: Harrisonburg Department of Public Transportation Average Weekday Ridership – Routes 3 and 4

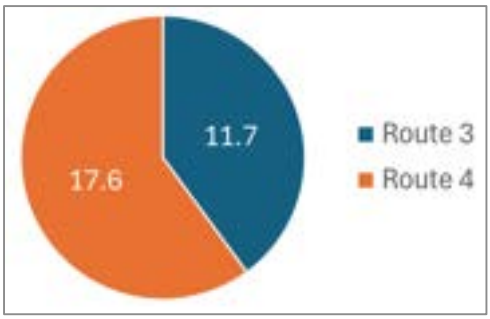


Figure 8. Average Total Daily Weekday Ridership by Route (within the study area)

BICYCLE LEVEL OF COMFORT ASSESSMENT

A bicycle level of comfort (BLoC) assessment, also referred to as level of traffic stress (LTS) analysis, was completed regarding bicycle mobility in the study area. The 2022 "Levels of Traffic Stress" created by Dr. Peter Furth guided road segment grading criteria and grading levels. Levels of comfort were determined by quantifying and compiling several attributes: Average Daily Traffic (ADT), speed, number of lanes, parking lane presence and width, and bike facility presence. The four LTS ratings are:

- "LTS 1: Strong separation from all except low speed, low volume traffic. Simple crossings. Suitable for children.
- LTS 2: Except in low speed / low volume traffic situations, cyclists have their own place to ride that keeps them from having to interact with traffic except at formal crossings. Physical separation from higher speed and multilane traffic. Crossings that are easy for an adult to negotiate. Corresponds to design criteria for Dutch bicycle route facilities. A level of traffic stress that most adults can tolerate, particularly those sometimes classified as 'interested but concerned.'
- LTS 3: Involves interaction with moderate speed or multilane traffic, or close proximity to higher speed traffic. A level of traffic stress acceptable to those classified as 'enthused and confident.'
- LTS 4: Involves interaction with higher speed traffic or close proximity to high-speed traffic. A level of stress acceptable only to those classified as 'strong and fearless.'"[1]

Road segment attributes were gathered from City GIS shapefiles and VDOT roadway open data. The ADTs collected for this study and the City's S Main Street speed study were used in the LTS calculation for study area corridors; the ADTs from VDOT data were used for the other roadways. The overall level of comfort is shown on the BLoC map, seen in **Figure 9**.

Within the study area, S Main Street, S High Street, Pear Street, W Mosby Road, Pleasant Hill Road, and Erickson Avenue exhibit LTS 3. LTS 3 indicates that there are limited separated facilities for bicycles, close proximity with high-speed traffic, and/or proximity to a high volume of traffic. Despite having 25 MPH speed limits, Pear Street, W Mosby Road, and Pleasant Hill Road have no bicycle facilities and are two-lane roadways with no shoulder, so it is understandable that these roadways are less comfortable for bicyclists. S Main Street, S High Street, and Erickson Avenue do have bicycle lanes, while still receiving an LTS rating of 3. This indicates that the bicycle lanes are likely not of sufficient width and/or separation from traffic in the corridor to be comfortable for all users. The speed limit is 35 MPH on these roadways, there are two travel lanes in each direction, and higher speed traffic reduces bicyclist comfort. Overall, there is not an existing network of comfortable bicycle facilities (LTS 1 or 2) in the study area.

[1] https://peterfurth.sites.northeastern.edu/level-of-traffic-stress/

Figure 9: Bicycle Level of Comfort (BLoC) map

BICYCLE AND PEDESTRIAN FACILITIES

There are existing bicycle and pedestrian facilities within the study area. **Figure 10** summarizes the presence of bicycle lanes, sidewalks, detectable warning surface (DWS) on sidewalk ramps, and crosswalk locations. Sidewalk connectivity in the study area is limited. Erickson Avenue and S Main Street have sidewalk continuously on one side throughout the study area. W Mosby Road has sidewalk on one side that connects developments to S Main Street. The other corridors have portions of sidewalk that do not connect. There is DWS on most study area sidewalk ramps; however, one ramp at Pleasant Hill Road and S Main Street does not have DWS. Bike lanes are present on Erickson Avenue, S High Street, and S Main Street. There are no bicycle indications, such as share-the-road signs or pavement markings, on other study area corridors. In addition, according to the Harrisonburg Community Bike Map 2022[2], several of the corridors have steep grades: Erickson Avenue, Pear Street, and Pleasant Hill Road.

Pedestrian and bicycle volume at intersections was collected on October 29, 2024, along with the turning movement counts. During the AM peak hour of 7:30 AM to 8:30 AM, there were four pedestrian crossings at the intersection of Pleasant Hill Road and Pear Street, one pedestrian at Pleasant Hill Road and Central Avenue, and two pedestrian crossings at S Main Street and Erickson Avenue. During the PM peak hour of 4:30 PM to 5:30 PM, there were pedestrian crossings at nine of the 14 study intersections. There were 12 pedestrian crossings during the PM peak hour at S Main Street and Pleasant Hill Road. **Table 2** summarizes the pedestrian volumes by intersection.

The majority of pedestrian volume occurred between 3:00 PM and 5:30 PM. The highest number of pedestrian crossings seen in the study area during one 15-minute period was 18 pedestrian crossings from 3:30 PM to 3:45 PM. Ten of those pedestrian crossings were at the intersection of Pear Street and Cobblers Court, which could be attributed to a school bus dropping off students at the Cobblers Court development.

The AM peak hour of 7:30 AM to 8:30 AM recorded zero bicycles. The PM peak hour from 4:30 PM to 5:30 PM recorded 18 bicycles. S High Street and Erickson Avenue, S Main Street and Erickson Avenue, and S Main Street and Pleasant Hill Road recorded the highest volume of bicycles compared to the other intersections. They each had between four to six bicycles as the maximum hourly intersection bicycle volume. In general, the study area experiences the most bicycle volume between 2:00 PM and 6:15 PM.

[2] https://www.harrisonburgva.gov/bike-map

Figure 10: Existing Pedestrian and Bicycle Facilities

Table 2: Pedestrian Volume at Study Area Intersections

Intersection	AM Peak Hour Pedestrian Volume	PM Peak Hour Pedestrian Volume	Maximum Number of Pedestrians in any one 15-minute Period	Total Pedestrian Volume between 7:00 AM and 7:00 PM
S High Street and Erickson Avenue	0	0	3	7
S High Street and Pear Street	0	2	5	27
Pleasant Hill Road and Pear Street	4	1	2	11
Pleasant Hill Road and Willow Hill Drive	1	0	1	4
Pleasant Hill Road and Central Avenue	0	2	6	23
Pear Street and Erickson Avenue	0	0	1	5
Pear Street and Russell Drive	0	2	4	22
Pear Street and Cobblers Court	0	0	10	19
Pear Street and Ruby Drive	0	0	2	4
Pear Street and W Mosby Road	0	2	1	10
W Mosby Road and Mosby Court	0	3	3	14
S Main Street and W Mosby Road	0	1	5	27
S Main Street and Erickson Avenue/Stone Spring Road	2	5	4	32
S Main Street and Pleasant Hill Road	0	12	7	37

ACCESS MANAGEMENT

Access Points

The VDOT *Roadway Design Manual (RDM) Appendix F* identifies intersection spacing standards across various facility types and functional classifications. For areas that are more urbanized with a multimodal facilities focus, VDOT *RDM, Appendix B(2) Multimodal Design Standards For Mixed-Use Urban Centers* may be used in place of Appendix F standards, and are chosen based on likely future uses of the study area roadway network. Different spacing standards are provided based on the Virginia Department of Rail and Public Transportation (DRPT) *Multimodal System Design Guidelines*. The study area best fits in the "P4: Large Town/Suburban Center" multimodal center type. VDOT *RDM, Appendix B(2)* Table B(2)-3 is modified from *RDM Appendix F* Table 2-2, and applies to the small corridors' access management, but redirects to the *Appendix F* table for larger corridors. **Table 3** indicates which *RDM Appendix* standards are used for which corridors.

Figure 11 documents the intersection spacing between study intersections. The intersection spacing on Erickson Avenue between S High Street and Pear Street, for the full access unsignalized intersections, is not compliant. The existing spacing is 440 feet, and the minimum spacing requirement is 660 feet. This is not including the two access points along the segment that also

render the segment non-compliant. The spacing between the intersections along Pleasant Hill Road with Central Avenue and with Emery Street is not adequate, at 380 feet, compared to the required 400 feet.

Figure 12 visualizes which access points are compliant and non-compliant with these access management requirements in the study area. Note that compliance is not assessed for driveways of single-family homes which must be provided access to the property.

All signalized intersections meet separation requirements with other signalized intersections per the VDOT Roadway Design Manual Appendix B(2) Table B(2)-3.

The City will install a three-foot-wide concrete median on S Main Street from just south of W Mosby Road to Erickson Avenue in 2025. This will improve access management compliance and reduce the potential for crashes along this section of S Main Street. Most of the accesses along this section will become Right-In Right-Out, and will need only 250 feet of spacing. However, given the density of access on this section, this reduction in spacing requirement will bring only one access point into compliance.

Table 3: Intersection Minimum Spacing Requirements

Corridor	VDOT RDM Standard Location	Speed Limit	Facility Type	Signalized Intersections	Unsignalized Intersections / Full Crossovers	Full Access / Directional Crossovers	Right-in / Right-Out
S High Street	Appendix F Table 2-2	35 MPH	Other Principal Arterial	1,320	1,050	565	305
Erickson Avenue S Main Street			Minor Arterial	1,050	660	470	250
Pear Street	Appendix B(2) Table B(2)-3	25 MPH	Major Avenue	800	400		200
Pleasant Hill Road		25 MPH					
W Mosby Road		25-35 MPH					

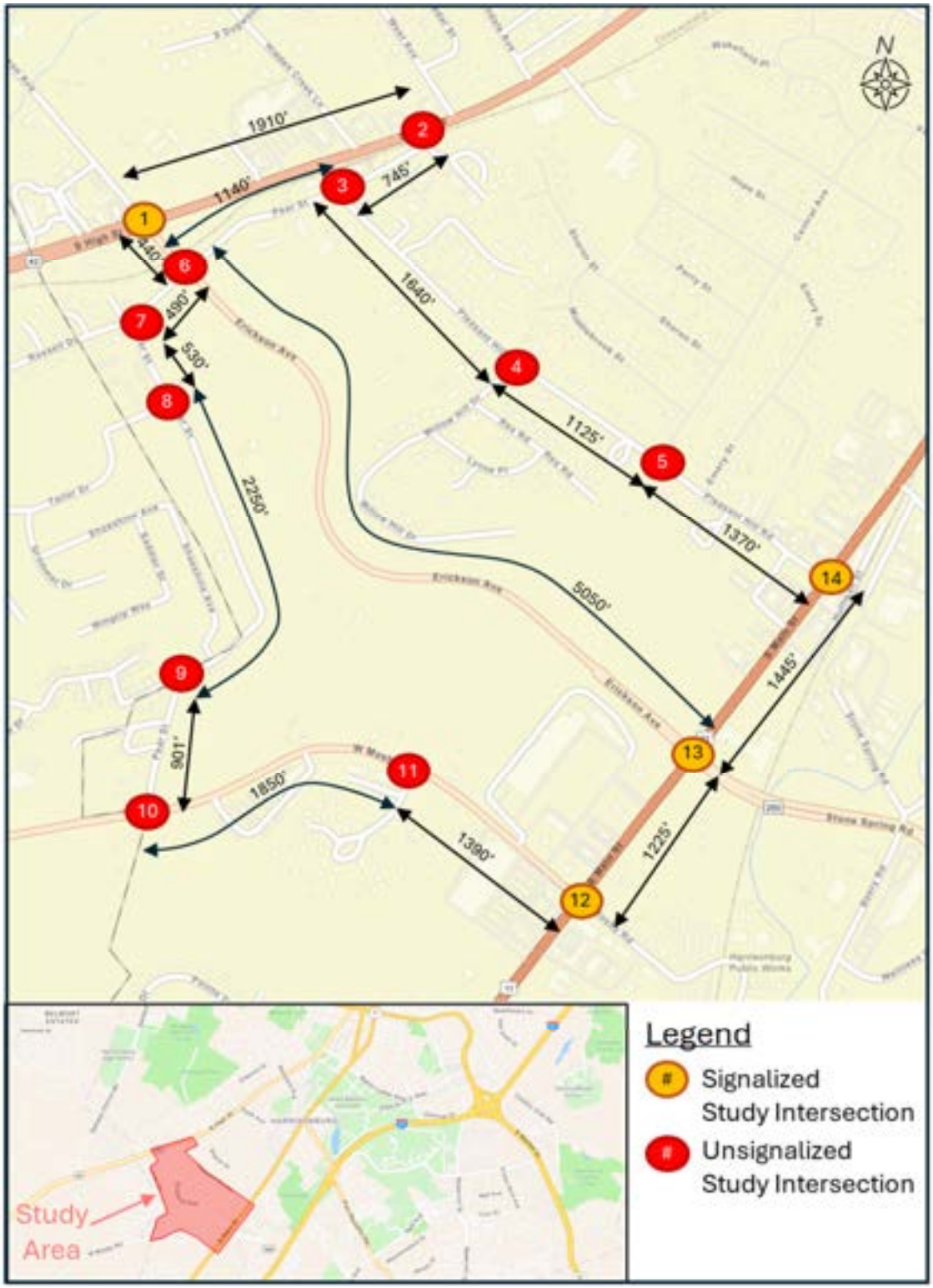


Figure 11: Study Intersection Spacing Diagram (Not to scale)

Figure 12: Access Point Compliance in Study Area

Intersection Sight Distance

Intersection sight distance is measured according to the American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets* (Green Book). The minimum intersection sight distance (ISD) for passenger vehicles turning left or right from a stopped condition are summarized by corridor in **Table 4** for grades of three percent (3%) or less, calculated using the posted speed limit.

Table 4: Required Intersection Sight Distance from Stop

Corridor	Speed (MPH)	Type	Left-turn ISD	Right-turn ISD
S High St	35 MPH	4-lane with TWLTL	440 ft	335 ft
Pear St	25 MPH	2-lane	280 ft	240 ft
Pleasant Hill Road	25 MPH	2-lane	280 ft	240 ft
Erickson Avenue	35 MPH	4-lane with left-turn lane and bike lane	450 ft	335 ft
W Mosby Road at Pear Street	35 MPH	2-lane	390 ft	335 ft
W Mosby Road at Mosby Court	35 MPH	2-lane with center turn lane	415 ft	335 ft

A desktop review of the unsignalized study intersections was completed to identify potential sight distance issues based on vertical and horizontal curvature, vegetation, and parked vehicles. In addition, ISD exhibits were prepared to illustrate the potential sight distance issues with respect to physical obstructions and right-of-way constraints. All sight distance evaluations are preliminary and should be field verified. A summary of potential sight distance impacts for stop-controlled approaches at unsignalized intersections in the study area is presented below in **Table 5**. ISD exhibits can be found in **Appendix B.**

Table 5: Potential Sight Distance Impacts (by Intersection) for Minor Street Stop-Controlled Approaches

Intersection	Potential Sight Distance Impacts
Pear Street and S High Street	Queued vehicles, electric pole
Pleasant Hill Road and Pear Street	None identified
Pear Street and Erickson Avenue	Railroad signal poles, queued vehicles, vertical curvature
Russell Drive and Pear Street	None identified
Cobblers Court and Pear Street	None identified
Ruby Drive and Pear Street	Parked vehicles, vertical curvature
Pear Street and W Mosby Road	None identified
Mosby Court and W Mosby Road	Vertical curvature, fence
Willow Hill Drive and Pleasant Hill Road	Vertical curvature
Central Avenue and Pleasant Hill Road	Vegetation

Existing Conditions Traffic Analysis

The existing operating conditions for each study intersection along the corridor were analyzed using Synchro software for the AM and PM peak hours. The key steps in preparing the network for existing conditions traffic analysis were as follows:

- Preparing Synchro files to include all study intersections and geometry
- Incorporating City-provided signal timings into Synchro
- Inputting AM and PM peak hour turning movement count data for all study intersections, including peak hour factors and heavy vehicle percentages
- Network review for volume balancing

Peak Hours

The TMC data indicated that the study intersections had various AM and PM intersection-specific peak hours. For the volumes at each intersection to be properly balanced, the network peak hour was used, which represented the highest total network volume across all study intersections. The network peak hour was found to be 7:30 to 8:30 AM for the morning and 3:30 to 4:30 PM for the evening. However, 4:30 to 5:30 PM was selected for the PM peak hour given that the future developments are likely to generate trips during a more traditional commuter time, and the difference in volumes across the network between the 3:30 to 4:30 PM peak hour compared to the 4:30 to 5:30 PM peak hour were nominal.

Measures of Effectiveness

Several measures of effectiveness (MOE), generated by Synchro analysis software, were used to analyze existing operations at the study area intersections. These MOEs included average vehicular delay, level of service (LOS), and 95th percentile queue length. Highway Capacity Manual (HCM) 6th Edition methodology was used to report MOEs from Synchro at unsignalized intersections. HCM 2000 methodology was used to report MOEs from Synchro at signalized intersections due to limitations of HCM 6 methodology to analyze unique signal operations.

Table 6 summarizes the findings from the MOEs for all intersections, including average vehicular delay, level of service (LOS), available storage, and 95th percentile queue length. Overall intersection delay is not reported for unsignalized intersections since delay cannot be calculated for uncontrolled through movements. Movements for which delay cannot be calculated are indicated with “(-)” in the table, and movements with zero volume are indicated by “N/A” in the table.

Table 6: AM and PM Peak Hour Results

Approach	Movement	Storage Length	Existing AM			Existing PM		
			LOS+Delay	V/C Ratio	95th Percentile Queue Length	LOS+Delay	V/C Ratio	95th Percentile Queue Length
Intersection 1: S High Street and Erickson Avenue (Signalized)								
Overall Intersection		-	C (33.8)	0.66	-	D (36.3)	0.69	-
Eastbound (Erickson Avenue)	EBL	235	C (28.1)	0.47	96	D (35.2)	0.53	110
	EBTR	-	D (43.7)	0.76	226	D (47.8)	0.55	164
	EB Approach	-	D (40.4)	-	-	D (43.9)	-	-
Westbound (Erickson Avenue)	WBL	150	C (28.6)	0.56	115	D (35.4)	0.60	187
	WBTR	-	D (39.2)	0.69	192	D (50.3)	0.78	265
	WB Approach	-	D (36.6)	-	-	D (46.0)	-	-
Northbound (S High Street)	NBL	130	C (22.2)	0.05	19	C (22.5)	0.14	46
	NBT	-	D (38.0)	0.60	205	D (37.9)	0.50	249
	NBR	240	C (22.7)	0.14	47	C (22.1)	0.24	98
	NB Approach	-	C (33.5)	-	-	C (32.2)	-	-
Southbound (S High Street)	SBL	150	C (27.0)	0.57	144	C (26.8)	0.56	183
	SBT	-	C (27.0)	0.35	151	C (30.8)	0.44	245
	SBR	390	B (17.4)	0.09	26	B (18.9)	0.12	34
	SB Approach	-	C (25.2)	-	-	C (27.5)	-	-
Intersection 2: S High Street and Pear Street (Unsignalized)								
Eastbound (Driveway)	EBLTR	-	N/A	-	-	D (27.0)	0.02	2.5
	EB Approach	-	N/A	-	-	D (27.0)	-	-
Westbound (Pear Street)	WBLTR	-	B (13.1)	0.18	17.5	C (23.2)	0.37	42.5
	WB Approach	-	B (13.1)	-	-	C (23.2)	-	-
Northbound (S High Street)	NBL	-	N/A	-		A (9.8)	0.00	0
	NBTR	-	(-)	-	-	(-)	-	-
	NB Approach	-	(-)	-	-	(-)	-	-
Southbound (S High Street)	SBL	90	A (9.5)	0.07	5	A (9.8)	0.09	7.5
	SBTR	-	(-)	-	-	(-)	-	-
	SB Approach	-	A (0.8)	-	-	A (0.7)	-	-
Intersection 3: Pleasant Hill Road and Pear Street (Unsignalized)								
Westbound (Pleasant Hill	WBLR	-	B (10.3)	0.14	12.5	A (10.0)	0.14	12.5
	WB Approach	-	B (10.3)	-	-	A (10.0)	-	-
Northbound (Pear Street)	NBTR	-	(-)	-	-	(-)	-	-
	NB Approach	-	(-)	-	-	(-)	-	-
Southbound (Pear Street)	SBL	-	A (7.6)	0.05	5	A (7.6)	0.06	5
	SBT	-	(-)	-	-	(-)	-	-
	SB Approach	-	(-)	-	-	(-)	-	-
Intersection 4: Pleasant Hill Road and Willow Hill Drive (Unsignalized)								
Eastbound (Pleasant Hill Road)	EBL	-	N/A	-	0	N/A	-	0
	EBTR	-	(-)	-	-	(-)	-	-
	EB Approach	-	(-)	-	-	(-)	-	-
Westbound (Pleasant Hill Road)	WBL	-	A (7.6)	0.01	0	A (7.5)	0.02	2.5
	WBTR	-	(-)	-	-	(-)	-	-
	WB Approach	-	(-)	-	-	(-)	-	-
Northbound (Willow Hill Drive)	NBLTR	-	A (9.8)	0.07	5	A (9.5)	0.03	2.5
	NB Approach	-	A (9.8)	-	-	A (9.5)	-	-
Southbound (Driveway)	SBLTR	-	B (10.5)	0.00	0	N/A	-	-
	SB Approach	-	B (10.5)	-	-	N/A	-	-
Intersection 5: Pleasant Hill Road and Central Avenue (Unsignalized)								
Eastbound (Pleasant Hill Road)	EBL	-	A (7.6)	0.01	0	A (7.7)	0.01	0
	EBTR	-	(-)	-	-	(-)	-	-
	EB Approach	-	(-)	-	-	(-)	-	-
Westbound (Pleasant Hill Road)	WBL	-	N/A	-	0	N/A	-	0
	WBTR	-	(-)	-	-	(-)	-	-
	WB Approach	-	(-)	-	-	(-)	-	-
Northbound (Driveway)	NBLTR	-	N/A	-	-	A (8.8)	0.00	0
	NB Approach	-	N/A	-	-	A (8.8)	-	-
Southbound (Central Avenue)	SBLTR	-	B (10.6)	0.12	10	B (10.9)	0.10	7.5
	SB Approach	-	B (10.6)	-	-	B (10.9)	-	-

(-) = Free movement

N/A = Zero volume; no delay reported

Table 6 (continued): AM and PM Peak Hour Results

Approach	Movement	Storage Length	Existing AM			Existing PM		
			LOS+Delay	V/C Ratio	95th Percentile Queue Length	LOS+Delay	V/C Ratio	95th Percentile Queue Length
Intersection 6: Pear Street and Erickson Avenue (Unsignalized)								
Eastbound (Erickson Avenue)	EBL	50	A (9.0)	0.04	2.5	A (9.7)	0.06	5
	EBTR	-	(-)	-	-	(-)	-	-
	EB Approach	-	(-)	-	-	(-)	-	-
Westbound (Erickson Avenue)	WBL	270	B (10.6)	0.04	2.5	A (9.5)	0.03	2.5
	WBTR	-	(-)	-	-	(-)	-	-
	WB Approach	-	(-)	-	-	(-)	-	-
Northbound (Pear Street)	NBLTR	-	**F (106.7)**	0.87	142.5	**F (235.1)**	1.26	245
	NB Approach	-	**F (106.7)**	-	-	**F (235.1)**	-	-
Southbound (Pear Street)	SBLTR	-	C (17.5)	0.19	17.5	D (25.8)	0.23	22.5
	SB Approach	-	C (17.5)	-	-	D (25.8)	-	-
Intersection 7: Pear Street and Russell Drive (Unsignalized)								
Eastbound (Russell Drive)	EBLTR	-	B (10.1)	0.04	2.5	B (10.3)	0.03	2.5
	EB Approach	-	B (10.1)	-	-	B (10.3)	-	-
Northbound (Pear Street)	NBL	-	A (7.8)	0.00	0	A (7.5)	0.00	0
	NBT	-	(-)	-	-	(-)	-	-
	NB Approach	-	(-)	-	-	(-)	-	-
Southbound (Pear Street)	SBTR	-	(-)	-	-	(-)	-	-
	SB Approach	-	(-)	-	-	(-)	-	-
Intersection 8: Pear Street and Cobblers Court (Unsignalized)								
Eastbound Westbound (Driveway)	EBLTR	-	B (10.2)	0.12	10	B (10.3)	0.11	10
	WBLTR	-	A (8.5)	0.00	0	A (9.3)	0.00	0
	WB Approach	-	A (8.5)	-	-	A (9.3)	-	-
Northbound (Pear Street)	NBLTR	-	A (7.6)	0.02	2.5	A (7.5)	0.01	0
	NB Approach	-	A (2.9)	-	-	A (1.1)	-	-
Southbound (Pear Street)	SBL	-	N/A	-	0	A (8.4)	0.00	0
	SBTR	65	(-)	-	-	(-)	-	-
	SB Approach	-	(-)	-	-	(-)	-	-
Intersection 9: Pear Street and Ruby Drive (Unsignalized)								
Eastbound (Ruby Drive)	EBLTR	-	A (9.5)	0.05	2.5	A (9.5)	0.04	2.5
	EB Approach	-	A (9.5)	-	-	A (9.5)	-	-
Northbound (Pear Street)	NBLT	-	A (7.6)	0.01	0	A (7.4)	0.01	0
	NB Approach	-	A (1.7)	-	-	A (1.0)	-	-
Southbound (Pear Street)	SBTR	-	(-)	-	-	(-)	-	-
	SB Approach	-	(-)	-	-	(-)	-	-
Intersection 10: Pear Street and W Mosby Road (Unsignalized)								
Eastbound (W Mosby Road)	EBLT	-	A (7.8)	0.02	2.5	A (7.9)	0.01	0
	EB Approach	-	A (0.7)	-	-	A (0.5)	-	-
Westbound (W Mosby Road)	WBTR	-	(-)	-	-	(-)	-	-
	WB Approach	-	(-)	-	-	(-)	-	-
Southbound (Pear Street)	SBLR	-	B (11.9)	0.19	17.5	B (13.7)	0.16	15
	SB Approach	-	B (11.9)	-	-	B (13.7)	-	-
Intersection 11: W Mosby Road and Mosby Court (Unsignalized)								
Eastbound (W Mosby Road)	EBTR	-	(-)	-	-	(-)	-	-
	EB Approach	-	(-)	-	-	(-)	-	-
Westbound (W Mosby Road)	WBL	170	A (8.2)	0.01	0	A (8.1)	0.04	2.5
	WBT	-	(-)	-	-	(-)	-	-
	WB Approach	-	A (0.4)	-	-	A (0.9)	-	-
Northbound (Mosby Court)	NBLR	-	B (10.6)	0.04	2.5	B (13.0)	0.09	7.5
	NB Approach	-	B (10.6)	-	-	B (13.0)	-	-

