

March 24, 2022

Mr. Mark DiLungo  
The Bluffs, LLC  
c/o DFG Electric, Inc.  
218 Foxon Road  
East Haven, CT 06513

**Re: Traffic Study  
The Bluffs  
161 Foxon Road (Route 80) and 31 and 100 Sperry Lane  
East Haven, Connecticut  
SLR #141.15956.00001**

Dear Mr. DiLungo,

At your request, we have prepared this traffic study with respect to your 380-unit elderly residential community development, including four multifamily buildings, to be located at the former Girl Scouts campgrounds on Sperry Lane, north of Foxon Road (Route 80) in East Haven, Connecticut.

Primary access will be via a new driveway at 161 Foxon Road, which for reference is approximately 600 feet west of Sperry Lane. Note that Sperry Lane is to remain for a handful of existing houses that have access on it but will not provide site access for The Bluffs. Ultimately, the handful of existing Sperry Lane houses may be given access via The Bluffs' site driveway to/from Foxon Road, and the existing Sperry Lane connection to Foxon Road could be closed if so desired. The site location and area roadways are shown in Figure 1.

The study involved field reconnaissance and inventory of current roadway and traffic conditions; collection of traffic volume data, crash data, and other pertinent information; a determination of future roadway traffic before the proposed development is opened (background traffic); an estimation of site traffic volumes generated by the proposed development; review of the sight line visibility at Foxon Road from the proposed site access driveway; and analysis of the signalized intersections of Foxon Road at Wheelbarrow Lane/River Road and at Totoket Road and the unsignalized intersections of Foxon Road at North High Street and at Branhaven Drive as well as the proposed development site driveway access at Foxon Road both without and with The Bluffs.

#### **Study Area Roadway and Site Environs**

Foxon Road (also known as Route 80) is a principal arterial that runs east-west, south of the site. The roadway has 12-foot travel lanes, an 8-foot shoulder, buffer strip, and concrete sidewalks in both

directions. Connecticut Transit bus service routes 212 and 213 travel east/west on Foxon Road in the study area and have several nonsheltered stop locations in this area. The posted speed limit on Route 80 is 45 miles per hour (mph). As measured by the Connecticut Department of Transportation (CTDOT) in 2021, the 85th percentile speed for this segment of Route 80 is 52.2 mph in the eastbound direction and 49.0 mph in the westbound direction.

Foxon Road has a signalized intersection with Wheelbarrow Lane/River Road (west of the site driveway). The east approach of this intersection has a dedicated left-turn lane and two through lanes. The west approach has a dedicated left-turn lane and one through lane. The south and north approaches have a left/through lane and a dedicated right-turn lane. The north and south approaches have a posted speed limit of 25 mph.

Foxon Road also has another signalized intersection, near the site, with Totoket Road east of the site. The west, north, and south approaches have a single multipurpose lane, and the east approach has a dedicated left-turn lane and one through lane. The north and south approaches have a posted speed limit of 25 mph.

Two unsignalized intersections are also included in the study area that are present on Foxon Road at Branhaven Drive and Foxon Road at North High Street (Route 100). For the Foxon Road at North High Street intersection, the south and west approaches have a single multipurpose lane, and the east approach has a dedicated left-turn lane and one through lane. The south approach has a posted speed limit of 35 mph. At the intersection of Foxon Road and Branhaven Drive, the east and west approaches have a single multipurpose lane, and the north and south approaches are unmarked with a posted speed limit of 25 mph.

The surrounding area is a mixture of commercial, residential, and institutional uses, with larger shopping centers within 2 miles to the west toward Interstate 91.

### **Area Traffic Volumes**

Review was made of available traffic data from CTDOT. The state maintains traffic monitoring locations to the east on Route 80 at the East Haven-North Branford town line. The available state data from 2021 at this location indicates two-way Annualized Average Daily Traffic (AADT) of 9,700 vehicles at the East Haven/North Branford town line. It shows traffic peaking in the afternoon when 992 vehicles were counted on February 4, 2021.

To supplement the data obtained from CTDOT, manual turning movement counts were performed at the intersections of Route 80 at North High Street, Route 80 at Wheelbarrow Lane/River Road, Route 80 at Branhaven Drive, and Route 80 at Totoket Road on Thursday, January 13, 2022, during the typical commuter peak periods. CTDOT's Bureau of Policy and Planning advised no adjustments to the counts were necessary to account for COVID-19 traffic impacts. However, after comparing the manual turning movement counts to previous May 2017 counts collected at some of the study intersections and finding

that the older counts were higher, we increased the 2022 counts by 15 percent to account for the difference and any seasonal influences on traffic volumes as an added conservative measure. Figure 2 shows the overall peak-hour traffic volumes for the weekday morning (7:00 a.m. to 8:00 a.m.) and afternoon (4:45 p.m. to 5:45 p.m.).