(-) = Free movement

N/A = Zero volume; no delay reported

Table 6 (continued): AM and PM Peak Hour Results

Approach	Movement	Storage Length	Existing AM			Existing PM		
			LOS+Delay	V/C Ratio	95th Percentile Queue Length	LOS+Delay	V/C Ratio	95th Percentile Queue Length
Intersection 12: S Main Street and W Mosby Road (Signalized)								
Overall Intersection		-	C (22.6)	0.72	-	C (31.4)	0.77	-
Eastbound (W Mosby Road)	EBL	160	E (74.5)	0.87	#298	F (88.8)	0.95	#378
	EBTR	-	D (42.9)	0.10	52	D (39.4)	0.08	51
	EB Approach	-	E (63.5)	-	-	E (77.9)	-	-
Westbound (W Mosby Road)	WBLTR	-	D (42.1)	0.02	0	E (67.2)	0.50	99
	WB Approach	-	D (42.1)	-	-	E (67.2)	-	-
Northbound (S Main Street)	NBL	150	B (14.3)	0.44	49	B (17.7)	0.39	62
	NBTR	-	B (15.7)	0.43	251	C (22.8)	0.61	482
	NB Approach	-	B (15.6)	-	-	C (22.4)	-	-
Southbound (S Main Street)	SBL	190	A (9.8)	0.10	m11	C (26.2)	0.07	m7
	SBTR	-	B (15.5)	0.66	306	C (21.7)	0.66	m411
	SB Approach	-	B (15.3)	-	-	C (21.7)	-	-
Intersection 13: S Main Street and Erickson Avenue/Stone Spring Road (Signalized)								
Overall Intersection		-	D (35.5)	0.68	-	D (42.4)	0.86	-
Eastbound (Erickson Avenue)	EBL	350	C (29.4)	0.13	50	C (32.2)	0.24	77
	EBT	-	E (63.4)	0.81	237	E (68.2)	0.82	265
	EBR	300	D (41.5)	0.41	79	D (37.2)	0.14	31
	EB Approach	-	D (52.7)	-	-	E (56.1)	-	-
Westbound (Stone Spring Road)	WBL	500	D (53.5)	0.81	#338	E (72.8)	0.92	#501
	WBTR	-	D (35.1)	0.34	173	D (39.8)	0.41	225
	WBR	200	C (25.2)	0.13	34	C (23.5)	0.16	48
	WB Approach	-	D (39.6)	-	-	D (49.1)	-	-
Northbound (S Main Street)	NBL	190	C (21.2)	0.52	m79	D (37.4)	0.73	m190
	NBT	-	C (26.6)	0.48	158	D (44.0)	0.75	m306
	NBR	330	B (10.7)	0.19	m30	C (24.8)	0.50	m214
	NB Approach	-	C (20.7)	-	-	D (36.2)	-	-
Southbound (S Main Street)	SBL	190	C (24.3)	0.36	63	D (37.5)	0.73	240
	SBTR	-	C (33.5)	0.53	262	C (33.3)	0.61	334
	SBR	160	C (29.8)	0.03	0	C (32.8)	0.04	18
	SB Approach	-	C (31.5)	-	-	C (34.5)	-	-
Intersection 14: S Main Street and Pleasant Hill Road (Signalized)								
Overall Intersection		-	B (14.7)	0.32	-	B (15.0)	0.42	-
Eastbound (Pleasant Hill Road)	EBLT	-	E (59.8)	0.50	105	E (66.2)	0.56	m130
	EBR	220	D (48.7)	0.09	8	E (59.1)	0.06	m0
	EB Approach	-	D (52.3)	-	-	E (62.5)	-	-
Westbound (Pleasant Hill Road)	WBLT	-	F (85.0)	0.47	22	E (75.6)	0.45	41
	WBR	-	N/A	-	-	E (66.7)	-	-
	WB Approach	-	F (85.0)	-	-	E (75.1)	-	-
Northbound (S Main Street)	NBL	190	A (3.5)	0.09	14	A (5.6)	0.25	m22
	NBTR	-	A (3.5)	0.28	67	A (1.9)	0.33	63
	NB Approach	-	A (3.5)	-	-	A (2.4)	-	-
Southbound (S Main Street)	SBL	140	A (6.6)	0.00	4	N/A	0.00	0
	SBTR	-	B (12.7)	0.27	164	B (18.3)	0.42	310
	SB Approach	-	B (12.7)	-	-	B (18.3)	-	-

# = 95th percentile volume exceeds capacity, queue may be longer
m = Volume for 95th percentile queue is metered by upstream signal
(-) = Free movement
N/A = Zero volume; no delay reported

Existing Conditions Analysis Results

The unsignalized intersection of Pear Street and Erickson Avenue experienced significant delay for the northbound and southbound approaches (the stop-controlled approaches). The northbound approach delay was 106.7 seconds (LOS F) and 235.1 seconds (LOS F) in the AM and PM peak hours, respectively. The southbound approach delay was 17.5 seconds (LOS C) and 25.8 seconds (LOS D) in the AM and PM peak hours, respectively. These delays are due to the limited gaps in both eastbound and westbound traffic on Erickson Avenue in order to cross or turn left. Additionally, the close proximity to the intersection of Erickson Avenue and S High Street to the west contributes to difficulty in finding a gap. Lastly, the Pear Street approaches are one shared lane, meaning that a vehicle waiting for a gap to turn left impedes all vehicles behind. The volume-to-capacity ratio for the northbound approach is 0.87 in the AM peak hour and 1.26 in the PM peak hour, indicating the volume significantly exceeds capacity in the PM peak hour for that approach.

The nine other unsignalized intersections did not experience significant delay. The highest delay in the AM peak hour for any side street approach at these nine unsignalized intersections was 13.1 seconds for the westbound approach at the intersection of Pear Street and S High Street. Likewise, the highest delay in the PM peak hour for any side street approach was 27.0 seconds for the eastbound approach at the intersection of Pear Street and S High Street. These delays are primarily attributed to the need for a gap in both directions of opposing traffic to cross or turn left at these intersections.

At the signalized intersection of S High Street and Erickson Avenue, overall intersection delay was 33.8 seconds (LOS C) during the AM peak hour and 36.3 seconds (LOS D) during the PM peak hour. The longest delay was 43.7 seconds (LOS D) in the AM peak hour for the eastbound through movement, and 50.3 seconds (LOS D) in the PM peak hour for the westbound through movement. Additionally, the 95th percentile queues exceed capacity in the PM peak hour for the southbound and westbound left-turn movements. Overall, the intersection operates similarly for all approaches, with all but one movement operating at a LOS C or worse in both the AM and PM peak hours.

At the signalized intersection of S Main Street and W Mosby Road, overall intersection delay was 22.6 seconds (LOS C) during the AM peak hour and 31.4 seconds (LOS C) during the PM peak hour. The longest delay was experienced at the eastbound left-turn movement, with 74.5 seconds (LOS E) in the AM peak hour and 88.8 seconds (LOS F) in the PM peak hour. Additionally, the 95th percentile queues exceed capacity in both the AM and PM peak hours for the eastbound left-turn movement. The eastbound left-turn lane becomes a two-way left-turn lane upstream of the intersection, so the queuing would not impede through traffic, but it would impede vehicles attempting to turn left from one of the many access points on this approach. The poor level of service on the eastbound and westbound approaches can be attributed to the prioritization of the northbound and southbound approaches on S Main Street.

At the signalized intersection of S Main Street and Erickson Avenue, overall intersection delay was 35.5 seconds (LOS D) during the AM peak hour, and 42.4 seconds (LOS D) during the PM peak hour. The intersection volume-to-capacity ratio of 0.86 in the PM peak hour is significant. The longest delays were 63.4 seconds (LOS E) in the AM peak hour for the eastbound through movement, and 72.8 seconds (LOS E) in the PM peak hour for the westbound left-turn movement. In the PM peak hour, the westbound left-turn movement volume-to-capacity ratio in 0.92, indicating it is almost at

capacity. Additionally, the 95th percentile queues exceed capacity in the PM peak hour for the westbound, northbound, and southbound left-turn movements. While the intersection has protected-permissive left turns, due to the high volume, there are insufficient gaps for left-turning vehicles to utilize the permissive left-turn phase.

At the signalized intersection of S Main Street and Pleasant Hill Road, overall intersection delay was 14.7 seconds (LOS B) during the AM peak hour and 15.0 seconds (LOS B) during the PM peak hour. The longest delay was experienced at the westbound left-through movement, with 85.0 seconds (LOS F) in the AM peak hour and 75.6 seconds (LOS E) in the PM peak hour. However, this movement experienced very low volume, so a longer delay is less significant. The northbound and southbound approaches of S Main Street operate well, at LOS B or better.

Full Synchro HCM reports, documenting the detailed MOEs for AM and PM peak hour existing conditions for all intersections, can be found in **Appendix C**.

Conclusion

This report examined existing conditions throughout the study area through a variety of criteria, including traffic operations, safety, multimodal facilities, transit facilities and ridership, and access management. The following findings can be concluded from these various assessments:

Traffic Operations

- The measured 85th percentile speed is within 7 MPH of the posted speed limit for all but one study area roadway, Pleasant Hill Road. The 85th percentile speed was 36 MPH, 11 MPH over the posted speed limit of 25 MPH.
- The network AM peak hour is 7:30 to 8:30 AM, and the PM network peak hour is 4:30 PM to 5:30 PM.
- The unsignalized intersection of Pear Street and Erickson Avenue experienced significant delay on the stop-controlled approaches, and exceeded capacity on the northbound approach during the PM peak. The funded RCUT project will address safety and operations at this intersection.
- The unsignalized intersection of S High Street and Pear Street experienced LOS C and LOS D on the stop-controlled approaches during the PM peak hour.
- The eight other unsignalized intersections operated fairly well, with general approach delays of LOS B or better.
- The Synchro traffic analysis matched field observations at Stone Spring Road and S Main Street with significant queuing and a high volume-to-capacity ratio for the westbound left-turn movement. The 95th percentile queues at the westbound, northbound, and southbound left-turn movements all exceeded storage during the PM peak hour. Average daily traffic was higher on S Main Street south of W Mosby Road than north of W Mosby Road, highlighting the significant turning movement volume at this location.
- The intersection of S High and Erickson operated similarly for all approaches, with all but one movement operating at a LOS C or worse in both the AM and PM peak hours.
- The intersection of S Main Street and W Mosby Road operated well during both peak hours, at a LOS C. The W Mosby Road approaches experienced significant delay. Likewise, the intersection of S Main Street and Pleasant Hill Road operated at a LOS B during both peak hours. The Pleasant Hill Road approaches experienced significant delay but also had very low volumes.

Transit

- Public bus transit exists within the study area but does not have significant ridership. Average daily weekday ridership on Routes 3 and 4 are 11.6 and 13 riders, respectively.

Safety

- The most prevalent type of crashes at both intersections and along corridor segments were angle crashes and rear ends. This reflects issues with access management and a failure to yield right-of-way, as well as potential sight distance and roadway curvature issues.

Multimodal Facilities

- The Bicycle Level of Comfort assessment found that many of the study area corridors are fairly uncomfortable for bicyclists. Bike lanes are present on Erickson Avenue, S High Street, and S Main Street. There is no network of comfortable roadways for bicyclists (LTS 1 or 2) in the study area.
- Sidewalks are present in the study area, but do not have high connectivity. They are frequently found on only one side of the street. Most intersections have crosswalks on only three legs.
- Pedestrians and bicycles were counted in the study area. Both were higher in volume during the PM peak period than the AM peak.

Access Management

- Access management is poor in the study area, with most commercial accesses not in compliance with VDOT minimum spacing requirements. The funded S Main Street median project will address access management along S Main Street between W Mosby Road and Stone Spring Road.

Infrastructure Geometry

- Field observations noted horizontal and vertical curvature challenges on Pear Street, Erickson Avenue, Pleasant Hill Road, and W Mosby Road.
- The most common potential intersection sight distance issues are vertical curvature of the roadway and queued vehicles.

APPENDIX A

Crash Analysis

Crash Analysis – Erickson Avenue Area Study

Crash Severity

Table 1 summarizes crash severity by intersection along the study area over the last five years of crash data analyzed, from September 1, 2019 through August 31, 2024. Crashes that occurred within 250 feet of the center of an intersection were identified as having occurred within the intersection. All other crashes were identified as corridor crashes. One crash is within the 250-foot intersection radius for the intersection of Pear Street and Pleasant Hill Road but is actually on S High Street; this crash was counted as a corridor crash along S High Street, not as within the intersection.

Table 1: Summary of Crash Severity by Intersection

Intersection	Property Damage Only	Injury	Fatal Injury	Total Crashes
S High Street & Erickson Avenue	32	13	0	**45**
S High Street & Pear Street	4	2	0	**6**
Pleasant Hill Road & Pear Street	2	0	0	**2**
Pleasant Hill Road & Willow Hill Drive	2	0	0	**2**
Pleasant Hill Road & Central Avenue	1	0	0	**1**
Pear Street & Erickson Avenue	20	7	0	**27**
Pear Street & Russell Drive	0	0	0	**0**
Pear Street & Cobblers Court	0	0	0	**0**
Pear Street & Ruby Drive	1	1	0	**2**
Pear Street & W Mosby Road	2	1	0	**3**
W Mosby Road & Mosby Court	1	1	0	**2**
S Main Street & W Mosby Road	22	11	0	**33**
S Main Street & Erickson Avenue/Stone Spring Road	44	18	1	**63**
S Main Street & Pleasant Hill Road	13	6	0	**19**
Totals	**144**	**60**	**1**	**205**

The most intersection crashes occurred at the intersection of S Main Street and Erickson Avenue/Stone Spring Road, with 63 crashes. The majority of these crashes resulted in property damage only (44 crashes). There were 45 crashes at the intersection of S High Street and Erickson

Avenue, the second highest number of crashes, with most of these resulting in property damage only (32 crashes). There were 33 crashes at the intersection of S Main Street and W Mosby Road, 27 crashes at the intersection of Pear Street and Erickson Avenue, and 19 crashes at S Main Street and Pleasant Hill Road. The majority of crashes at each of these intersections also resulted in property damage only. The remaining study intersections each recorded six or fewer crashes.

One crash resulting in a fatality was reported during the study period, occurring at 6:33 AM at the intersection of S Main Street and Erickson Avenue/Stone Spring Road. Virginia Crash Map data identified one of the drivers as failing to maintain proper control due to falling asleep, resulting in the head-on crash.

A summary of crash severity along corridor segments within the study area over the same five-year period is provided in **Table 2.** Corridor crashes were identified as those occurring along a corridor excluding crashes occurring with 250 feet from the center of an intersection. **Attachment 1** provides maps of the study area showing all reported crashes during the five-year study period.

The highest number of corridor crashes occurred along S Main Street between W Mosby Road and Erickson Avenue, with 26 crashes reported. Most of these resulted in property damage only (23 crashes). Note that this segment of S Main Street has been identified for the construction of a raised median, which is intended to manage access to the many driveways through this stretch of roadway and will contribute to the reduction of crashes involving vehicle maneuvers to and from these access points. The segment of Erickson Avenue between Pear Street and S Main Street had 11 reported crashes, with a majority resulting in injury. The segment of S Main Street between Erickson Avenue and Pleasant Hill Road had 11 reported crashes, with the majority of crashes along this corridor segment resulting in property damage only. The remaining corridor segments within the study area recorded six or fewer crashes during the study period. Intersections and corridor segments with a significant number of crashes are discussed further in the following sections.

The AM, PM, and Off peak hours are referenced in the following sections. The network AM peak hour is 7:30 to 8:30 AM, and the PM network peak hour is 4:30 PM to 5:30 PM. Off peak refers to all other times of day.

Table 2: Summary of Crashes by Corridor Segment

Corridor Segment	Property Damage Only	Injury	Fatal Injury	Total Crashes
Erickson Avenue between Pear Street and S Main Street	5	6	0	**11**
Pleasant Hill Road between Willow Hill Drive and Central Avenue	1	0	0	**1**
S High Street between Erickson Avenue and Pear Street	4	0	0	**4**
S Main Street between W Mosby Road and Erickson Avenue	23	3	0	**26**
S Main Street between Erickson Avenue and Pleasant Hill Road	8	3	0	**11**
S Pear Street between Pleasant Hill Road and Erickson Avenue	1	0	0	**1**
S Pear Street between Cobblers Court and Ruby Drive	1	0	0	**1**
W Mosby Road between Pear Street and Mosby Court	3	0	0	**3**
W Mosby Road at Dukes Plaza Eastern Driveway	4	1	0	**5**
W Mosby Road at Dukes Plaza Western Driveway	6	0	0	**6**
Totals	**56**	**13**	**0**	**69**

INTERSECTION ANALYSIS

S Main Street and Erickson Avenue/Stone Spring Road

The intersection of S Main Street and Erickson Avenue/Stone Spring Road recorded the most crashes within the study area with 63 crashes, one of which resulted in the single fatality recorded within the study area over the five-year period. The fatality was the result of a head-on crash occuring on May 23, 2023, at 6:33 AM. Virginia Crash Map data identified one of the drivers as failing to maintain proper control due to falling asleep. Weather and lighting conditions do not appear to have been a factor in the crash and alcohol was not involved. The characteristics of this crash do not appear to be representative of a larger crash pattern at the intersection.

Figure 1 summarizes the crash types at this study intersection. There were 23 rear-end crashes, 22 angle crashes, and five each of sideswipe-same-direction and head-on crashes. Three crashes involved deer. Other crash types were reported two or less times. Many of the rear end crashes occurred on the westbound approach of Stone Spring Road where there is vertical curvature in the road due to the bridge over the railroad.

Most crashes occurred under daylight conditions and during off-peak hours, as summarized in **Figure 2** and **Figure 3**, which suggests that traffic congestion was not a factor in the crash frequency.

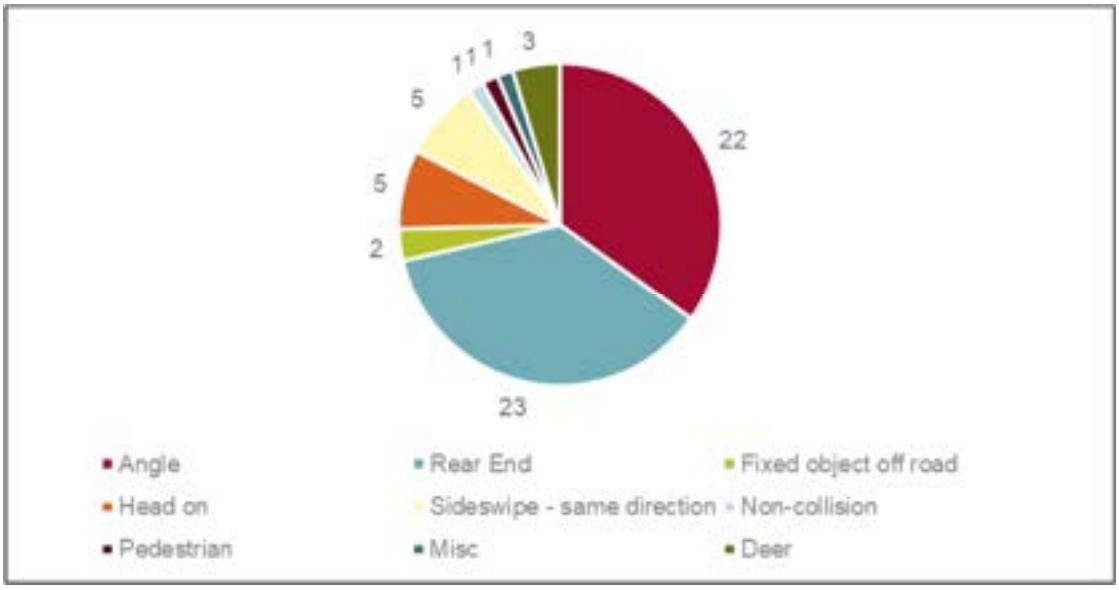


Figure 1: Crash Type at S Main Street and Erickson Avenue/Stone Spring Road

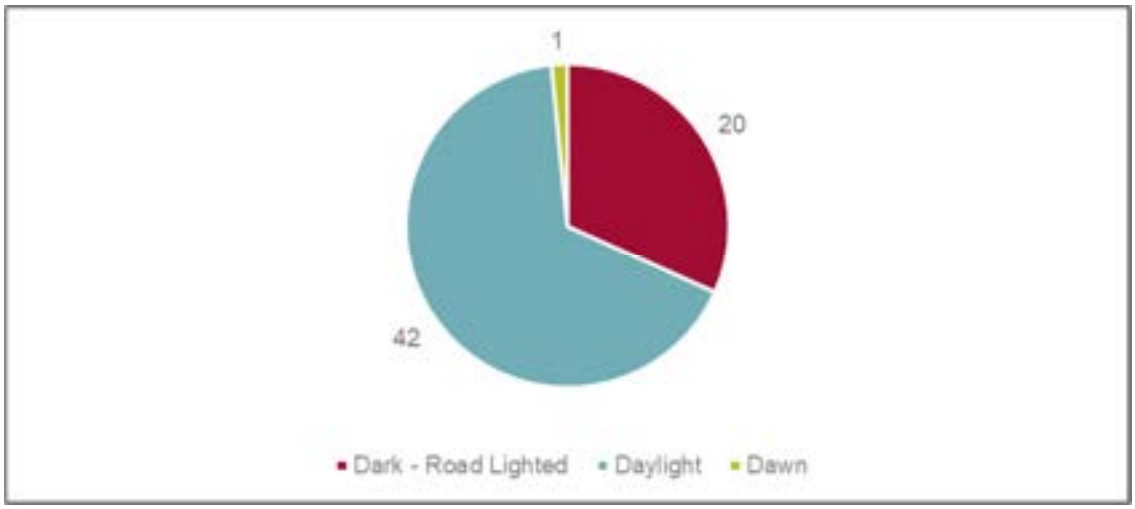


Figure 2: Light Conditions at S Main Street and Erickson Avenue/Stone Spring Road

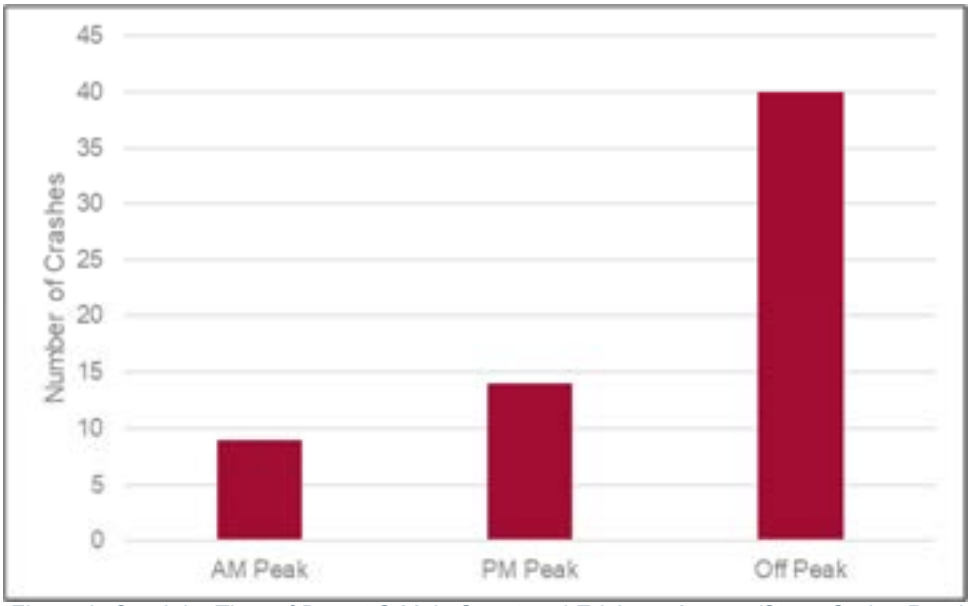


Figure 3: Crash by Time of Day at S Main Street and Erickson Avenue/Stone Spring Road

S High Street and Erickson Avenue

There were a total of 45 reported crashes at the intersection of S High Street and Erickson Avenue. **Figure 4** summarizes the crash types at this study intersection. Most of the crashes reported at this intersection were angle and rear-end crashes, which totaled 16 and 14 crashes, respectively. There were six sideswipe-same-direction crashes and three or less head-on, sideswipe-opposite-direction, fixed object off road, and fixed object in road crashes. Most crashes occurred in daylight conditions, as summarized in **Figure 5**. An evaluation of crashes by time of day shows crashes mostly occurred during PM peak and off-peak hours, as summarized in **Figure 6**.

The prevelance of angle crashes occuring in daylight conditions suggests the crash pattern may be attributed to constants at the intersection, such as geometry, topography, or operations. The crash records reviewed do not provide information regarding direction of travel for the vehicles involved. A review of existing conditions indicates the following could be contributing factors to the frequency of angle crashes at the intersection:

- Each left-turn lane offers a yield-on-flashing-yellow-arrow phase, which may be misjudged by drivers attempting to make that movement opposing oncoing traffic. Crash data identified drivers involved in multiple angle crashes as not having the right-of-way.
- The west leg approaches the intersection uphill, creating a vertical curve, which may limit intersection sight distance for westbound left-turning drivers.
- Access points on the south side of the west leg may contribute to angle crashes, as drivers attempt to make a left turn into one of these access points without an adequate gap.

The rear end crashes all occurred during daylight conditions, and multiple involved a driver following too closely.

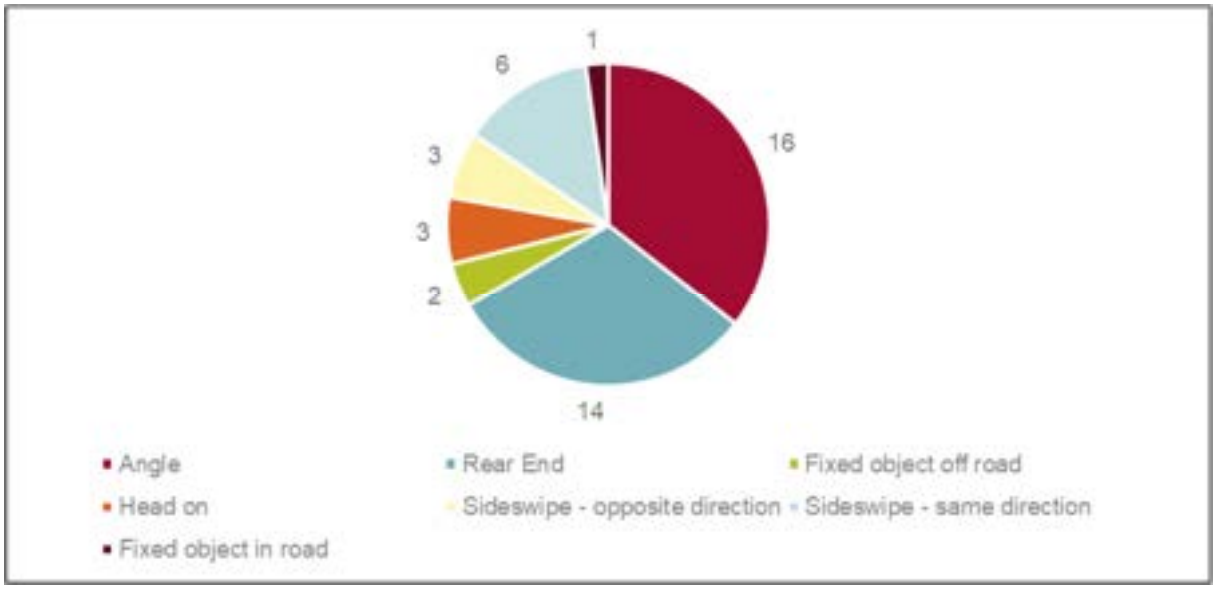


Figure 4: Crash Type at S High Street and Erickson Avenue

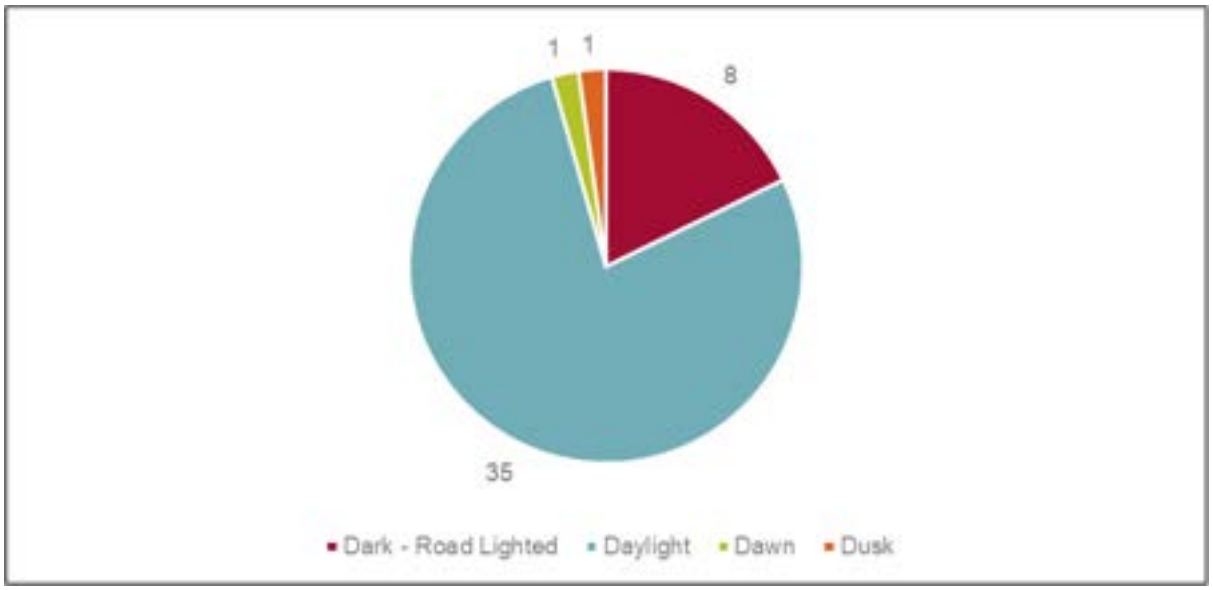


Figure 5: Light Conditions at S High Street and Erickson Avenue

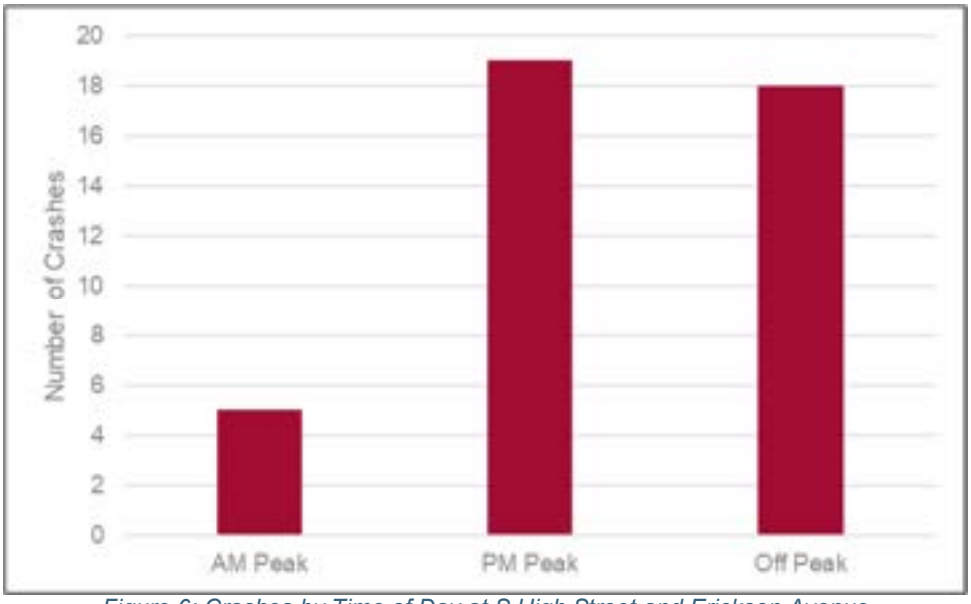


Figure 6: Crashes by Time of Day at S High Street and Erickson Avenue

S Main Street and Mosby Road

There were a total of 33 reported crashes at the intersection of S Main Street and Mosby Road. **Figure 7** summarizes the crash types at this study intersection. There were 12 angle crashes, 11 rear-end crashes, four sideswipe-same-direction crashes, and two or less of head-on, fixed object off road, sideswipe-opposite-direction, backed-into, and pedestrian crashes. Nearly all crashes occurred in daylight conditions, as shown in **Figure 8**. Most crashes occurred during off-peak hours, as shown in **Figure 9**. The occurance of primarily off-peak period and daylight crashes may be attributed to the increase in volume associated with midday commercial retail and restaurant activity rather than morning and evening commuters. Unlike commuters who likely travel the corridor on a daily basis, midday traffic is more likely to consist of drivers less familiar with the area, which could make drivers more prone to being involved in a crash.

The prevelance of angle crashes occuring in daylight conditions suggests the crash pattern may be attributed to constants at the intersection, such as geometry, topography, or operations. The crash records reviewed do not provide information regarding direction of travel for the vehicles involved. A review of existing conditions indicates the following could be contributing factors to the frequency of angle crashes at the intersection:

- The northbound and southbound approaches along S Main Street do not have a sign directing left-turning drivers to yield to opposing traffic. Multiple angle crashes were noted to have involved a driver disregarding the traffic signal.
- The single lane westbound approach of Mosby Road does not allow for a protected left-turn phase.

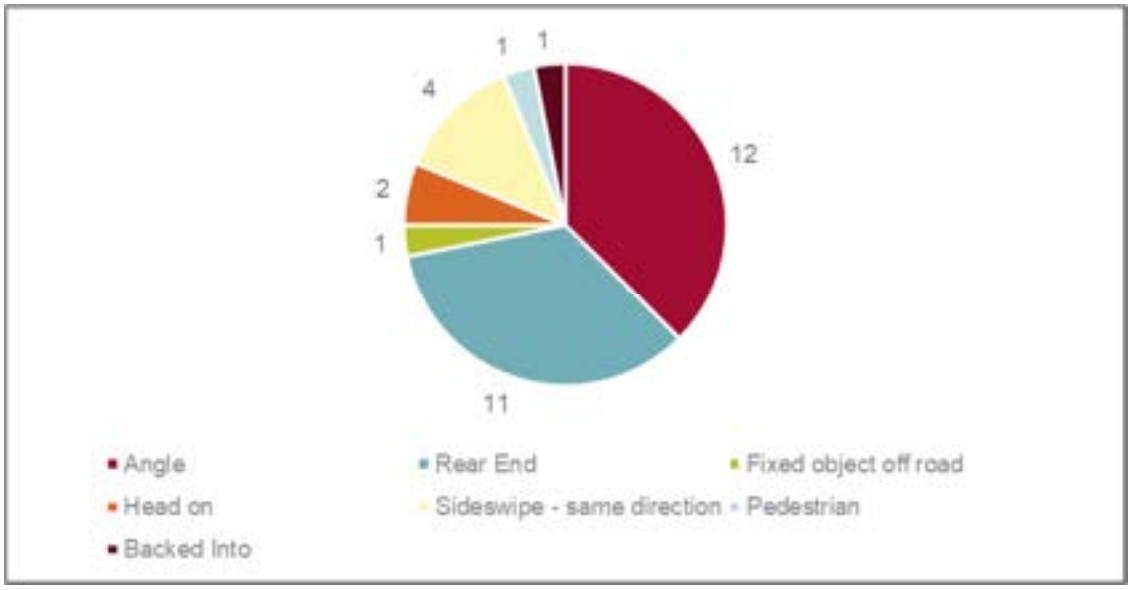


Figure 7: Crash Type at S Main Street and Mosby Road

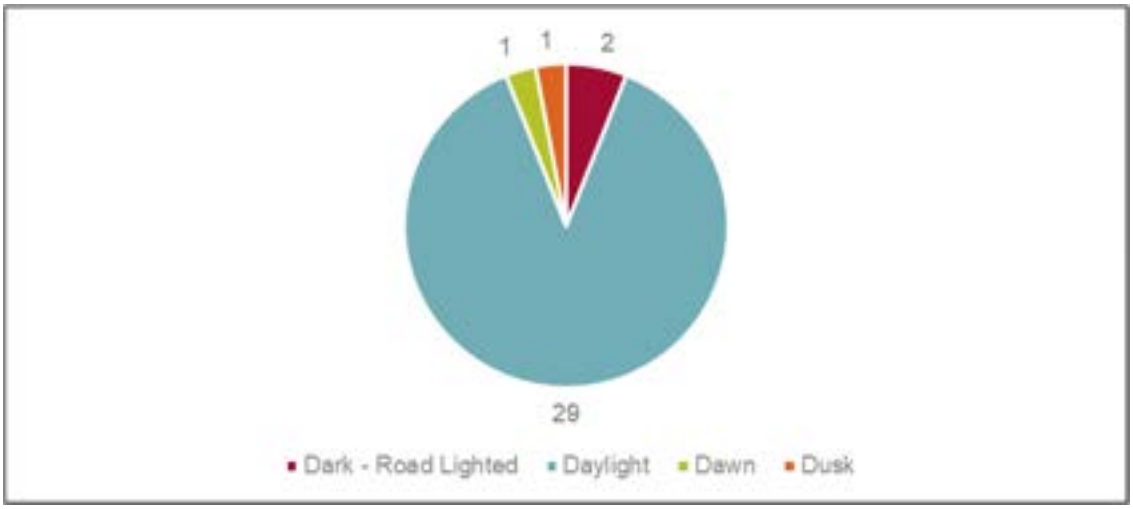


Figure 8: Light Condition at S Main Street and Mosby Road

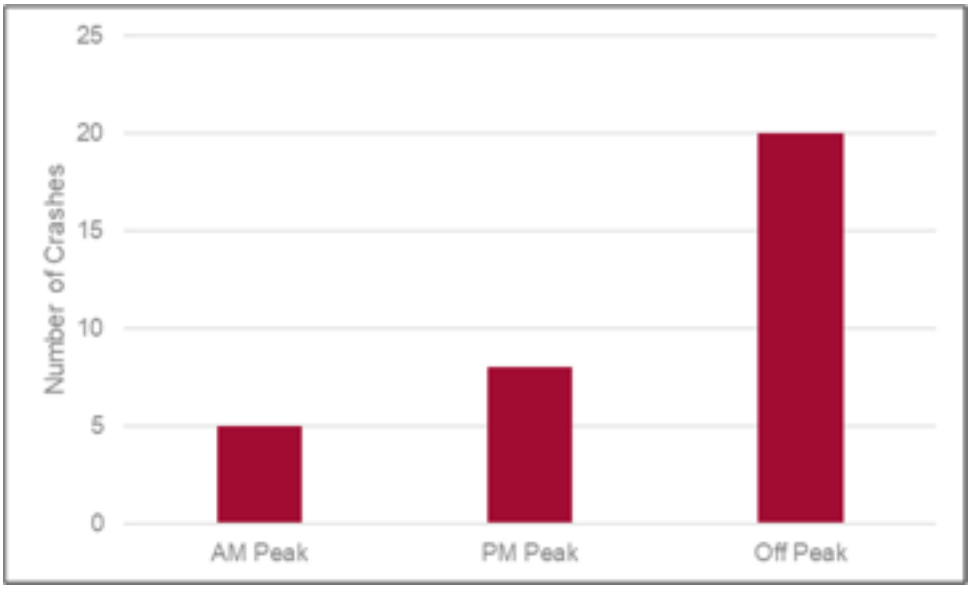


Figure 9: Crash by Time of Day at S Main Street and Mosby Road

Pear Street and Erickson Avenue

There were a total of 27 reported crashes at the intersection of Pear Street and Erickson Avenue. **Figure 10** summarizes the crash types at this study intersection. There were 21 angle crashes, 5 rear-end crashes, and a single sideswipe-same-direction crash. Most crashes occurred in daylight conditions, as shown in **Figure 11**. Most crashes occurred during the PM peak or off-peak hours, as shown in **Figure 12**.

The intersection is unsignalized, with stop control at the Pear Street approaches. A review of Viriginia Crash Map data shows multiple angle crashes at this location involve a driver not having the right-of-way or disregarding the stop sign. All crashes occurred along Erickson Avenue, not on Pear Street.

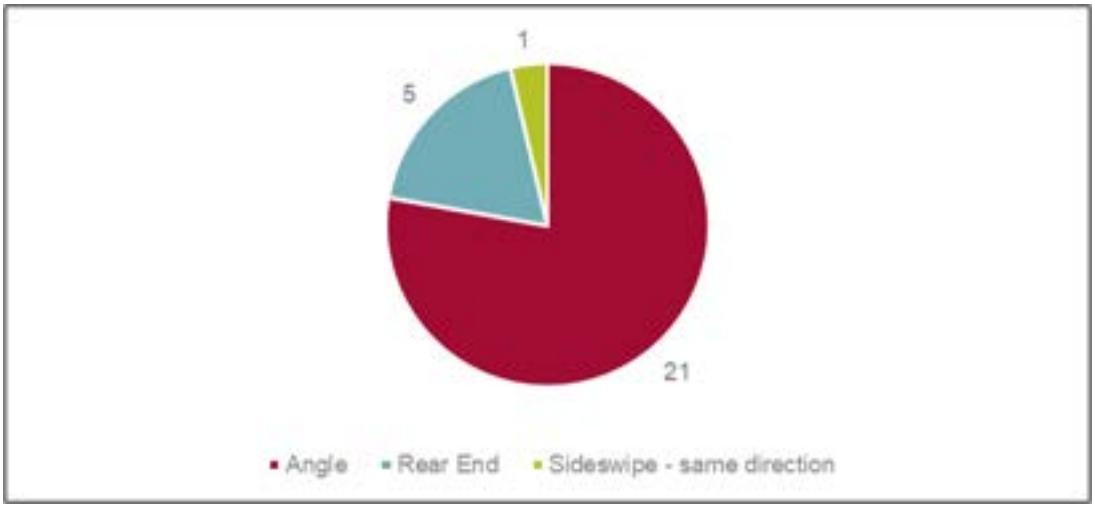


Figure 10: Crash Type at Pear Street and Erickson Avenue

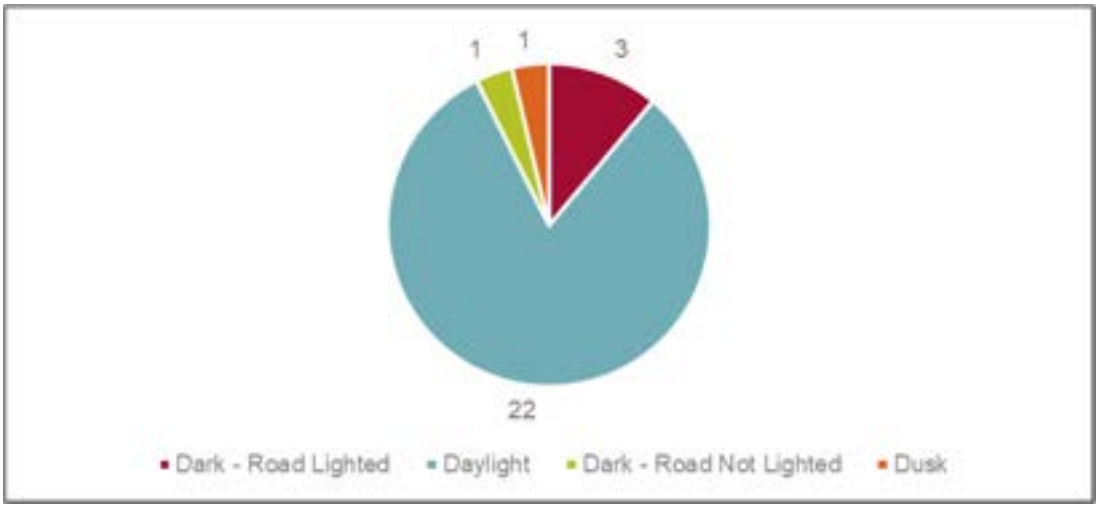


Figure 11: Light Conditions at Pear Street and Erickson Avenue

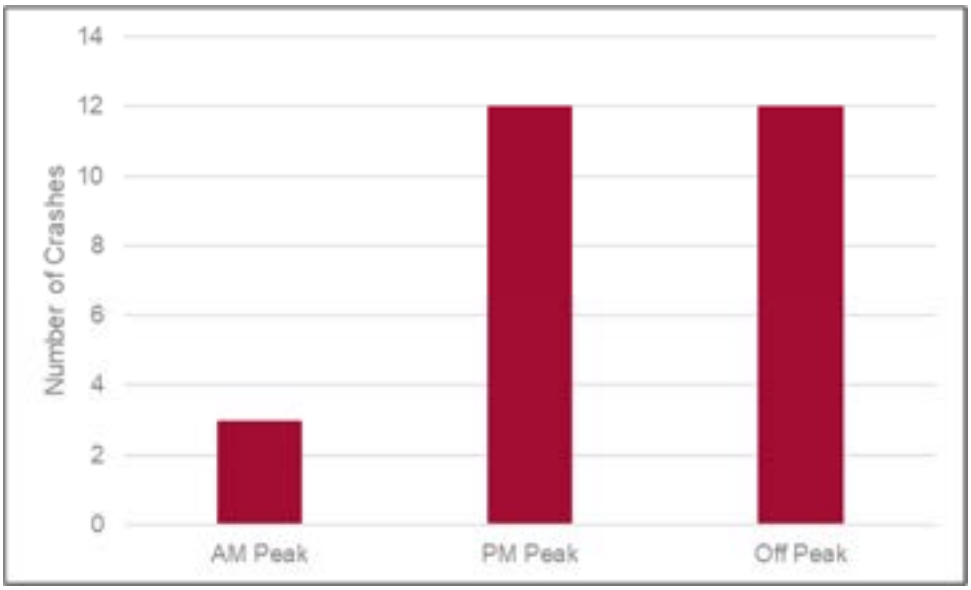


Figure 12: Crash by Time of Day at Pear Street and Erickson Avenue

S Main Street and Pleasant Hill Road

There were a total of 19 reported crashes at the intersection of S Main Street and Pleasant Hill Road. **Figure 13** summarizes the crash types at this study intersection. There were 10 angle crashes, three sideswipe-same-direction crashes, two each of rear-end crashes, fixed object off road crashes, and a single head-on crash. Most crashes occurred in daylight conditions, as shown in **Figure 14**. Most crashes occurred during the off-peak hours, as shown in **Figure 15**.

The number of angle crashes at this intersection may be attributed to the lack of signs at each approach directing left-turning drivers to yield to opposing traffic. As well, there is a vertical curve on the southbound approach that limits sight distance. Several of the angle crashes occurred on the westbound approach and could be attributed to non-compliance with access management guidelines.

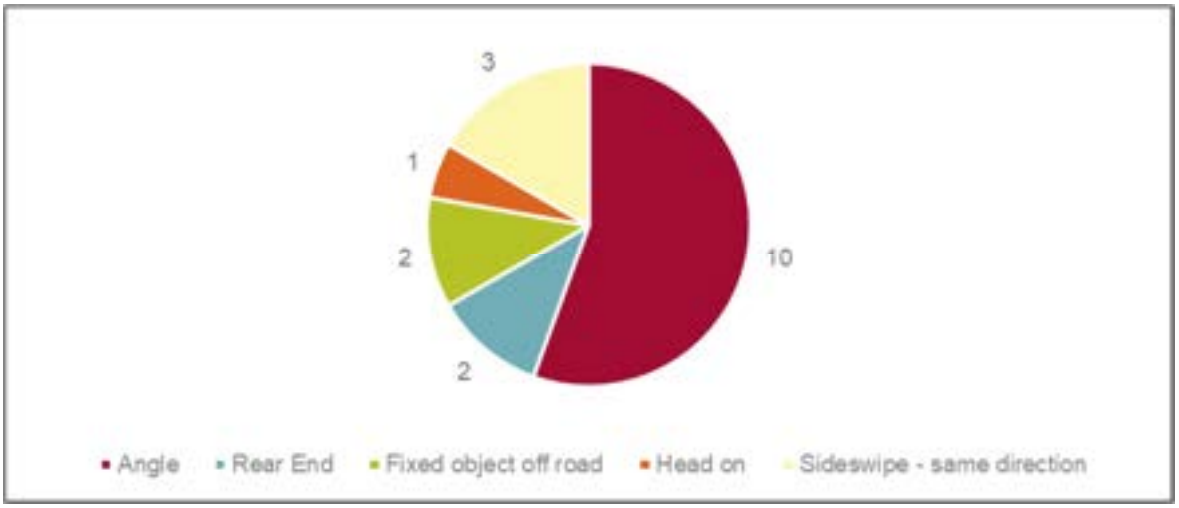


Figure 13: Crash Type at S Main Street and Pleasant Hill Road

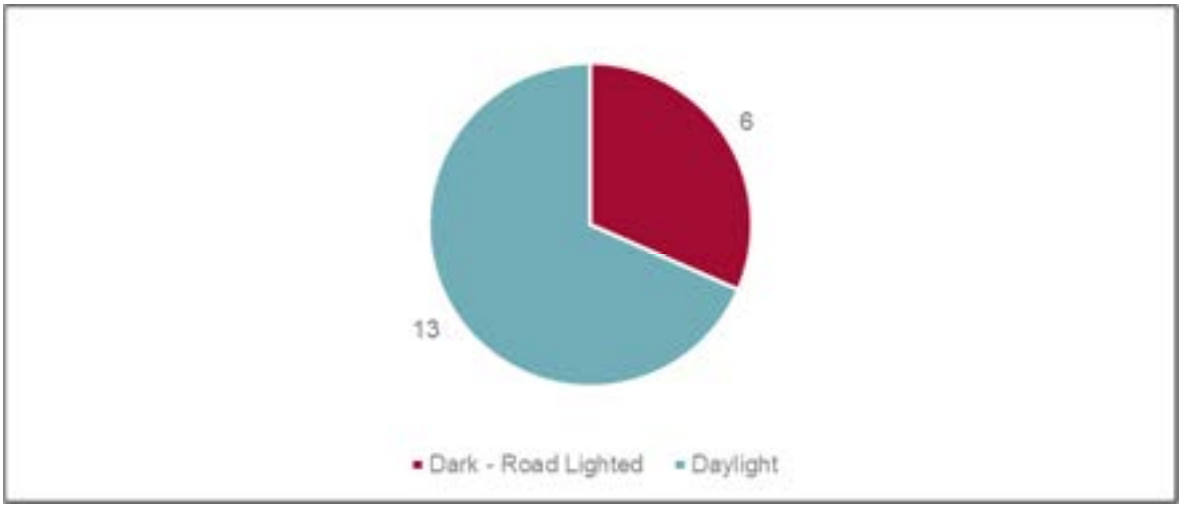


Figure 14: Light Condition at S Main Street and Pleasant Hill Road

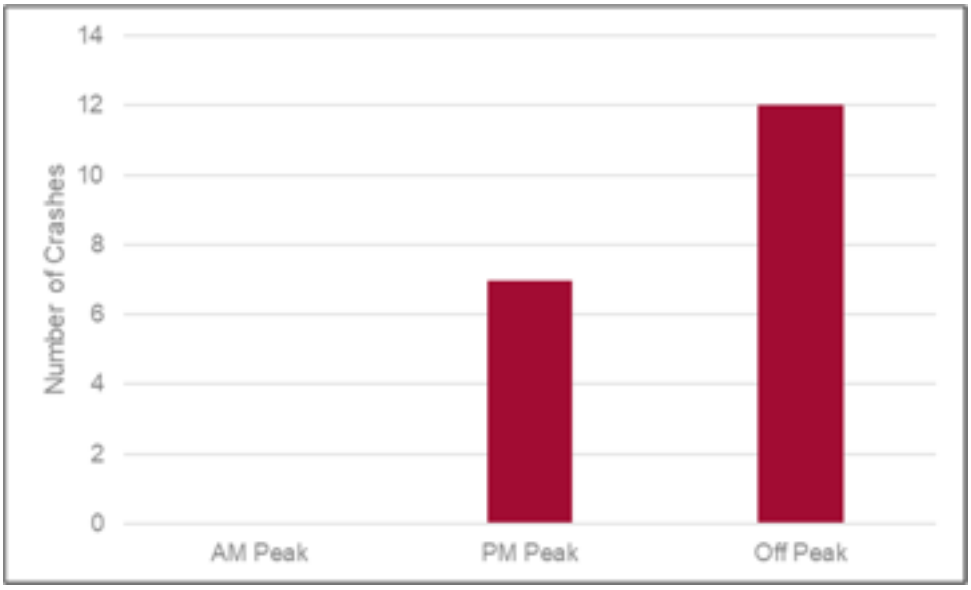


Figure 15: Crash by Time of Day at S Main Street and Pleasant Hill Road

CORRIDOR ANALYSIS

S Main Street between W Mosby Road and Erickson Avenue

The segment of S Main Street between W Mosby Road and Erickson Avenue recorded the most crashes of any corridor segment within the study area with 26 crashes during the five-year study period. **Figure 16** summarizes the crash types at this study intersection. There were 10 angle crashes, three sideswipe-same-direction crashes, and two each of rear-end crashes, fixed object off road crashes, and a single head-on crash. All the crashes occurred in daylight conditions. Most crashes occurred during the PM and off-peak hours, as shown in **Figure 17**.

Adverse conditions do not appear to have contributed to the crash history along this segment. The prevalence of rear-end and angle crashes may be contributed by the number of closely spaced commercial driveways along southbound S Main Street that vehicles may be entering and exiting during the PM peak and off-peak hours. As noted, this segment is slated for access management improvements with the construction of a raised median along S Main Street. Multiple angle crashes were cited as involving a driver that was attempting to make a movement without having the right-of-way.

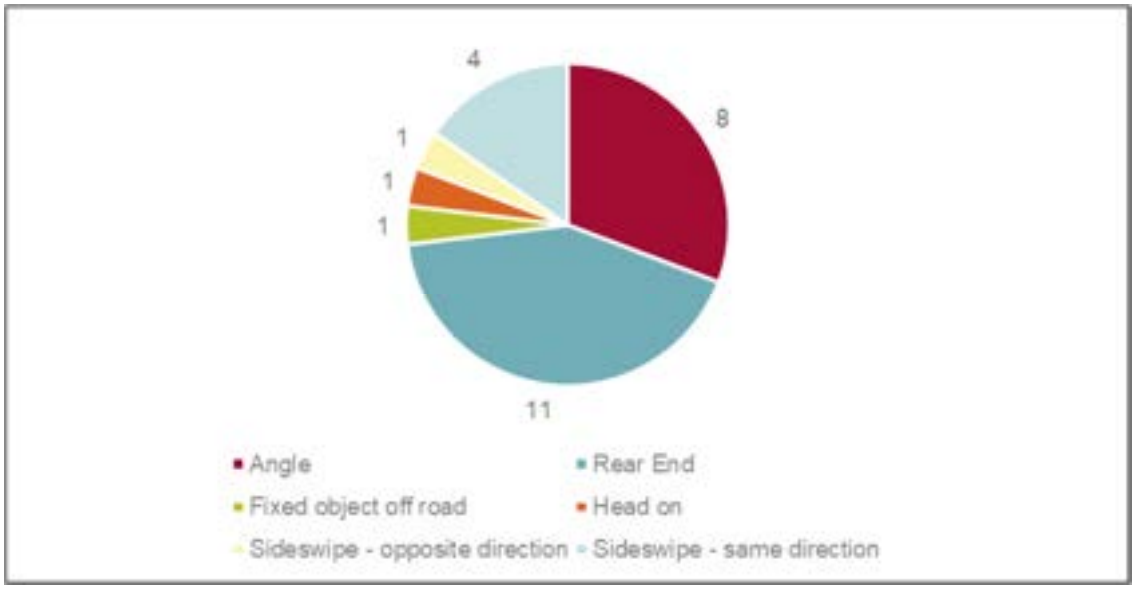


Figure 16: Crash Type S Main Street between W Mosby Road and Erickson Avenue

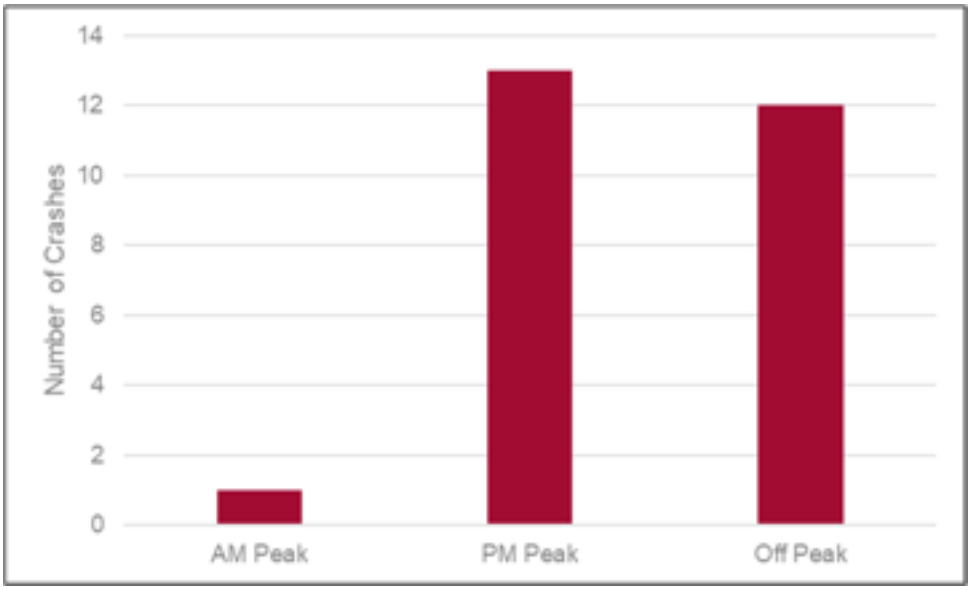


Figure 17: Crash by Time of Day at S High Street and Erickson Avenue

Erickson Avenue between Pear Street and S Main Street

The segment of Erickson Avenue between Pear Street and S Main Street recorded 11 crashes during the five-year study period. **Figure 18** summarizes the crash types at this study intersection. Most crashes occurred in daylight conditions, as shown in **Figure 19.** Most crashes occurred during the off-peak hours, as shown in **Figure 20**.

Crashes along this segment did not occur during adverse weather or lighting conditions. Four of the crashes occurred at the first horizontal curve north of S Main Street, although there does not appear to be a common, discernible pattern.

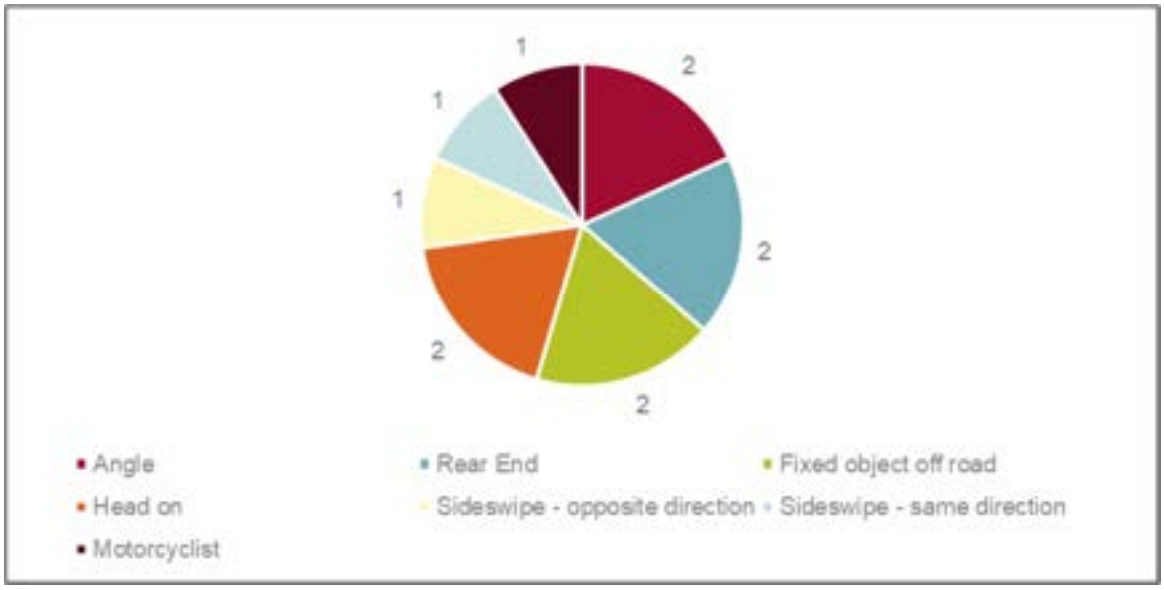


Figure 18: Crash Type at Erickson Avenue between Pear Street and S Main Street

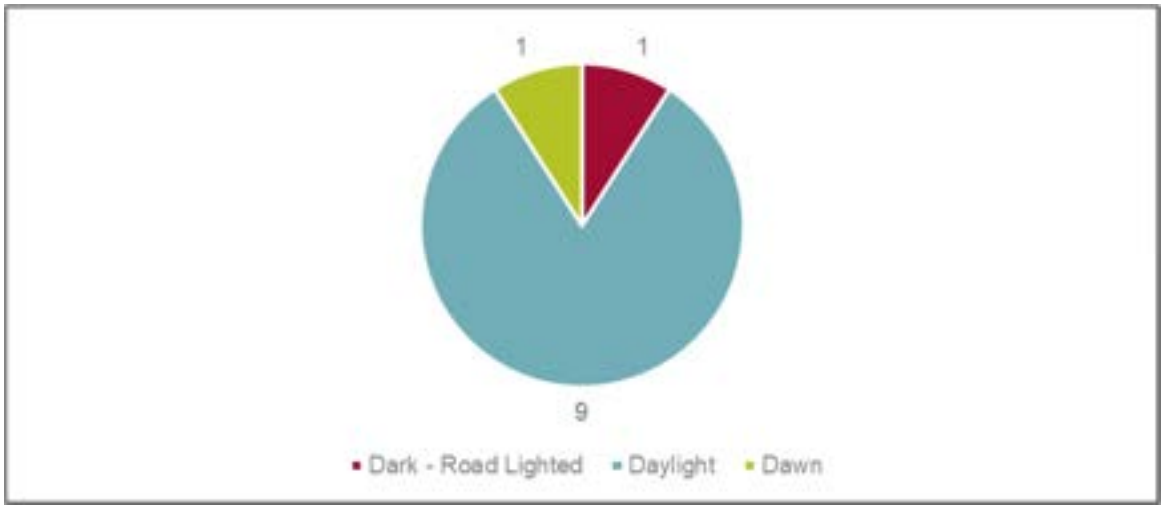


Figure 19: Light Condition at Erickson Avenue between Pear Street and S Main Street

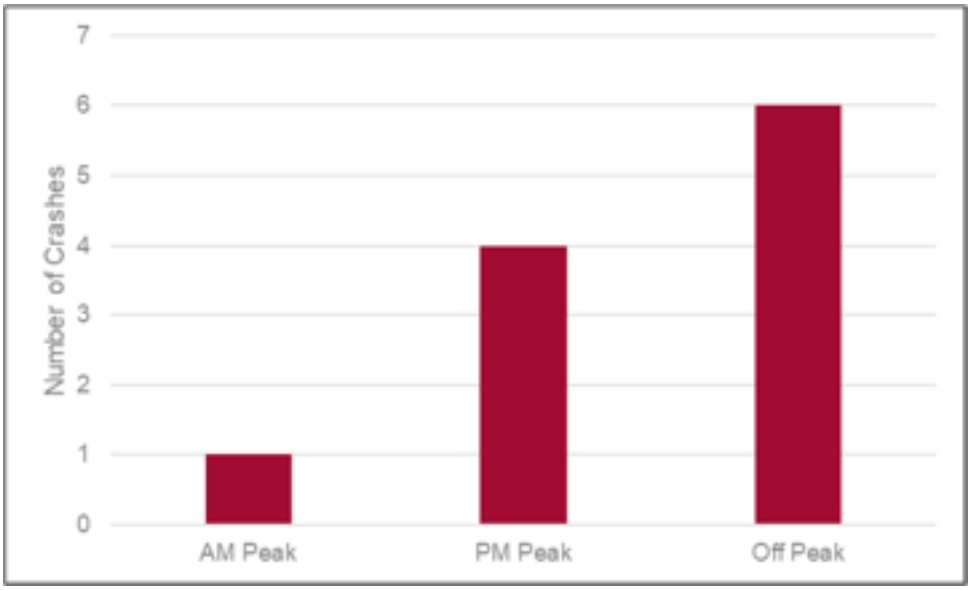


Figure 20: Crash by Time of Day at Erickson Avenue between Pear Street and S Main Street

S Main Street between Erickson Avenue and Pleasant Hill Road

The segment of S Main Street between Erickson Avenue and Pleasant Hill Road recorded 11 crashes during the five-year study period. **Figure 21** summarizes the crash types at this study intersection. There were six angle crashes, three rear-end crashes, one sideswipe-same-direction, and a crash involving a deer. Most crashes occurred in daylight conditions, as shown in **Figure 22.** Most crashes occurred during the PM peak, as shown in **Figure 23**.

Most of the crashes along this segment were located near commercial driveways along S Main Street. Multiple crashes were cited as involving a driver who attempted to make a movement without having the right-of-way.

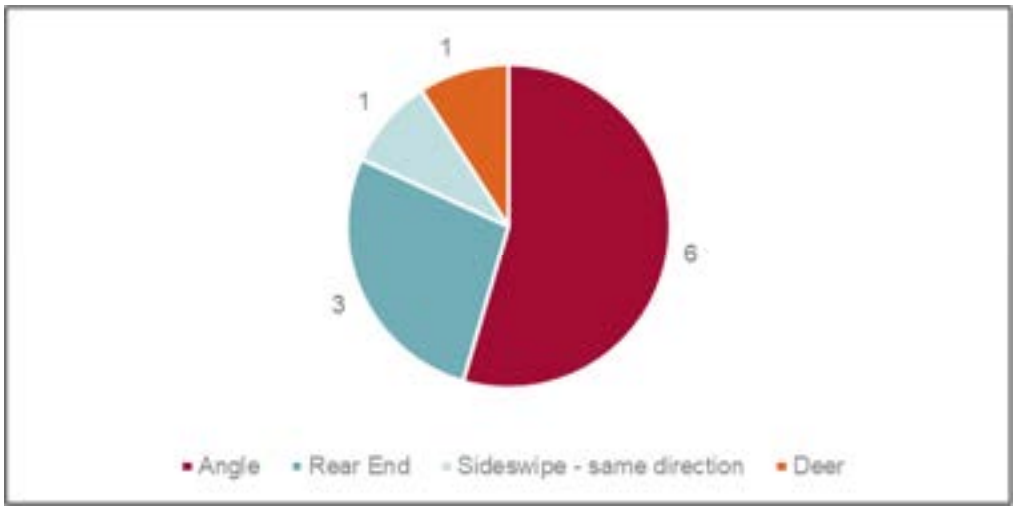


Figure 21: Crash Type at S Main Street between Erickson Avenue and Pleasant Hill Road

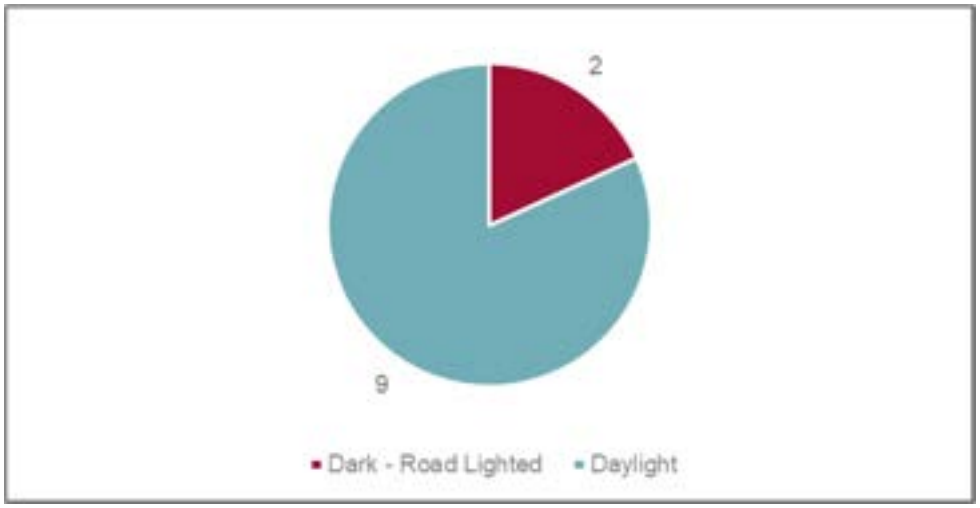


Figure 22: Light Condition at S Main Street between Erickson Avenue and Pleasant Hill Road

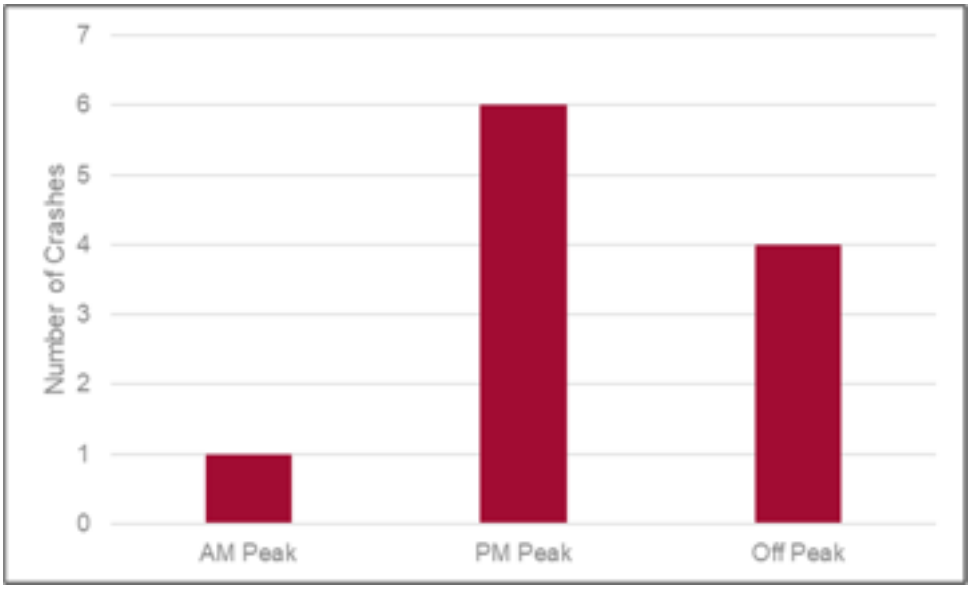


Figure 23: Crash by Time of Day at S Main Street between Erickson Avenue and Pleasant Hill Road

W Mosby Road at Dukes Plaza Driveways

The eastern and western driveways at Dukes Plaza along W Mosby Road recorded five and six crashes, respectively. All five of the crashes at the eastern driveway were angle crashes. The western driveway also recorded five angle crashes, in addition to a single head-on crash. All of these crashes occurred during daylight conditions and a majority occurred during PM peak hours. **Figure 24** and **Figure 25** summarize the time of day during which crashes occurred.

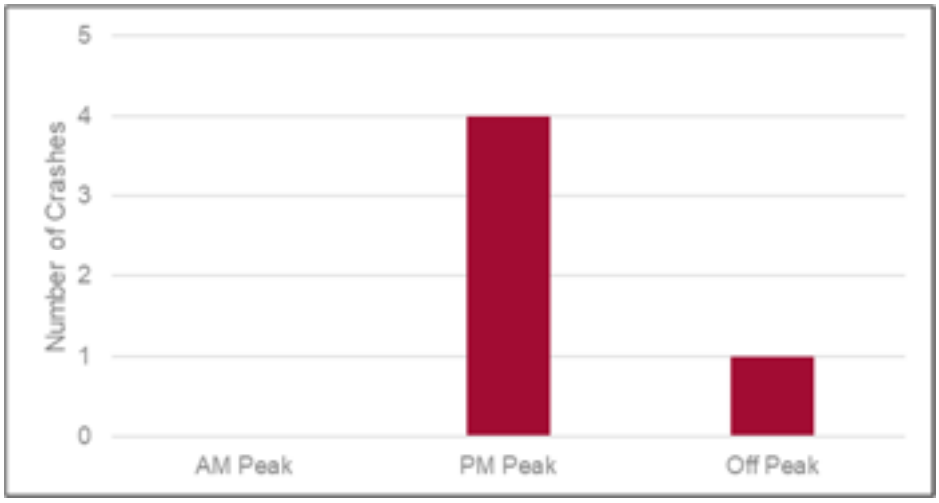


Figure 24: W Mosby Road at Dukes Plaza Eastern Driveway

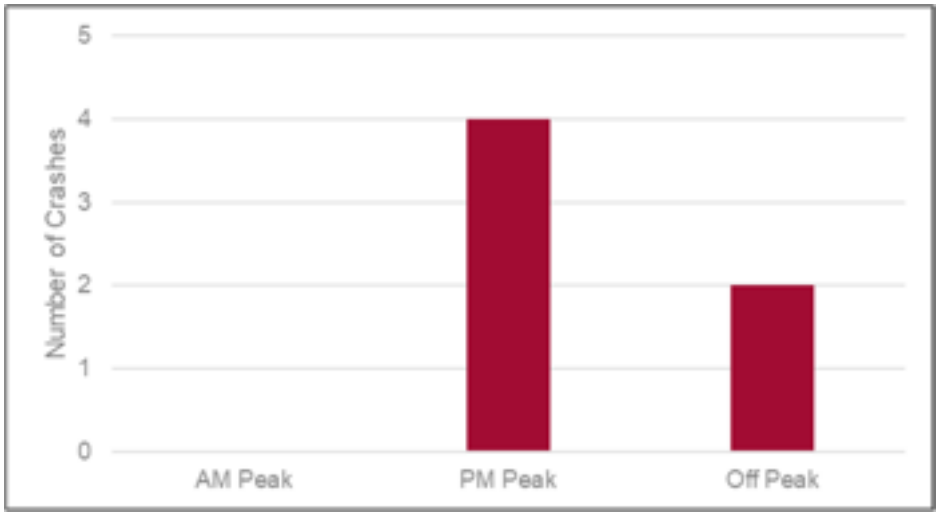


Figure 25: W Mosby Road at Dukes Plaza Western Driveway

Each of the angle crashes at the eastern driveway were cited in Virginia Crash Map data as involving a vehicle not having the right-of-way. Four of these crashes involved a vehicle attempting to turn onto W Mosby Road from the plaza parking lot. The storage length of the left-turn lane of the eastbound approach at the intersection of W Mosby Road and S Main Street is approximately 150 feet, beginning closely to where the eastern driveway is located. During peak hours when the storage lane may be closer to capacity, drivers attempting to turn left when exiting the plaza parking lot may have limited sight distance with regard to vehicles traveling along westbound W Mosby Road.

Three of the crashes at the western driveway exhibit a similar pattern of vehicles attempting to turn onto W Mosby Road from the plaza parking lot and not having the right-of-way. Two of the crashes at this location are cited as involving a vehicle attempting to make a left-turn and not having the right-of-way.

Kimley»Horn

ATTACHMENT 1

Crash Maps

Matchline F-F (See Sheet 5)

Matchline A-A (See Sheet 2)

0 125 250 500
Feet

Erickson Avenue Area Study

S High Street and Pear Street

Legend

Collision Type
- Rear End
- Angle
- Head On
- Sideswipe - Same Direction
- Sideswipe - Opposite Direction
- Fixed Object in Road
- Non-Collision
- Fixed Object - Off Road
- Deer
- Ped
- 14. Motorcyclist
- Backed Into
- Other

Crash Severity
- K - Fatal Injury
- A - Serious Visible Injury
- B - Minor Visible Injury
- C - Nonvisible Injury
- O - Property Damage Only

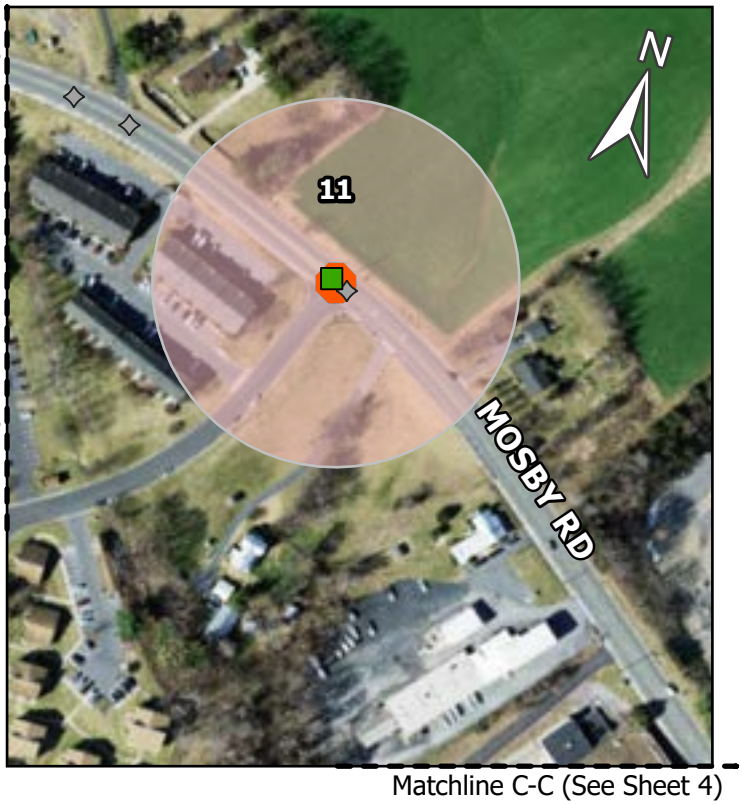
250ft Intersection Buffer

Intersection Type
- Signalized
- Unsignalized

Sources: Commonwealth of Virginia, Maxar, VDOT

Erickson Avenue Area Study

Pear Street and Mosby Road



Matchline B-B (See Continuation on this Sheet)

Matchline C-C (See Sheet 4)

Matchline A-A (See Sheet 1)

Matchline B-B (See Continuation on this Sheet)

Legend

Collision Type
- Rear End
- Angle
- Head On
- Sideswipe - Same Direction
- Sideswipe - Opposite Direction
- Fixed Object in Road
- Non-Collision
- Fixed Object - Off Road
- Deer
- Ped
- 14. Motorcyclist
- Backed Into
- Other

Crash Severity
- K - Fatal Injury
- A - Serious Visible Injury
- B - Minor Visible Injury
- C - Nonvisible Injury
- O - Property Damage Only
- 250ft Intersection Buffer

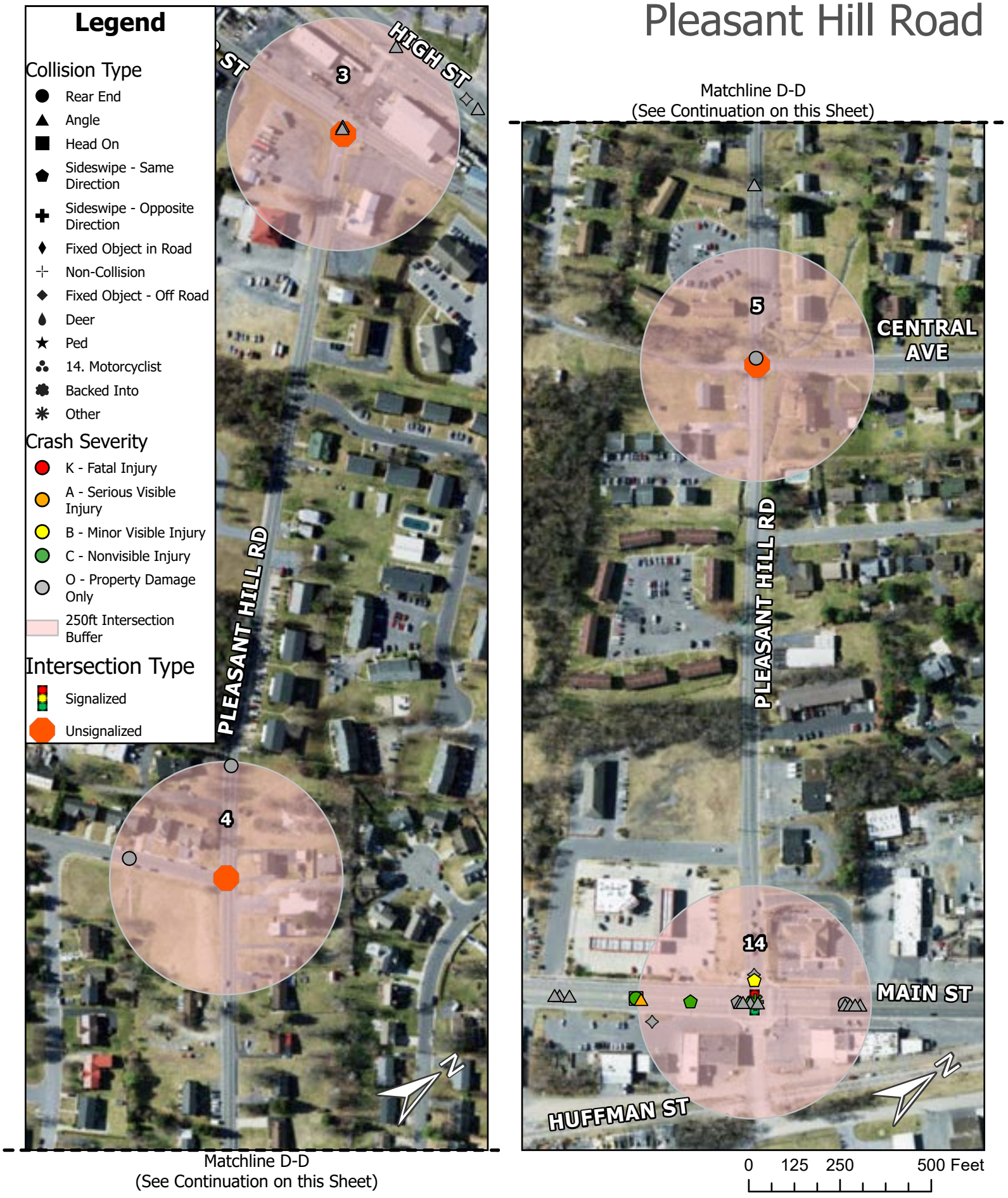
Intersection Type
- Signalized
- Unsignalized

0 125 250 500
Feet

Sources: Commonwealth of Virginia, Maxar, VDOT

Erickson Avenue Area Study

Pleasant Hill Road



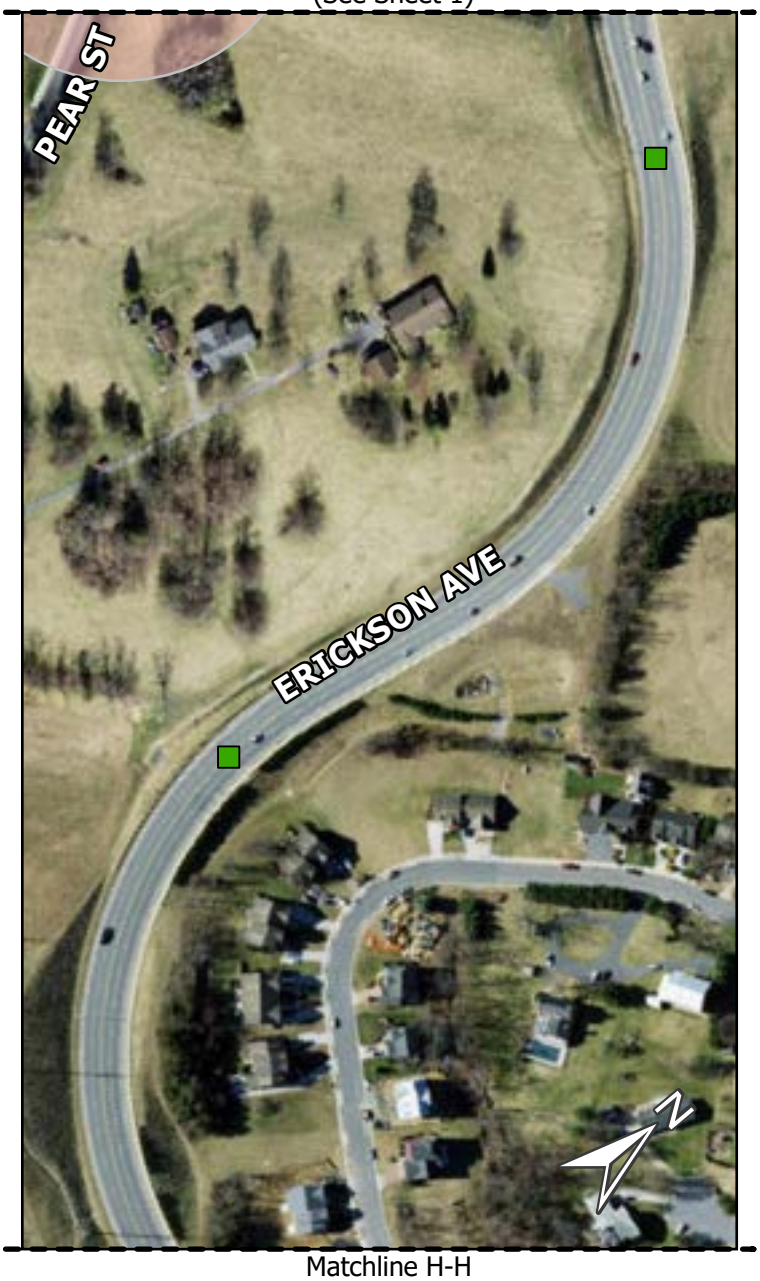
Sources: Commonwealth of Virginia, Maxar, VDOT

Erickson Avenue Area Study

S Main Street

Sources: Commonwealth of Virginia, Maxar, VDOT

Matchline F-F
(See Sheet 1)



Matchline H-H
(See Continuation on this Sheet)

Matchline H-H
(See Continuation on this Sheet)

Matchline G-G
(See Sheet 4)

Erickson Avenue Area Study

Erickson Avenue

0 125 250 500
Feet

Legend

Collision Type
- Rear End
- Angle
- Head On
- Sideswipe - Same Direction
- Sideswipe - Opposite Direction
- Fixed Object in Road
- Non-Collision
- Fixed Object - Off Road
- Deer
- Ped
- 14. Motorcyclist
- Backed Into
- Other

Crash Severity
- K - Fatal Injury
- A - Serious Visible Injury
- B - Minor Visible Injury
- C - Nonvisible Injury
- O - Property Damage Only

250ft Intersection Buffer

Intersection Type
- Signalized
- Unsignalized

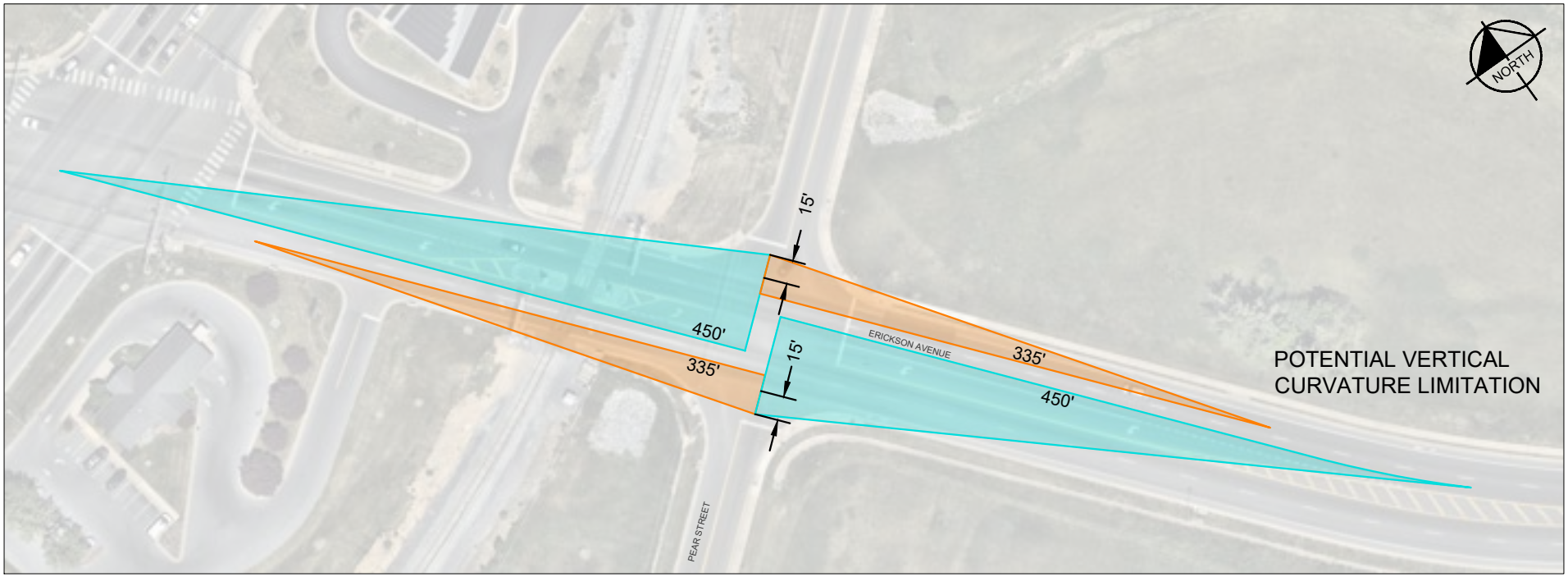
Sources: Commonwealth of Virginia, Maxar, VDOT

APPENDIX B

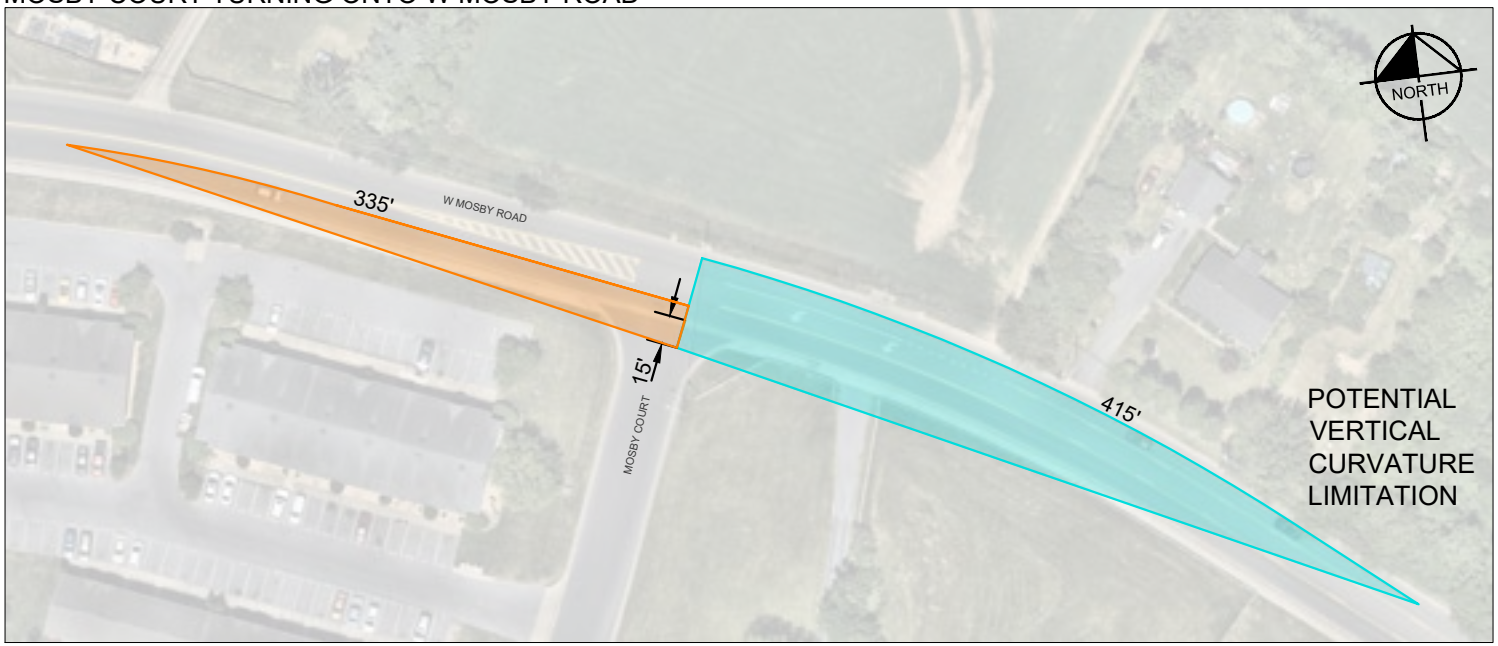
Intersection Sight Distance Exhibits

INTERSECTION SIGHT DISTANCE EXHIBIT 1 OF 5

PEAR STREET TURNING ONTO ERICKSON AVENUE



MOSBY COURT TURNING ONTO W MOSBY ROAD



NOTE: INTERSECTION SIGHT DISTANCE CALCULATIONS ASSUME ZERO TO 3% APPROACH GRADE. ANY APPROACH UPGRADE GREATER THAN 3% REQUIRES ADDITIONAL SIGHT DISTANCE.

LEGEND

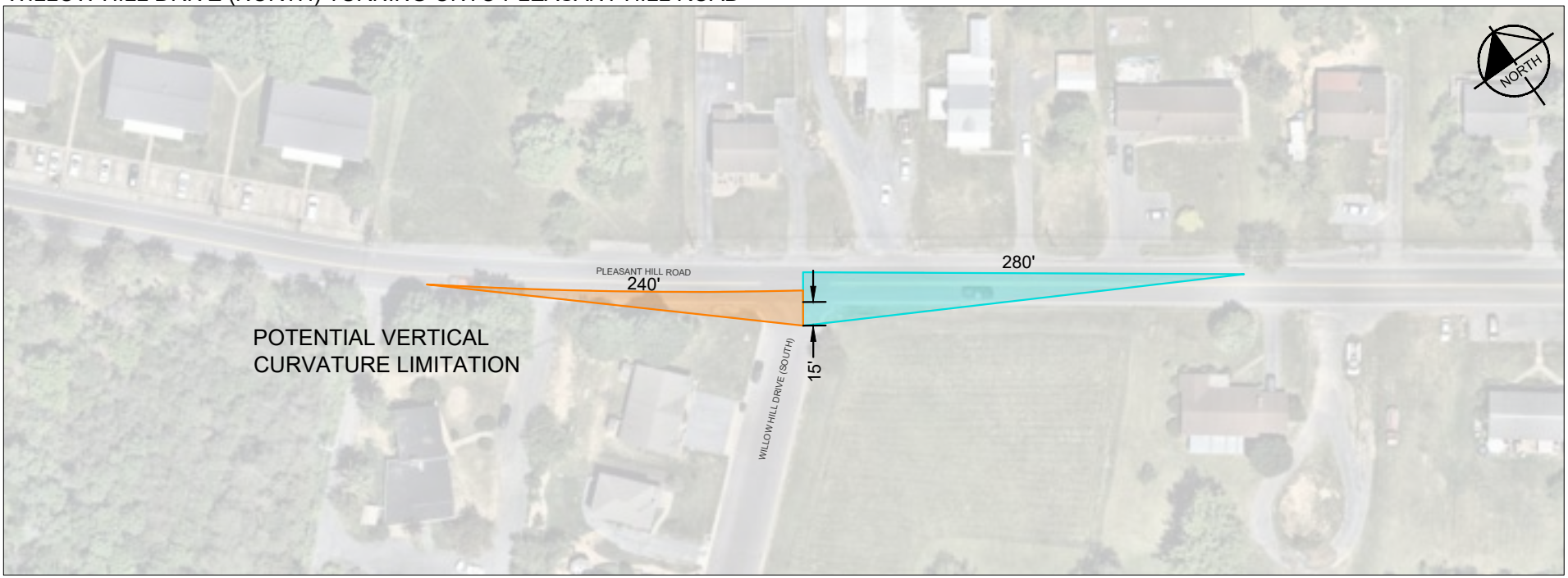
- RIGHT TURN SIGHT DISTANCE
- LEFT TURN SIGHT DISTANCE

GRAPHIC SCALE IN FEET

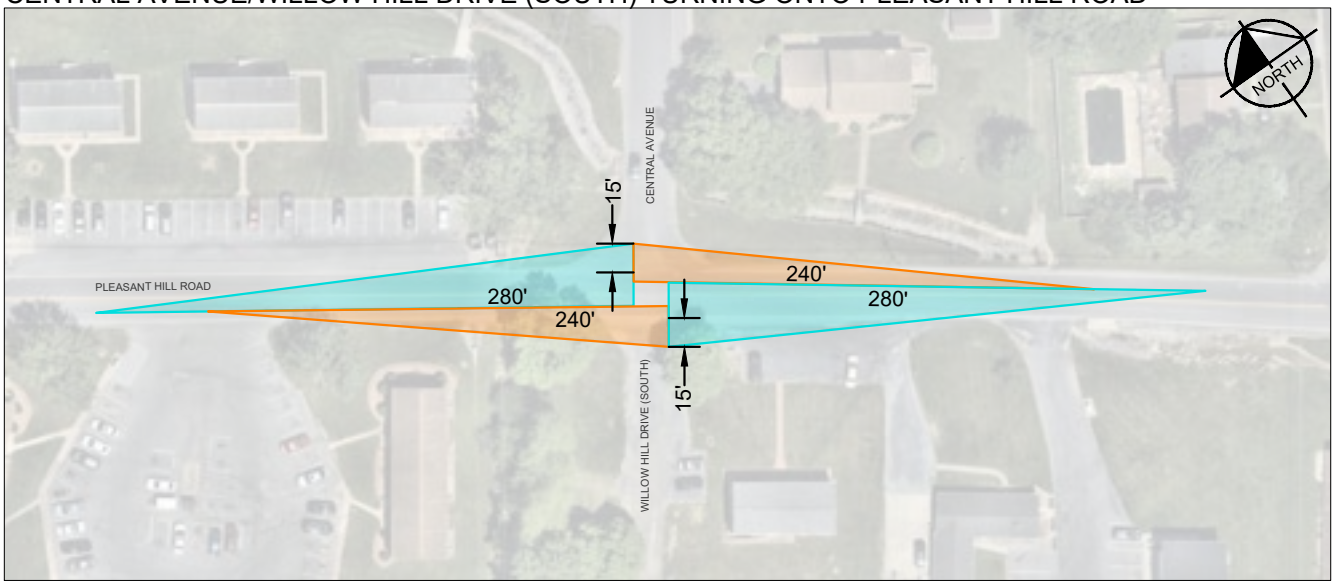
0 50 100 200

INTERSECTION SIGHT DISTANCE EXHIBIT 2 OF 5

WILLOW HILL DRIVE (NORTH) TURNING ONTO PLEASANT HILL ROAD



CENTRAL AVENUE/WILLOW HILL DRIVE (SOUTH) TURNING ONTO PLEASANT HILL ROAD



NOTE: INTERSECTION SIGHT DISTANCE CALCULATIONS ASSUME ZERO TO 3% APPROACH GRADE. ANY APPROACH UPGRADE GREATER THAN 3% REQUIRES ADDITIONAL SIGHT DISTANCE.

LEGEND

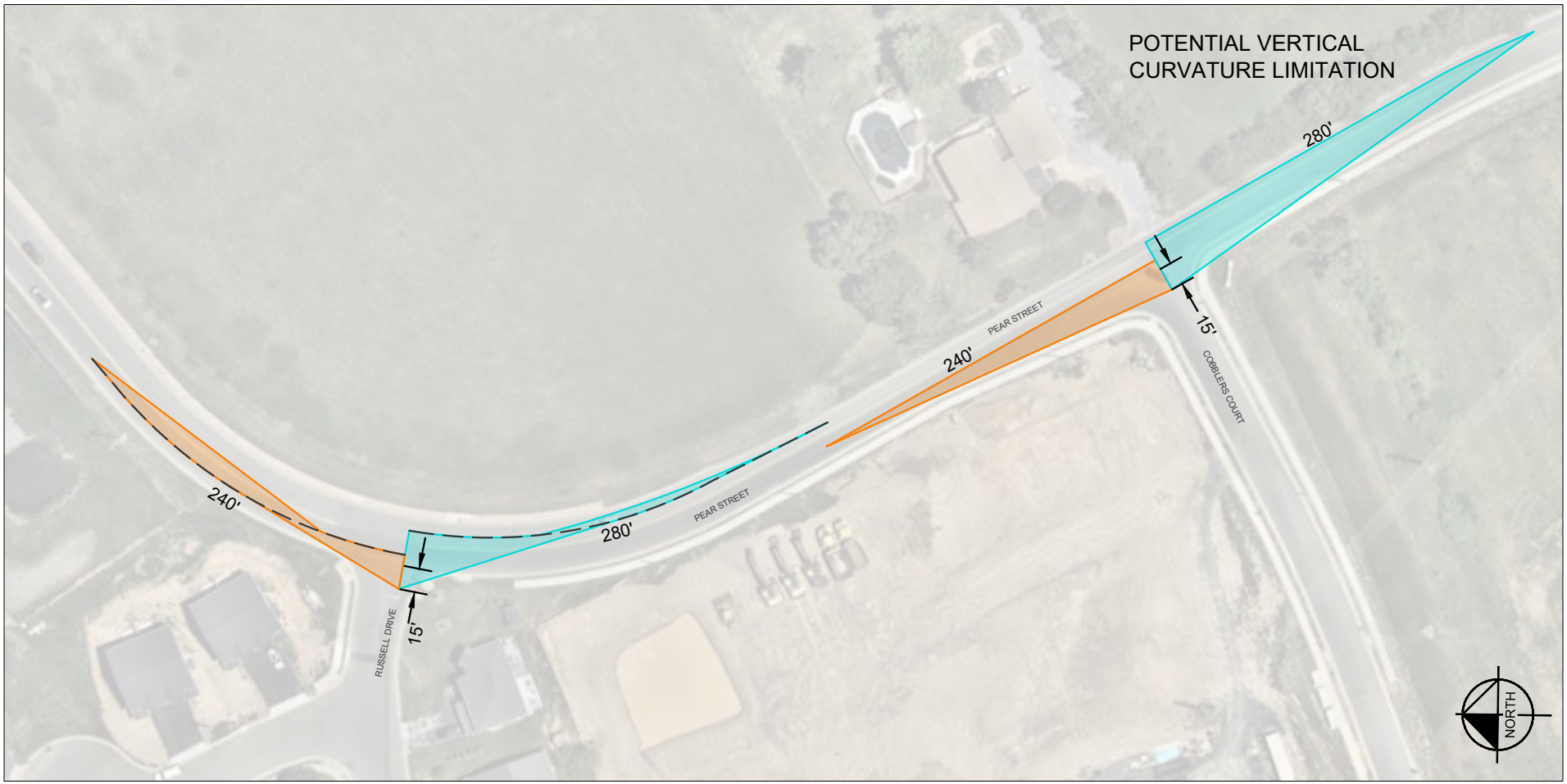
- RIGHT TURN SIGHT DISTANCE
- LEFT TURN SIGHT DISTANCE

GRAPHIC SCALE IN FEET

0 50 100 200

INTERSECTION SIGHT DISTANCE EXHIBIT 3 OF 5

RUSSELL DRIVE AND COBBLERS COURT TURNING ONTO PEAR STREET



NOTE: INTERSECTION SIGHT DISTANCE CALCULATIONS ASSUME ZERO TO 3% APPROACH GRADE. ANY APPROACH UPGRADE GREATER THAN 3% REQUIRES ADDITIONAL SIGHT DISTANCE.

LEGEND

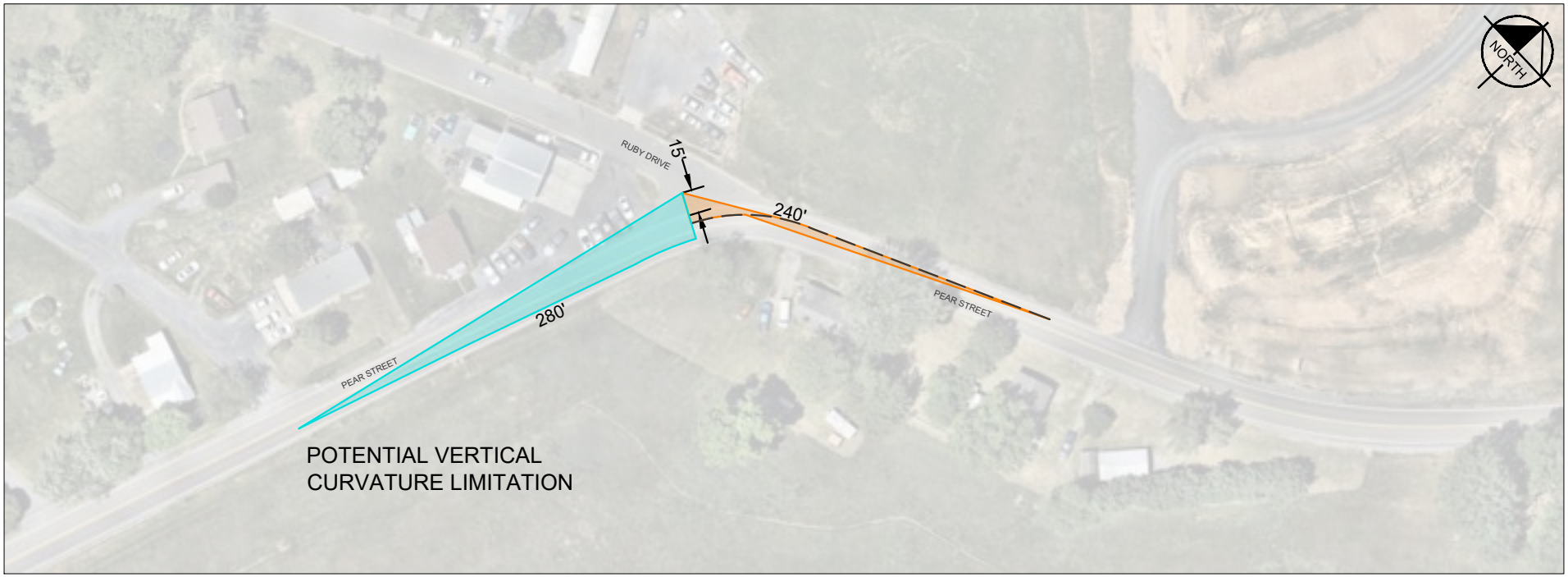
- RIGHT TURN SIGHT DISTANCE
- LEFT TURN SIGHT DISTANCE

GRAPHIC SCALE IN FEET

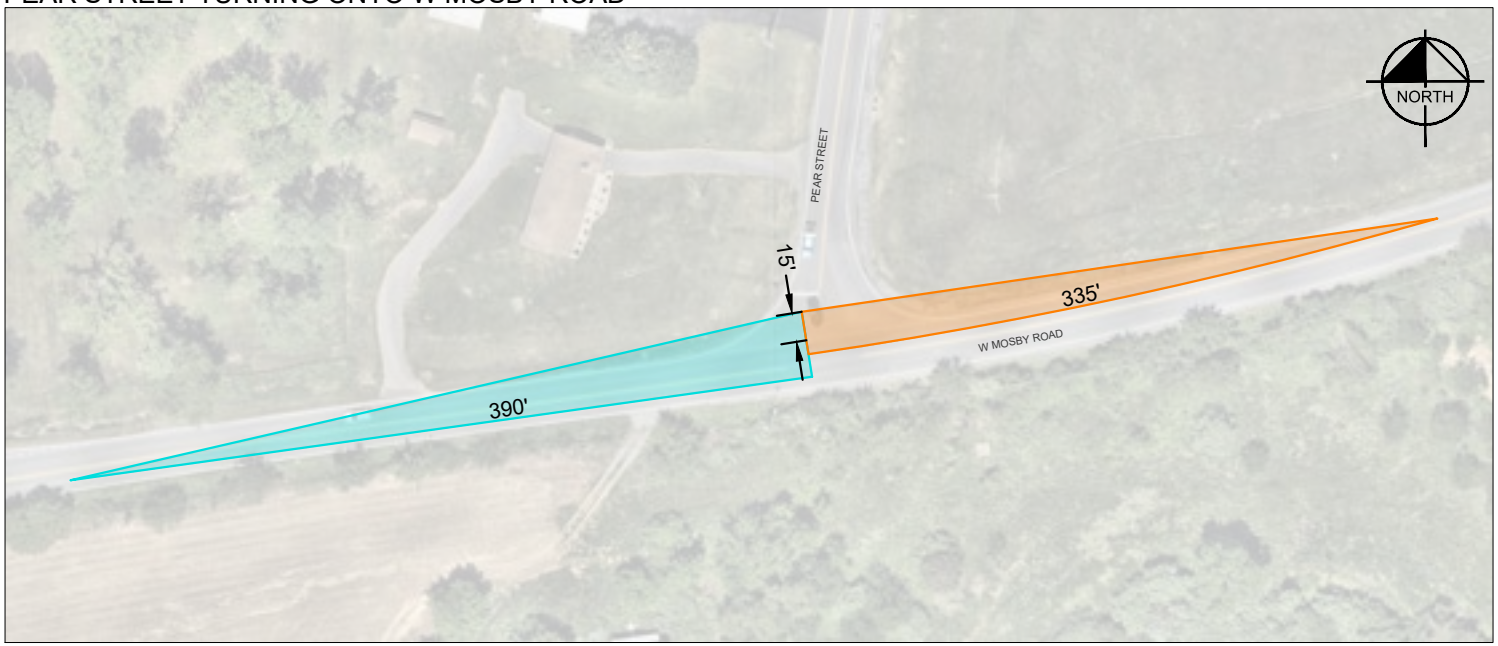
0 50 100 200

INTERSECTION SIGHT DISTANCE EXHIBIT 4 OF 5

RUBY DRIVE TURNING ONTO PEAR STREET



PEAR STREET TURNING ONTO W MOSBY ROAD



NOTE: INTERSECTION SIGHT DISTANCE CALCULATIONS ASSUME ZERO TO 3% APPROACH GRADE. ANY APPROACH UPGRADE GREATER THAN 3% REQUIRES ADDITIONAL SIGHT DISTANCE.

LEGEND

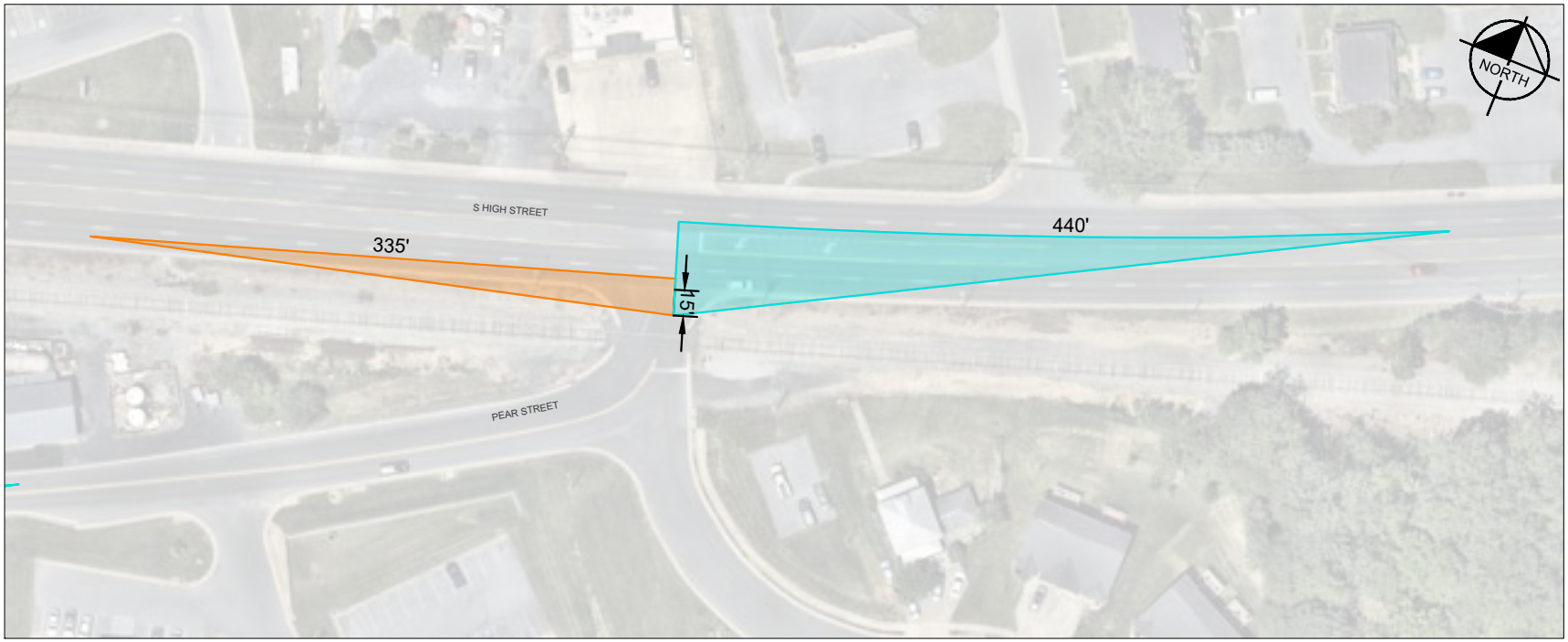
- RIGHT TURN SIGHT DISTANCE
- LEFT TURN SIGHT DISTANCE

GRAPHIC SCALE IN FEET

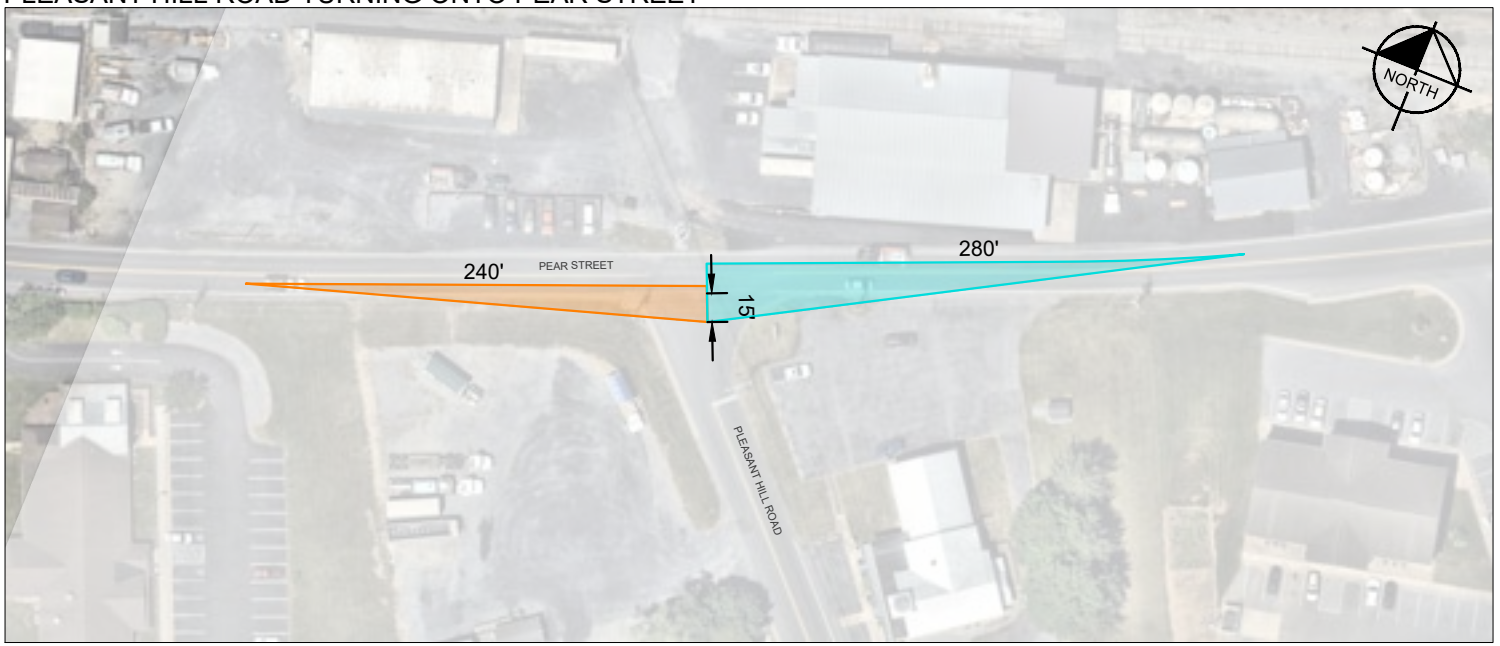
0 50 100 200

INTERSECTION SIGHT DISTANCE EXHIBIT 5 OF 5

PEAR STREET TURNING ONTO S HIGH STREET



PLEASANT HILL ROAD TURNING ONTO PEAR STREET



NOTE: INTERSECTION SIGHT DISTANCE CALCULATIONS ASSUME ZERO TO 3% APPROACH GRADE. ANY APPROACH UPGRADE GREATER THAN 3% REQUIRES ADDITIONAL SIGHT DISTANCE.

LEGEND

- RIGHT TURN SIGHT DISTANCE
- LEFT TURN SIGHT DISTANCE

GRAPHIC SCALE IN FEET

0 50 100 200

Kimley»Horn

APPENDIX C

Synchro MOE Reports

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	141	533	172	515	15	463	177	205	376	138
v/c Ratio	0.47	0.77	0.56	0.71	0.04	0.60	0.23	0.57	0.29	0.14
Control Delay	25.3	45.5	27.8	37.7	18.4	39.6	4.8	26.9	25.2	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.3	45.5	27.8	37.7	18.4	39.6	4.8	26.9	25.2	2.4
Queue Length 50th (ft)	58	166	72	141	5	143	8	83	79	0
Queue Length 95th (ft)	96	226	115	192	19	205	47	144	151	26
Internal Link Dist (ft)		616		345		1390			1400	
Turn Bay Length (ft)	235		150		130		240	150		390
Base Capacity (vph)	304	728	355	836	397	778	818	375	1287	965
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.73	0.48	0.62	0.04	0.60	0.22	0.55	0.29	0.14

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	130	471	19	158	338	136	2	12	426	163	189	346
Future Volume (vph)	130	471	19	158	338	136	2	12	426	163	189	346
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	11	12	12	12	12
Total Lost time (s)	7.2	7.2		7.2	7.2			10.0	10.0	7.2	10.0	10.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.99		1.00	0.96			1.00	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1703	3488		1719	3199			1632	3438	1553	1671	3406
Flt Permitted	0.32	1.00		0.28	1.00			0.53	1.00	1.00	0.44	1.00
Satd. Flow (perm)	565	3488		508	3199			908	3438	1553	775	3406
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)	141	512	21	172	367	148	2	13	463	177	205	376
RTOR Reduction (vph)	0	3	0	0	46	0	0	0	0	102	0	0
Lane Group Flow (vph)	141	530	0	172	469	0	0	15	463	75	205	376
Heavy Vehicles (%)	6%	3%	0%	5%	8%	8%	0%	8%	5%	4%	8%	6%
Turn Type	D.P+P	NA		D.P+P	NA		D.P+P	D.P+P	NA	pm+ov	D.P+P	NA
Protected Phases	7	4		3	8		5	5	2	3	1	6
Permitted Phases	8			4			6	6		2	2	
Actuated Green, G (s)	31.8	19.9		31.8	21.3			33.8	22.6	34.5	33.8	31.8
Effective Green, g (s)	31.8	19.9		31.8	21.3			33.8	22.6	34.5	33.8	31.8
Actuated g/C Ratio	0.32	0.20		0.32	0.21			0.34	0.23	0.34	0.34	0.32
Clearance Time (s)	7.2	7.2		7.2	7.2			10.0	10.0	7.2	10.0	10.0
Vehicle Extension (s)	5.0	5.0		3.0	3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	299	694		305	681			321	776	535	362	1083
v/s Ratio Prot	0.05	c0.15		c0.07	0.15			0.00	c0.13	0.02	c0.06	c0.11
v/s Ratio Perm	0.10			0.11				0.01		0.03	0.13	
v/c Ratio	0.47	0.76		0.56	0.69			0.05	0.60	0.14	0.57	0.35
Uniform Delay, d1	25.6	37.8		26.2	36.3			22.1	34.6	22.5	25.0	26.1
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	5.9		2.4	2.9			0.1	3.4	0.1	2.0	0.9
Delay (s)	28.1	43.7		28.6	39.2			22.2	38.0	22.7	27.0	27.0
Level of Service	C	D		C	D			C	D	C	C	C
Approach Delay (s)		40.4			36.6				33.5			25.2
Approach LOS		D			D				C			C

Intersection Summary			
HCM 2000 Control Delay	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	34.4
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	127
Future Volume (vph)	127
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	7.2
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1538
Flt Permitted	1.00
Satd. Flow (perm)	1538
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	138
RTOR Reduction (vph)	80
Lane Group Flow (vph)	58
Heavy Vehicles (%)	5%
Turn Type	pm+ov
Protected Phases	7
Permitted Phases	6
Actuated Green, G (s)	42.3
Effective Green, g (s)	42.3
Actuated g/C Ratio	0.42
Clearance Time (s)	7.2
Vehicle Extension (s)	5.0
Lane Grp Cap (vph)	650
v/s Ratio Prot	0.01
v/s Ratio Perm	0.03
v/c Ratio	0.09
Uniform Delay, d1	17.3
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	17.4
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	11	0	79	0	652	11	53	603	0
Future Vol, veh/h	0	0	0	11	0	79	0	652	11	53	603	0
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	-	-	-	-	-	-	-	-	-	90	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	0	2	2	6	6	18	3	6	6
Mvmt Flow	0	0	0	12	0	87	0	716	12	58	663	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1137	1507	332	1170	1501	364	-	0	0	728	0	0
Stage 1	779	779	-	722	722	-	-	-	-	-	-	-
Stage 2	358	728	-	448	779	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.5	6.54	6.94	-	-	-	4.16	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.5	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.5	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.5	4.02	3.32	-	-	-	2.23	-	-
Pot Cap-1 Maneuver	157	120	664	150	121	633	0	-	-	865	-	-
Stage 1	355	404	-	389	429	-	0	-	-	-	-	-
Stage 2	633	427	-	565	404	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	129	112	664	142	113	633	-	-	-	865	-	-
Mov Cap-2 Maneuver	244	221	-	267	234	-	-	-	-	-	-	-
Stage 1	355	377	-	389	429	-	-	-	-	-	-	-
Stage 2	546	427	-	527	377	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	13.1	0	0.8
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	-	542	865	-	-
HCM Lane V/C Ratio	-	-	-	0.182	0.067	-	-
HCM Control Delay (s)	-	-	0	13.1	9.5	-	-
HCM Lane LOS	-	-	A	B	A	-	-
HCM 95th %tile Q(veh)	-	-	-	0.7	0.2	-	-

Intersection	
Int Delay, s/veh	5.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	51	40	41	31	60	19
Future Vol, veh/h	51	40	41	31	60	19
Conflicting Peds, #/hr	0	4	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	13	7	2	6	11	5
Mvmt Flow	62	49	50	38	73	23

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	238	73	0	0	88	0
Stage 1	69	-	-	-	-	-
Stage 2	169	-	-	-	-	-
Critical Hdwy	6.53	6.27	-	-	4.21	-
Critical Hdwy Stg 1	5.53	-	-	-	-	-
Critical Hdwy Stg 2	5.53	-	-	-	-	-
Follow-up Hdwy	3.617	3.363	-	-	2.299	-
Pot Cap-1 Maneuver	727	975	-	-	1453	-
Stage 1	927	-	-	-	-	-
Stage 2	835	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	690	971	-	-	1453	-
Mov Cap-2 Maneuver	690	-	-	-	-	-
Stage 1	927	-	-	-	-	-
Stage 2	792	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	5.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	791	1453	-
HCM Lane V/C Ratio	-	-	0.14	0.05	-
HCM Control Delay (s)	-	-	10.3	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.2	-

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	0	100	10	10	76	0	16	0	25	1	0	0
Future Vol, veh/h	0	100	10	10	76	0	16	0	25	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	8	7	20	10	11	11	6	7	8	0	0	0
Mvmt Flow	0	127	13	13	96	0	20	0	32	1	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	96	0	0	140	0	0	256	256	134	272	262	96
Stage 1	-	-	-	-	-	-	134	134	-	122	122	-
Stage 2	-	-	-	-	-	-	122	122	-	150	140	-
Critical Hdwy	4.18	-	-	4.2	-	-	7.16	6.57	6.28	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.57	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.57	-	6.1	5.5	-
Follow-up Hdwy	2.272	-	-	2.29	-	-	3.554	4.063	3.372	3.5	4	3.3
Pot Cap-1 Maneuver	1461	-	-	1395	-	-	689	639	899	685	646	966
Stage 1	-	-	-	-	-	-	860	776	-	887	799	-
Stage 2	-	-	-	-	-	-	873	785	-	857	785	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1461	-	-	1395	-	-	683	633	899	656	640	966
Mov Cap-2 Maneuver	-	-	-	-	-	-	683	633	-	656	640	-
Stage 1	-	-	-	-	-	-	860	776	-	887	791	-
Stage 2	-	-	-	-	-	-	864	777	-	827	785	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.9	9.8	10.5
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	800	1461	-	-	1395	-	-	656
HCM Lane V/C Ratio	0.065	-	-	-	0.009	-	-	0.002
HCM Control Delay (s)	9.8	0	-	-	7.6	0	-	10.5
HCM Lane LOS	A	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	123	0	0	70	15	0	0	0	52	0	20
Future Vol, veh/h	10	123	0	0	70	15	0	0	0	52	0	20
Conflicting Peds, #/hr	0	0	1	1	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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	20	5	6	10	10	13	2	2	2	0	2	10
Mvmt Flow	12	152	0	0	86	19	0	0	0	64	0	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	105	0	0	153	0	0	285	282	153	272	273	96
Stage 1	-	-	-	-	-	-	177	177	-	96	96	-
Stage 2	-	-	-	-	-	-	108	105	-	176	177	-
Critical Hdwy	4.3	-	-	4.2	-	-	7.12	6.52	6.22	7.1	6.52	6.3
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	2.38	-	-	2.29	-	-	3.518	4.018	3.318	3.5	4.018	3.39
Pot Cap-1 Maneuver	1381	-	-	1380	-	-	667	627	893	685	634	939
Stage 1	-	-	-	-	-	-	825	753	-	916	815	-
Stage 2	-	-	-	-	-	-	897	808	-	831	753	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1381	-	-	1379	-	-	644	621	892	680	628	939
Mov Cap-2 Maneuver	-	-	-	-	-	-	644	621	-	680	628	-
Stage 1	-	-	-	-	-	-	817	745	-	908	815	-
Stage 2	-	-	-	-	-	-	873	808	-	824	745	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0	0	10.6
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1381	-	-	1379	-	-	736
HCM Lane V/C Ratio	-	0.009	-	-	-	-	-	0.121
HCM Control Delay (s)	0	7.6	0	-	0	-	-	10.6
HCM Lane LOS	A	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.4

Intersection	
Int Delay, s/veh	9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	36	695	92	24	520	12	62	30	23	2	9	52
Future Vol, veh/h	36	695	92	24	520	12	62	30	23	2	9	52
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	50	-	-	270	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	11	4	8	25	7	0	4	0	0	0	11	9
Mvmt Flow	38	732	97	25	547	13	65	32	24	2	9	55

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	560	0	0	829	0	0	1185	1467	415	1062	1509	280
Stage 1	-	-	-	-	-	-	857	857	-	604	604	-
Stage 2	-	-	-	-	-	-	328	610	-	458	905	-
Critical Hdwy	4.32	-	-	4.6	-	-	7.58	6.5	6.9	7.5	6.72	7.08
Critical Hdwy Stg 1	-	-	-	-	-	-	6.58	5.5	-	6.5	5.72	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.58	5.5	-	6.5	5.72	-
Follow-up Hdwy	2.31	-	-	2.45	-	-	3.54	4	3.3	3.5	4.11	3.39
Pot Cap-1 Maneuver	947	-	-	667	-	-	142	129	592	180	110	697
Stage 1	-	-	-	-	-	-	314	377	-	457	464	-
Stage 2	-	-	-	-	-	-	653	488	-	557	334	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	947	-	-	667	-	-	115	119	592	130	102	697
Mov Cap-2 Maneuver	-	-	-	-	-	-	115	119	-	130	102	-
Stage 1	-	-	-	-	-	-	301	362	-	439	447	-
Stage 2	-	-	-	-	-	-	567	470	-	468	321	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.5	106.7	17.5
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	139	947	-	-	667	-	-	353
HCM Lane V/C Ratio	0.871	0.04	-	-	0.038	-	-	0.188
HCM Control Delay (s)	106.7	9	-	-	10.6	-	-	17.5
HCM Lane LOS	F	A	-	-	B	-	-	C
HCM 95th %tile Q(veh)	5.7	0.1	-	-	0.1	-	-	0.7

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	8	4	101	115	9
Future Vol, veh/h	15	8	4	101	115	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	6	37	25	1	10	33
Mvmt Flow	18	10	5	123	140	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	279	146	151	0	-	0
Stage 1	146	-	-	-	-	-
Stage 2	133	-	-	-	-	-
Critical Hdwy	6.46	6.57	4.35	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.633	2.425	-	-	-
Pot Cap-1 Maneuver	702	816	1301	-	-	-
Stage 1	872	-	-	-	-	-
Stage 2	883	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	699	816	1301	-	-	-
Mov Cap-2 Maneuver	699	-	-	-	-	-
Stage 1	869	-	-	-	-	-
Stage 2	883	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.1	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1301	-	736	-	-
HCM Lane V/C Ratio	0.004	-	0.038	-	-
HCM Control Delay (s)	7.8	0	10.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	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	58	0	27	0	0	1	27	45	0	0	81	43
Future Vol, veh/h	58	0	27	0	0	1	27	45	0	0	81	43
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	-	-	-	-	-	-	-	-	-	-	-	65
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	1	1	0	0	0	0	7	4	5	12	11	13
Mvmt Flow	67	0	31	0	0	1	31	52	0	0	94	50

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	209	208	94	249	258	52	144	0	0	52	0	0
Stage 1	94	94	-	114	114	-	-	-	-	-	-	-
Stage 2	115	114	-	135	144	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.2	7.1	6.5	6.2	4.17	-	-	4.22	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.3	3.5	4	3.3	2.263	-	-	2.308	-	-
Pot Cap-1 Maneuver	750	691	968	709	650	1021	1408	-	-	1492	-	-
Stage 1	915	819	-	896	805	-	-	-	-	-	-	-
Stage 2	892	803	-	873	782	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	736	675	968	674	635	1021	1408	-	-	1492	-	-
Mov Cap-2 Maneuver	736	675	-	674	635	-	-	-	-	-	-	-
Stage 1	894	819	-	875	786	-	-	-	-	-	-	-
Stage 2	870	785	-	845	782	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.2	8.5	2.9	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1408	-	-	797	1021	1492	-	-
HCM Lane V/C Ratio	0.022	-	-	0.124	0.001	-	-	-
HCM Control Delay (s)	7.6	0	-	10.2	8.5	0	-	-
HCM Lane LOS	A	A	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0	0	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	19	17	59	96	16
Future Vol, veh/h	14	19	17	59	96	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	3	3	6	6	7	7
Mvmt Flow	16	22	20	69	113	19

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	232	123	132	0	-	0
Stage 1	123	-	-	-	-	-
Stage 2	109	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.16	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.254	-	-	-
Pot Cap-1 Maneuver	754	925	1429	-	-	-
Stage 1	900	-	-	-	-	-
Stage 2	913	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	743	925	1429	-	-	-
Mov Cap-2 Maneuver	743	-	-	-	-	-
Stage 1	887	-	-	-	-	-
Stage 2	913	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	1.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1429	-	838	-	-
HCM Lane V/C Ratio	0.014	-	0.046	-	-
HCM Control Delay (s)	7.6	0	9.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	22	219	139	54	63	51
Future Vol, veh/h	22	219	139	54	63	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	9	3	7	5	9	1
Mvmt Flow	24	235	149	58	68	55

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	207	0	-	0	461	178
Stage 1	-	-	-	-	178	-
Stage 2	-	-	-	-	283	-
Critical Hdwy	4.19	-	-	-	6.49	6.21
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	2.281	-	-	-	3.581	3.309
Pot Cap-1 Maneuver	1323	-	-	-	546	868
Stage 1	-	-	-	-	836	-
Stage 2	-	-	-	-	749	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1323	-	-	-	535	868
Mov Cap-2 Maneuver	-	-	-	-	535	-
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	749	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1323	-	-	-	646
HCM Lane V/C Ratio	0.018	-	-	-	0.19
HCM Control Delay (s)	7.8	0	-	-	11.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	280	6	8	177	3	20
Future Vol, veh/h	280	6	8	177	3	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	170	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	3	33	25	7	0	25
Mvmt Flow	292	6	8	184	3	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	298	0	495	295
Stage 1	-	-	-	-	295	-
Stage 2	-	-	-	-	200	-
Critical Hdwy	-	-	4.35	-	6.4	6.45
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.425	-	3.5	3.525
Pot Cap-1 Maneuver	-	-	1143	-	537	693
Stage 1	-	-	-	-	760	-
Stage 2	-	-	-	-	838	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1143	-	533	693
Mov Cap-2 Maneuver	-	-	-	-	533	-
Stage 1	-	-	-	-	760	-
Stage 2	-	-	-	-	832	-

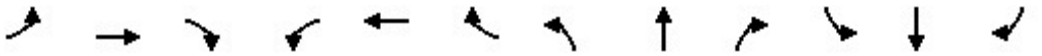
Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	667	-	-	1143	-
HCM Lane V/C Ratio	0.036	-	-	0.007	-
HCM Control Delay (s)	10.6	-	-	8.2	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	240	128	24	100	805	34	1213
v/c Ratio	0.87	0.32	0.07	0.44	0.42	0.09	0.66
Control Delay	79.3	10.1	0.3	14.5	15.6	6.4	15.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.3	10.1	0.3	14.5	15.6	6.4	15.9
Queue Length 50th (ft)	193	3	0	28	208	6	271
Queue Length 95th (ft)	#298	52	0	49	251	m11	306
Internal Link Dist (ft)		1327	452		1032		1169
Turn Bay Length (ft)	160			150		190	
Base Capacity (vph)	309	428	438	227	1935	382	1847
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.30	0.05	0.44	0.42	0.09	0.66

Intersection Summary

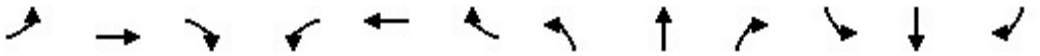
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	209	4	107	6	0	15	87	686	14	30	935	120
Future Volume (vph)	209	4	107	6	0	15	87	686	14	30	935	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-5%			2%			-2%			3%	
Total Lost time (s)	7.3	7.3			7.3		8.6	8.6		8.6	8.6	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86			0.90		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1796	1507			1416		1572	3165		1573	3253	
Flt Permitted	0.74	1.00			0.92		0.16	1.00		0.31	1.00	
Satd. Flow (perm)	1402	1507			1315		266	3165		515	3253	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	240	5	123	7	0	17	100	789	16	34	1075	138
RTOR Reduction (vph)	0	99	0	0	19	0	0	1	0	0	7	0
Lane Group Flow (vph)	240	29	0	0	5	0	100	804	0	34	1206	0
Heavy Vehicles (%)	3%	0%	11%	0%	19%	26%	16%	15%	7%	13%	8%	3%
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	25.6	25.6			25.6		79.9	76.1		79.9	73.5	
Effective Green, g (s)	25.6	25.6			25.6		79.9	76.1		79.9	73.5	
Actuated g/C Ratio	0.20	0.20			0.20		0.61	0.59		0.61	0.57	
Clearance Time (s)	7.3	7.3			7.3		8.6	8.6		8.6	8.6	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	276	296			258		227	1852		347	1839	
v/s Ratio Prot		0.02					0.02	c0.25		0.00	c0.37	
v/s Ratio Perm	c0.17				0.00		0.25			0.06		
v/c Ratio	0.87	0.10			0.02		0.44	0.43		0.10	0.66	
Uniform Delay, d1	50.6	42.8			42.1		12.9	15.0		13.8	19.5	
Progression Factor	1.00	1.00			1.00		1.00	1.00		0.70	0.72	
Incremental Delay, d2	24.0	0.1			0.0		1.4	0.7		0.1	1.5	
Delay (s)	74.5	42.9			42.1		14.3	15.7		9.8	15.5	
Level of Service	E	D			D		B	B		A	B	
Approach Delay (s)		63.5			42.1			15.6			15.3	
Approach LOS		E			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	24.5
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	48	413	296	349	371	218	185	476	289	138	515	42
v/c Ratio	0.13	0.81	0.56	0.86	0.34	0.28	0.51	0.46	0.33	0.35	0.50	0.06
Control Delay	24.5	67.3	11.6	64.4	36.1	2.8	20.7	26.2	2.2	20.2	33.7	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	67.3	11.6	64.4	36.1	2.8	20.7	26.2	2.2	20.2	33.7	0.4
Queue Length 50th (ft)	24	178	39	214	127	0	60	115	3	41	194	1
Queue Length 95th (ft)	50	237	79	#338	173	34	m79	158	m30	63	262	0
Internal Link Dist (ft)		853			1394			1169			1357	
Turn Bay Length (ft)	350		300	500		200	190		330	190		160
Base Capacity (vph)	365	541	565	430	1102	779	407	1043	896	393	1023	710
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.76	0.52	0.81	0.34	0.28	0.45	0.46	0.32	0.35	0.50	0.06

Intersection Summary

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

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	46	396	284	1	334	356	209	178	457	277	132	494
Future Volume (vph)	46	396	284	1	334	356	209	178	457	277	132	494
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-5%				-8%			-3%			-2%
Total Lost time (s)	8.6	8.6	8.3		8.6	8.6	8.3	8.3	8.3	8.6	8.3	8.3
Lane Util. Factor	1.00	0.95	1.00		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	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	1.00	1.00
Frt	1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1850	3628	1547		1755	3610	1630	1607	3214	1478	1720	3345
Flt Permitted	0.50	1.00	1.00		0.32	1.00	1.00	0.36	1.00	1.00	0.41	1.00
Satd. Flow (perm)	972	3628	1547		595	3610	1630	617	3214	1478	736	3345
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)	48	412	296	1	348	371	218	185	476	289	138	515
RTOR Reduction (vph)	0	0	140	0	0	0	132	0	0	131	0	0
Lane Group Flow (vph)	48	413	156	0	349	371	86	185	476	158	138	515
Confl. Peds. (#/hr)	1						1			1	1	
Heavy Vehicles (%)	0%	2%	7%	0%	7%	4%	2%	14%	14%	10%	6%	9%
Turn Type	D.P+P	NA	pm+ov	D.P+P	D.P+P	NA	pm+ov	D.P+P	NA	pm+ov	D.P+P	NA
Protected Phases	3	8	5	7!	7	4	1	5	2	7!	1	6
Permitted Phases	4		8	8	8		4	6		2	2	
Actuated Green, G (s)	44.0	18.3	32.4		44.0	39.7	51.4	52.2	40.5	66.2	52.2	38.1
Effective Green, g (s)	44.0	18.3	32.4		44.0	39.7	51.4	52.2	40.5	66.2	52.2	38.1
Actuated g/C Ratio	0.34	0.14	0.25		0.34	0.31	0.40	0.40	0.31	0.51	0.40	0.29
Clearance Time (s)	8.6	8.6	8.3		8.6	8.6	8.3	8.3	8.3	8.6	8.3	8.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	358	510	385		430	1102	644	355	1001	850	384	980
v/s Ratio Prot	0.00	0.11	0.04		c0.16	0.10	0.01	0.06	c0.15	0.04	0.03	c0.15
v/s Ratio Perm	0.04		0.06		c0.11		0.04	0.15		0.07	0.11	
v/c Ratio	0.13	0.81	0.41		0.81	0.34	0.13	0.52	0.48	0.19	0.36	0.53
Uniform Delay, d1	29.2	54.2	40.8		42.4	35.0	25.1	26.6	36.2	17.3	32.2	38.4
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.75	0.69	0.61	0.74	0.82
Incremental Delay, d2	0.2	9.2	0.7		11.1	0.2	0.1	1.2	1.4	0.1	0.6	2.0
Delay (s)	29.4	63.4	41.5		53.5	35.1	25.2	21.2	26.6	10.7	24.3	33.5
Level of Service	C	E	D		D	D	C	C	C	B	C	C
Approach Delay (s)		52.7				39.6			20.7			31.5
Approach LOS		D				D			C			C

Intersection Summary			
HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	33.8
Intersection Capacity Utilization	100.8%	ICU Level of Service	G
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	40
Future Volume (vph)	40
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	8.6
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)	1456
Flt Permitted	1.00
Satd. Flow (perm)	1456
Peak-hour factor, PHF	0.96
Adj. Flow (vph)	42
RTOR Reduction (vph)	28
Lane Group Flow (vph)	14
Confl. Peds. (#/hr)	
Heavy Vehicles (%)	12%
Turn Type	pm+ov
Protected Phases	3
Permitted Phases	6
Actuated Green, G (s)	42.4
Effective Green, g (s)	42.4
Actuated g/C Ratio	0.33
Clearance Time (s)	8.6
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	474
v/s Ratio Prot	0.00
v/s Ratio Perm	0.01
v/c Ratio	0.03
Uniform Delay, d1	29.8
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	29.8
Level of Service	C
Approach Delay (s)	
Approach LOS	

Intersection Summary

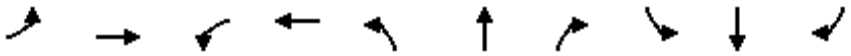
Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	70	143	7	54	612	2	550
v/c Ratio	0.51	0.44	0.10	0.09	0.25	0.00	0.24
Control Delay	68.8	5.0	61.6	2.6	2.7	6.0	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.8	5.0	61.6	2.6	2.7	6.0	9.6
Queue Length 50th (ft)	57	0	6	4	26	0	83
Queue Length 95th (ft)	105	8	22	14	67	4	164
Internal Link Dist (ft)	1324		115		1357		1543
Turn Bay Length (ft)		220		190		140	
Base Capacity (vph)	217	392	84	625	2445	656	2281
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.36	0.08	0.09	0.25	0.00	0.24

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	1	136	5	2	0	51	570	11	2	492	30
Future Volume (vph)	66	1	136	5	2	0	51	570	11	2	492	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			8%			4%			1%	
Total Lost time (s)		7.8	7.8		6.1		7.4	7.4		7.4	7.4	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frt		1.00	0.85		1.00		1.00	1.00		1.00	0.99	
Flt Protected		0.95	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1644	1576		1233		1717	3231		1796	3329	
Flt Permitted		0.95	1.00		0.97		0.43	1.00		0.41	1.00	
Satd. Flow (perm)		1644	1576		1233		781	3231		778	3329	
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)	69	1	143	5	2	0	54	600	12	2	518	32
RTOR Reduction (vph)	0	0	131	0	0	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	70	12	0	7	0	54	611	0	2	547	0
Heavy Vehicles (%)	12%	0%	4%	20%	100%	42%	3%	9%	18%	0%	7%	6%
Turn Type	Split	NA	Perm	Split	NA	Perm	D.P+P	NA		D.P+P	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases			8			4	6			2		
Actuated Green, G (s)		11.0	11.0		1.6		88.7	87.6		88.7	78.2	
Effective Green, g (s)		11.0	11.0		1.6		88.7	87.6		88.7	78.2	
Actuated g/C Ratio		0.08	0.08		0.01		0.68	0.67		0.68	0.60	
Clearance Time (s)		7.8	7.8		6.1		7.4	7.4		7.4	7.4	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		139	133		15		608	2177		539	2002	
v/s Ratio Prot		c0.04			c0.01		0.01	c0.19		0.00	c0.16	
v/s Ratio Perm			0.01				0.05			0.00		
v/c Ratio		0.50	0.09		0.47		0.09	0.28		0.00	0.27	
Uniform Delay, d1		56.9	54.9		63.8		7.9	8.5		6.6	12.4	
Progression Factor		1.00	0.88		1.00		0.44	0.38		1.00	1.00	
Incremental Delay, d2		2.9	0.3		21.2		0.1	0.3		0.0	0.3	
Delay (s)		59.8	48.7		85.0		3.5	3.5		6.6	12.7	
Level of Service		E	D		F		A	A		A	B	
Approach Delay (s)		52.3			85.0			3.5			12.7	
Approach LOS		D			F			A			B	

Intersection Summary			
HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	28.7
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	141	319	245	602	47	499	239	237	551	185
v/c Ratio	0.53	0.55	0.60	0.80	0.13	0.50	0.27	0.56	0.42	0.19
Control Delay	32.2	48.9	33.4	49.3	20.0	40.1	9.0	26.2	31.7	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	48.9	33.4	49.3	20.0	40.1	9.0	26.2	31.7	2.5
Queue Length 50th (ft)	73	118	136	217	19	172	44	107	175	0
Queue Length 95th (ft)	110	164	187	265	46	249	98	183	245	34
Internal Link Dist (ft)		616		345		1390			1400	
Turn Bay Length (ft)	235		150		130		240	150		390
Base Capacity (vph)	275	581	531	935	352	995	995	452	1311	981
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	0.51	0.55	0.46	0.64	0.13	0.50	0.24	0.52	0.42	0.19

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	138	297	16	240	421	169	10	36	489	234	232	540
Future Volume (vph)	138	297	16	240	421	169	10	36	489	234	232	540
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	11	12	12	12	12
Total Lost time (s)	7.2	7.2		7.2	7.2			10.0	10.0	7.2	10.0	10.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.99		1.00	0.96			1.00	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1805	3484		1770	3397			1708	3539	1583	1770	3539
Flt Permitted	0.21	1.00		0.47	1.00			0.39	1.00	1.00	0.40	1.00
Satd. Flow (perm)	393	3484		878	3397			710	3539	1583	751	3539
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	141	303	16	245	430	172	10	37	499	239	237	551
RTOR Reduction (vph)	0	3	0	0	38	0	0	0	0	74	0	0
Lane Group Flow (vph)	141	316	0	245	564	0	0	47	499	165	237	551
Heavy Vehicles (%)	0%	3%	0%	2%	2%	1%	10%	0%	2%	2%	2%	2%
Turn Type	D.P+P	NA		D.P+P	NA		D.P+P	D.P+P	NA	pm+ov	D.P+P	NA
Protected Phases	7	4		3	8		5	5	2	3	1	6
Permitted Phases	8			4			6	6		2	2	
Actuated Green, G (s)	37.6	19.9		37.6	25.4			48.0	33.7	51.4	48.0	42.5
Effective Green, g (s)	37.6	19.9		37.6	25.4			48.0	33.7	51.4	48.0	42.5
Actuated g/C Ratio	0.31	0.17		0.31	0.21			0.40	0.28	0.43	0.40	0.35
Clearance Time (s)	7.2	7.2		7.2	7.2			10.0	10.0	7.2	10.0	10.0
Vehicle Extension (s)	5.0	5.0		3.0	3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	266	577		406	719			329	993	678	421	1253
v/s Ratio Prot	0.05	0.09		c0.09	c0.17			0.01	0.14	0.04	c0.07	c0.16
v/s Ratio Perm	0.11			0.10				0.05		0.07	c0.16	
v/c Ratio	0.53	0.55		0.60	0.78			0.14	0.50	0.24	0.56	0.44
Uniform Delay, d1	31.5	45.9		32.9	44.7			22.3	36.1	21.9	25.1	29.6
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.7	1.9		2.5	5.6			0.2	1.8	0.2	1.7	1.1
Delay (s)	35.2	47.8		35.4	50.3			22.5	37.9	22.1	26.8	30.8
Level of Service	D	D		D	D			C	D	C	C	C
Approach Delay (s)		43.9			46.0				32.2			27.5
Approach LOS		D			D				C			C

Intersection Summary			
HCM 2000 Control Delay	36.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	34.4
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	181
Future Volume (vph)	181
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	7.2
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1599
Flt Permitted	1.00
Satd. Flow (perm)	1599
Peak-hour factor, PHF	0.98
Adj. Flow (vph)	185
RTOR Reduction (vph)	101
Lane Group Flow (vph)	84
Heavy Vehicles (%)	1%
Turn Type	pm+ov
Protected Phases	7
Permitted Phases	6
Actuated Green, G (s)	54.7
Effective Green, g (s)	54.7
Actuated g/C Ratio	0.46
Clearance Time (s)	7.2
Vehicle Extension (s)	5.0
Lane Grp Cap (vph)	728
v/s Ratio Prot	0.01
v/s Ratio Perm	0.04
v/c Ratio	0.12
Uniform Delay, d1	18.8
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	18.9
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	2	17	1	93	1	738	30	71	873	4
Future Vol, veh/h	1	0	2	17	1	93	1	738	30	71	873	4
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	90	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	3	0	1	0	1	2	0
Mvmt Flow	1	0	2	18	1	98	1	777	32	75	919	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1464	1884	464	1405	1870	405	925	0	0	809	0	0
Stage 1	1073	1073	-	795	795	-	-	-	-	-	-	-
Stage 2	391	811	-	610	1075	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.96	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.33	2.2	-	-	2.21	-	-
Pot Cap-1 Maneuver	91	72	550	101	73	592	747	-	-	819	-	-
Stage 1	239	299	-	351	402	-	-	-	-	-	-	-
Stage 2	610	396	-	453	298	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	70	65	549	93	66	592	746	-	-	819	-	-
Mov Cap-2 Maneuver	70	65	-	93	66	-	-	-	-	-	-	-
Stage 1	238	271	-	350	401	-	-	-	-	-	-	-
Stage 2	507	395	-	410	270	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27	23.2	0	0.7
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	746	-	-	167	313	819	-	-
HCM Lane V/C Ratio	0.001	-	-	0.019	0.373	0.091	-	-
HCM Control Delay (s)	9.8	-	-	27	23.2	9.8	-	-
HCM Lane LOS	A	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	1.7	0.3	-	-

Intersection	
Int Delay, s/veh	5.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	37	61	52	44	73	12
Future Vol, veh/h	37	61	52	44	73	12
Conflicting Peds, #/hr	0	1	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	3	3	0	1	8
Mvmt Flow	43	70	60	51	84	14

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	268	87	0	0	111	0
Stage 1	86	-	-	-	-	-
Stage 2	182	-	-	-	-	-
Critical Hdwy	6.4	6.23	-	-	4.11	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.327	-	-	2.209	-
Pot Cap-1 Maneuver	726	969	-	-	1485	-
Stage 1	942	-	-	-	-	-
Stage 2	854	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	685	968	-	-	1485	-
Mov Cap-2 Maneuver	685	-	-	-	-	-
Stage 1	942	-	-	-	-	-
Stage 2	805	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	6.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	837	1485	-
HCM Lane V/C Ratio	-	-	0.135	0.057	-
HCM Control Delay (s)	-	-	10	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.2	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	91	19	28	100	0	8	0	17	0	0	0
Future Vol, veh/h	0	91	19	28	100	0	8	0	17	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	0	100	21	31	110	0	9	0	19	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	110	0	0	121	0	0	283	283	111	292	293	110
Stage 1	-	-	-	-	-	-	111	111	-	172	172	-
Stage 2	-	-	-	-	-	-	172	172	-	120	121	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1493	-	-	1479	-	-	673	629	948	664	621	949
Stage 1	-	-	-	-	-	-	899	807	-	835	760	-
Stage 2	-	-	-	-	-	-	835	760	-	889	800	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1493	-	-	1479	-	-	662	615	948	640	607	949
Mov Cap-2 Maneuver	-	-	-	-	-	-	662	615	-	640	607	-
Stage 1	-	-	-	-	-	-	899	807	-	835	743	-
Stage 2	-	-	-	-	-	-	817	743	-	871	800	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.6	9.5	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	833	1493	-	-	1479	-	-	-
HCM Lane V/C Ratio	0.033	-	-	-	0.021	-	-	-
HCM Control Delay (s)	9.5	0	-	-	7.5	0	-	0
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	-

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	17	98	1	0	124	68	0	0	1	47	0	13
Future Vol, veh/h	17	98	1	0	124	68	0	0	1	47	0	13
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
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, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	5	0	0	0	0	0	0	0	0	2	1	0
Mvmt Flow	18	105	1	0	133	73	0	0	1	51	0	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	207	0	0	106	0	0	320	349	106	313	313	172
Stage 1	-	-	-	-	-	-	142	142	-	171	171	-
Stage 2	-	-	-	-	-	-	178	207	-	142	142	-
Critical Hdwy	4.15	-	-	4.1	-	-	7.1	6.5	6.2	7.12	6.51	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.12	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.12	5.51	-
Follow-up Hdwy	2.245	-	-	2.2	-	-	3.5	4	3.3	3.518	4.009	3.3
Pot Cap-1 Maneuver	1346	-	-	1498	-	-	637	578	954	640	604	877
Stage 1	-	-	-	-	-	-	866	783	-	831	759	-
Stage 2	-	-	-	-	-	-	828	734	-	861	781	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1345	-	-	1498	-	-	620	569	954	632	595	875
Mov Cap-2 Maneuver	-	-	-	-	-	-	620	569	-	632	595	-
Stage 1	-	-	-	-	-	-	854	772	-	819	758	-
Stage 2	-	-	-	-	-	-	814	733	-	848	770	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0	8.8	10.9
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	954	1345	-	-	1498	-	-	672
HCM Lane V/C Ratio	0.001	0.014	-	-	-	-	-	0.096
HCM Control Delay (s)	8.8	7.7	0	-	0	-	-	10.9
HCM Lane LOS	A	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.3

Intersection	
Int Delay, s/veh	20.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	49	610	104	22	735	20	71	33	39	3	8	37
Future Vol, veh/h	49	610	104	22	735	20	71	33	39	3	8	37
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	50	-	-	270	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	3	0	4	2	5	1	6	2	0	12	2
Mvmt Flow	53	656	112	24	790	22	76	35	42	3	9	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	812	0	0	768	0	0	1266	1678	384	1301	1723	406
Stage 1	-	-	-	-	-	-	818	818	-	849	849	-
Stage 2	-	-	-	-	-	-	448	860	-	452	874	-
Critical Hdwy	4.1	-	-	4.18	-	-	7.52	6.62	6.94	7.5	6.74	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.52	5.62	-	6.5	5.74	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.52	5.62	-	6.5	5.74	-
Follow-up Hdwy	2.2	-	-	2.24	-	-	3.51	4.06	3.32	3.5	4.12	3.32
Pot Cap-1 Maneuver	823	-	-	829	-	-	127	90	614	121	80	594
Stage 1	-	-	-	-	-	-	338	379	-	326	353	-
Stage 2	-	-	-	-	-	-	562	362	-	562	343	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	823	-	-	829	-	-	100	82	614	70	73	594
Mov Cap-2 Maneuver	-	-	-	-	-	-	100	82	-	70	73	-
Stage 1	-	-	-	-	-	-	316	355	-	305	343	-
Stage 2	-	-	-	-	-	-	496	352	-	441	321	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.3	235.1	25.8
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	122	823	-	-	829	-	-	224
HCM Lane V/C Ratio	1.26	0.064	-	-	0.029	-	-	0.23
HCM Control Delay (s)	235.1	9.7	-	-	9.5	-	-	25.8
HCM Lane LOS	F	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	9.8	0.2	-	-	0.1	-	-	0.9

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	5	5	128	122	14
Future Vol, veh/h	13	5	5	128	122	14
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	0	40	0	3	1	0
Mvmt Flow	16	6	6	156	149	17

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	328	160	168	0	-	0
Stage 1	160	-	-	-	-	-
Stage 2	168	-	-	-	-	-
Critical Hdwy	6.4	6.6	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.66	2.2	-	-	-
Pot Cap-1 Maneuver	671	795	1422	-	-	-
Stage 1	874	-	-	-	-	-
Stage 2	867	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	665	793	1419	-	-	-
Mov Cap-2 Maneuver	665	-	-	-	-	-
Stage 1	868	-	-	-	-	-
Stage 2	865	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.3	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1419	-	696	-	-
HCM Lane V/C Ratio	0.004	-	0.032	-	-
HCM Control Delay (s)	7.5	0	10.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↕			↕			↕			↰	↱
Traffic Vol, veh/h	1	55	0	11	0	0	2	13	76	0	1	76	50
Future Vol, veh/h	1	55	0	11	0	0	2	13	76	0	1	76	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	65
Veh in Median Storage, #	-	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	1	2	9	50	50	50	0	2	2	100	2	2
Mvmt Flow	1	67	0	13	0	0	2	16	93	0	1	93	61

Major/Minor	Minor2			Minor1			Major1			Major2			
Conflicting Flow All	0	221	220	93	257	281	93	154	0	0	93	0	0
Stage 1	0	95	95	-	125	125	-	-	-	-	-	-	-
Stage 2	0	126	125	-	132	156	-	-	-	-	-	-	-
Critical Hdwy	-	7.11	6.52	6.29	7.6	7	6.7	4.1	-	-	5.1	-	-
Critical Hdwy Stg 1	-	6.11	5.52	-	6.6	6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	6.11	5.52	-	6.6	6	-	-	-	-	-	-	-
Follow-up Hdwy	-	3.509	4.018	3.381	3.95	4.45	3.75	2.2	-	-	3.1	-	-
Pot Cap-1 Maneuver	0	737	678	945	608	554	847	1439	-	-	1059	-	-
Stage 1	0	914	816	-	776	709	-	-	-	-	-	-	-
Stage 2	0	880	792	-	769	686	-	-	-	-	-	-	-
Platoon blocked, %	-								-	-		-	-
Mov Cap-1 Maneuver	0	727	669	945	593	547	847	1439	-	-	1059	-	-
Mov Cap-2 Maneuver	0	727	669	-	593	547	-	-	-	-	-	-	-
Stage 1	0	903	815	-	767	700	-	-	-	-	-	-	-
Stage 2	0	867	782	-	757	685	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.3	9.3	1.1	0.1
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1439	-	-	756	847	1059	-	-
HCM Lane V/C Ratio	0.011	-	-	0.106	0.003	0.001	-	-
HCM Control Delay (s)	7.5	0	-	10.3	9.3	8.4	0	-
HCM Lane LOS	A	A	-	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0	0	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	6	11	68	69	20
Future Vol, veh/h	20	6	11	68	69	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	2	2	4	4
Mvmt Flow	22	7	12	76	77	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	188	88	99	0	-	0
Stage 1	88	-	-	-	-	-
Stage 2	100	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.12	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.218	-	-	-
Pot Cap-1 Maneuver	806	976	1494	-	-	-
Stage 1	940	-	-	-	-	-
Stage 2	929	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	800	976	1494	-	-	-
Mov Cap-2 Maneuver	800	-	-	-	-	-
Stage 1	932	-	-	-	-	-
Stage 2	929	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1494	-	835	-	-
HCM Lane V/C Ratio	0.008	-	0.035	-	-
HCM Control Delay (s)	7.4	0	9.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	236	228	67	65	10
Future Vol, veh/h	16	236	228	67	65	10
Conflicting Peds, #/hr	0	0	0	0	1	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	1	1	2	6	0
Mvmt Flow	17	254	245	72	70	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	317	0	-	0	570	282
Stage 1	-	-	-	-	281	-
Stage 2	-	-	-	-	289	-
Critical Hdwy	4.1	-	-	-	6.46	6.2
Critical Hdwy Stg 1	-	-	-	-	5.46	-
Critical Hdwy Stg 2	-	-	-	-	5.46	-
Follow-up Hdwy	2.2	-	-	-	3.554	3.3
Pot Cap-1 Maneuver	1255	-	-	-	476	762
Stage 1	-	-	-	-	757	-
Stage 2	-	-	-	-	751	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1255	-	-	-	468	761
Mov Cap-2 Maneuver	-	-	-	-	468	-
Stage 1	-	-	-	-	745	-
Stage 2	-	-	-	-	751	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	13.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1255	-	-	-	493
HCM Lane V/C Ratio	0.014	-	-	-	0.164
HCM Control Delay (s)	7.9	0	-	-	13.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.6

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	301	11	38	295	17	24
Future Vol, veh/h	301	11	38	295	17	24
Conflicting Peds, #/hr	0	3	3	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	170	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	3	0	2	1	5	4
Mvmt Flow	338	12	43	331	19	27

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	353	0	764	347
Stage 1	-	-	-	-	347	-
Stage 2	-	-	-	-	417	-
Critical Hdwy	-	-	4.12	-	6.45	6.24
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.218	-	3.545	3.336
Pot Cap-1 Maneuver	-	-	1206	-	368	692
Stage 1	-	-	-	-	709	-
Stage 2	-	-	-	-	659	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1203	-	354	690
Mov Cap-2 Maneuver	-	-	-	-	354	-
Stage 1	-	-	-	-	707	-
Stage 2	-	-	-	-	635	-

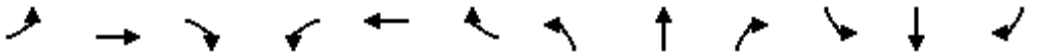
Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	13
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	495	-	-	1203	-
HCM Lane V/C Ratio	0.093	-	-	0.035	-
HCM Control Delay (s)	13	-	-	8.1	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	329	93	79	103	1186	14	1116
v/c Ratio	0.95	0.20	0.62	0.39	0.57	0.06	0.67
Control Delay	85.6	10.9	60.0	15.3	20.7	11.3	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.6	10.9	60.0	15.3	20.7	11.3	21.6
Queue Length 50th (ft)	270	7	42	35	303	2	272
Queue Length 95th (ft)	#378	51	99	62	482	m7	m411
Internal Link Dist (ft)		1327	452		1032		1169
Turn Bay Length (ft)	160			150		190	
Base Capacity (vph)	346	477	144	289	2088	248	1677
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.19	0.55	0.36	0.57	0.06	0.67

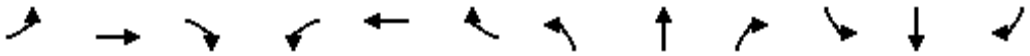
Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	303	9	76	19	15	39	95	1079	12	13	803	224
Future Volume (vph)	303	9	76	19	15	39	95	1079	12	13	803	224
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-5%			2%			-2%			3%	
Total Lost time (s)	7.3	7.3			7.3		8.6	8.6		8.6	8.6	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	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	
Frt	1.00	0.87			0.93		1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1850	1549			1683		1787	3569		1778	3287	
Flt Permitted	0.68	1.00			0.88		0.17	1.00		0.16	1.00	
Satd. Flow (perm)	1321	1549			1499		311	3569		300	3287	
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)	329	10	83	21	16	42	103	1173	13	14	873	243
RTOR Reduction (vph)	0	62	0	0	30	0	0	0	0	0	17	0
Lane Group Flow (vph)	329	31	0	0	49	0	103	1186	0	14	1099	0
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	0%	0%	10%	5%	0%	2%	2%	2%	0%	0%	5%	1%
Turn Type	D.P+P	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases	3	8			4		5	2		1	6	
Permitted Phases	4			4			6			2		
Actuated Green, G (s)	28.9	36.2			9.2		79.3	76.7		79.3	70.7	
Effective Green, g (s)	28.9	36.2			9.2		79.3	76.7		79.3	70.7	
Actuated g/C Ratio	0.21	0.26			0.07		0.57	0.55		0.57	0.51	
Clearance Time (s)	7.3	7.3			7.3		8.6	8.6		8.6	8.6	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	347	400			98		266	1955		197	1659	
v/s Ratio Prot	c0.13	0.02					0.02	c0.33		0.00	c0.33	
v/s Ratio Perm	c0.06				0.03		0.20			0.04		
v/c Ratio	0.95	0.08			0.50		0.39	0.61		0.07	0.66	
Uniform Delay, d1	54.2	39.3			63.2		16.8	21.4		27.1	25.8	
Progression Factor	1.00	1.00			1.00		1.00	1.00		0.96	0.78	
Incremental Delay, d2	34.6	0.1			4.0		0.9	1.4		0.1	1.5	
Delay (s)	88.8	39.4			67.2		17.7	22.8		26.2	21.7	
Level of Service	F	D			E		B	C		C	C	
Approach Delay (s)		77.9			67.2			22.4			21.7	
Approach LOS		E			E			C			C	

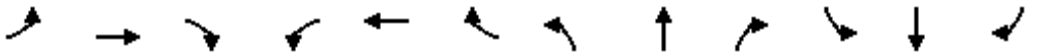
Intersection Summary			
HCM 2000 Control Delay	31.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	31.8
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	75	435	187	411	448	216	296	721	525	267	591	62
v/c Ratio	0.24	0.83	0.33	0.92	0.41	0.26	0.73	0.75	0.56	0.73	0.61	0.10
Control Delay	28.4	71.9	4.5	76.1	40.9	4.1	35.0	44.4	15.5	41.6	34.1	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.4	71.9	4.5	76.1	40.9	4.1	35.0	44.4	15.5	41.6	34.1	1.9
Queue Length 50th (ft)	42	203	5	284	172	15	120	223	116	140	250	5
Queue Length 95th (ft)	77	265	31	#501	225	48	m190	m306	m214	240	334	18
Internal Link Dist (ft)		853			1394			1169			1357	
Turn Bay Length (ft)	350		300	500		200	190		330	190		160
Base Capacity (vph)	318	560	626	446	1089	830	474	967	936	366	961	630
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.78	0.30	0.92	0.41	0.26	0.62	0.75	0.56	0.73	0.61	0.10

Intersection Summary

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



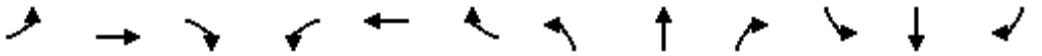
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	413	178	390	426	205	281	685	499	254	561	59
Future Volume (vph)	71	413	178	390	426	205	281	685	499	254	561	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-5%			-8%			-3%			-2%	
Total Lost time (s)	8.6	8.6	8.3	8.6	8.6	8.3	8.3	8.3	8.6	8.3	8.3	8.6
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1813	3664	1547	1859	3681	1648	1796	3592	1623	1823	3506	1609
Flt Permitted	0.42	1.00	1.00	0.28	1.00	1.00	0.28	1.00	1.00	0.19	1.00	1.00
Satd. Flow (perm)	799	3664	1547	548	3681	1648	538	3592	1623	359	3506	1609
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)	75	435	187	411	448	216	296	721	525	267	591	62
RTOR Reduction (vph)	0	0	123	0	0	96	0	0	93	0	0	42
Lane Group Flow (vph)	75	435	64	411	448	120	296	721	432	267	591	20
Confl. Peds. (#/hr)	1					1	4					4
Heavy Vehicles (%)	2%	1%	7%	1%	2%	1%	2%	2%	1%	0%	4%	0%
Turn Type	D.P+P	NA	pm+ov	D.P+P	NA	pm+ov	D.P+P	NA	pm+ov	D.P+P	NA	pm+ov
Protected Phases	3	8	5	7	4	1	5	2	7	1	6	3
Permitted Phases	4		8	8		4	6		2	2		6
Actuated Green, G (s)	47.8	20.2	40.2	47.8	41.4	62.1	58.4	37.7	65.3	58.4	38.4	44.8
Effective Green, g (s)	47.8	20.2	40.2	47.8	41.4	62.1	58.4	37.7	65.3	58.4	38.4	44.8
Actuated g/C Ratio	0.34	0.14	0.29	0.34	0.30	0.44	0.42	0.27	0.47	0.42	0.27	0.32
Clearance Time (s)	8.6	8.6	8.3	8.6	8.6	8.3	8.3	8.3	8.6	8.3	8.3	8.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	319	528	444	445	1088	731	404	967	856	366	961	514
v/s Ratio Prot	0.01	0.12	0.02	c0.18	0.12	0.02	0.10	c0.20	0.10	0.11	0.17	0.00
v/s Ratio Perm	0.07		0.02	c0.13		0.05	c0.20		0.17	0.20		0.01
v/c Ratio	0.24	0.82	0.14	0.92	0.41	0.16	0.73	0.75	0.50	0.73	0.61	0.04
Uniform Delay, d1	31.8	58.2	37.1	48.0	39.5	23.4	29.4	46.8	26.1	45.8	44.3	32.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.10	0.86	0.94	0.67	0.69	1.00
Incremental Delay, d2	0.4	10.1	0.1	24.8	0.3	0.1	5.2	4.0	0.4	6.8	2.8	0.0
Delay (s)	32.2	68.2	37.2	72.8	39.8	23.5	37.4	44.0	24.8	37.5	33.3	32.8
Level of Service	C	E	D	E	D	C	D	D	C	D	C	C
Approach Delay (s)		56.1			49.1			36.2			34.5	
Approach LOS		E			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	42.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	33.8
Intersection Capacity Utilization	112.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	86	95	17	1	133	846	816
v/c Ratio	0.55	0.30	0.19	0.00	0.25	0.32	0.40
Control Delay	74.8	2.4	68.1	0.0	3.8	1.8	17.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.8	2.4	68.1	0.0	3.8	1.8	17.7
Queue Length 50th (ft)	76	0	15	0	4	13	177
Queue Length 95th (ft)	m130	m0	41	0	m22	63	310
Internal Link Dist (ft)	1324		115			1357	1543
Turn Bay Length (ft)		220			190		
Base Capacity (vph)	223	370	104	293	540	2676	2047
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.26	0.16	0.00	0.25	0.32	0.40

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	1	89	14	2	1	125	791	5	0	719	48
Future Volume (vph)	80	1	89	14	2	1	125	791	5	0	719	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			8%			4%			1%	
Total Lost time (s)		7.8	7.8		6.1	6.1	7.4	7.4			7.4	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95			0.95	
Frpb, ped/bikes		1.00	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	
Frt		1.00	0.85		1.00	0.85	1.00	1.00			0.99	
Flt Protected		0.95	1.00		0.96	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		1820	1607		1645	1521	1767	3499			3485	
Flt Permitted		0.95	1.00		0.96	1.00	0.29	1.00			1.00	
Satd. Flow (perm)		1820	1607		1645	1521	543	3499			3485	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	85	1	95	15	2	1	133	841	5	0	765	51
RTOR Reduction (vph)	0	0	87	0	0	1	0	0	0	0	3	0
Lane Group Flow (vph)	0	86	8	0	17	0	133	846	0	0	813	0
Confl. Peds. (#/hr)	5					5	5		2	2		5
Heavy Vehicles (%)	1%	0%	2%	7%	0%	0%	0%	1%	0%	2%	2%	0%
Turn Type	Split	NA	Perm	Split	NA	Perm	D.P+P	NA		D.P+P	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases			8			4	6			2		
Actuated Green, G (s)		11.9	11.9		3.3	3.3	96.1	103.5			78.5	
Effective Green, g (s)		11.9	11.9		3.3	3.3	96.1	103.5			78.5	
Actuated g/C Ratio		0.09	0.09		0.02	0.02	0.69	0.74			0.56	
Clearance Time (s)		7.8	7.8		6.1	6.1	7.4	7.4			7.4	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)		154	136		38	35	526	2586			1954	
v/s Ratio Prot		c0.05			c0.01		0.03	c0.24			c0.23	
v/s Ratio Perm			0.01			0.00	0.14					
v/c Ratio		0.56	0.06		0.45	0.00	0.25	0.33			0.42	
Uniform Delay, d1		61.5	58.9		67.5	66.7	14.0	6.3			17.6	
Progression Factor		1.01	1.00		1.00	1.00	0.38	0.26			1.00	
Incremental Delay, d2		4.3	0.2		8.2	0.0	0.2	0.3			0.7	
Delay (s)		66.2	59.1		75.6	66.7	5.6	1.9			18.3	
Level of Service		E	E		E	E	A	A			B	
Approach Delay (s)		62.5			75.1			2.4			18.3	
Approach LOS		E			E			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.7
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			