### **Crashes**

Information on crash data for Foxon Road (Route 80) between North High Street and Totoket Road was obtained from the University of Connecticut's Connecticut Crash Data Repository for the period of January 1, 2019, to December 31, 2021. The data collected for this period is shown in Table 1, summarized by location, collision type, and crash severity.

In the vicinity of the site driveway between Sperry Lane and Wheelbarrow Lane, there was only one crash, which resulted in property damage.

There were 13 crashes reported at the signalized intersection of Route 80 at Wheelbarrow Lane/River Road; seven were property damage only, and six were possible or suspected injuries. Of these crashes, six were rear-end-type collisions, five were collisions at an angle, and the rest of them were fixed-object collisions.

The section of Route 80 from Branhaven Drive to the intersection of Totoket Road had a total of 31 crashes, which is roughly one-third of the total crashes. Sixty-seven percent of them resulted in property damage only.

There was one crash that occurred during the study period that resulted in a fatality along Route 80 between Wheelbarrow Lane/River Road and North High Street at approximately 4:20 a.m. on December 23, 2021, where a motorist traveling eastbound lost control and struck a business sign. Two additional fatal crashes occurred prior to the 3-year study period but within the past 10 years. One fatal crash occurred on April 24, 2018, at 6:30 a.m., when a motorcyclist travelling eastbound was rear-ended at the intersection of Route 80 and Totoket Road. The other fatal crash occurred on July 18, 2014, at approximately 7:45 p.m., when a motorcyclist headed westbound was involved in a sideswipe with an eastbound-headed vehicle, east of Circle Drive and Sperry Lane. In all of the cases, the weather conditions were clear and dry, and the crashes occurred at different times of the day.

Overall, within the study area, there was a total of 67 crashes that occurred during the recent 3-year period. Most of the crashes were rear-end collisions (49 percent), followed by angle collisions (19 percent), which unfortunately are quite common at intersections. The majority of the crashes involved property damage only.

Table 1 Crash Summary

LOCATION	TYPE OF COLLISION								CRASH SEVERITY					
	ANGLE	FIXED-OBJECT	HEAD-ON	REAR-END	SIDESWIPE, OPPOSITE DIRECTION	SIDESWIPE, SAME DIRECTION	WILDLIFE	TOTAL	FATAL INJURY	POSSIBLE INJURY	PROPERTY DAMAGE ONLY	SUSPECTED MINOR INJURY	SUSPECTED SERIOUS INJURY	TOTAL
Route 80 at North High Street	1			7				8		2	5	1		8
Route 80 between North High Street and River Road/ Wheelbarrow Lane	1	1		1				3	1		1	1		3
Route 80 at River Road/ Wheelbarrow Lane	5	2		6				13		2	7	4		13
Route 80 between River Road/ Wheelbarrow Lane and Sperry Lane							1	1			1			1
Route 80 at Sperry Lane		1				1		2			2			2
Route 80 between Sperry Lane and Branhaven Drive		1	2				1	4		1	2	1		4
Route 80 at Branhaven Drive		1		4				5			4	1		5
Route 80 between Branhaven Drive and Totoket Road	3	2	2	8	2		2	19		3	11	4	1	19
Route 80 at Totoket Road	3	1		7	1			12		3	9			12
Grand Total	13	9	4	33	3	1	4	67	1	11	42	12	1	67

Source: University of Connecticut's Connecticut Crash Data Repository from January 1, 2019, to December 31, 2021

### **Proposed Development**

The proposed development will be located on the former Girl Scouts campgrounds north of Foxon Road and east of East Haven High School. Planned are 380 dwelling units in four multistory buildings (260 dwelling units across three of the buildings; 120 units in the fourth building). Vehicle access to/from the development will be via a new driveway at 161 Foxon Road approximately 600 feet west of Sperry Lane.

The site access drive will be designed with one entrance lane and one exit lane. Site egress to Foxon Road will be stop-sign controlled for motorists exiting the development. An existing emergency access for The Bluffs via the East Haven High School access road (Wheelbarrow Lane) is also proposed.

Speed data was collected by CTDOT for Foxon Road during February 2021. The location of speed collection aligns within feet of the proposed access at 161 Foxon Road. The 85th percentile speeds for this location are 52.2 mph eastbound and 49.0 mph westbound, which require 580 feet and 545 feet, respectively, of Intersection Sight Distance (ISD) for passenger cars. The available ISD from the proposed access point exceeds CTDOT guidelines in both travel directions for the posted speed limit of 45 mph as well as the 85th percentile speeds.

### **Site Traffic and Distribution**

The site traffic for the proposed senior housing development was estimated based on review of statistical data published by the Institute of Transportation Engineers (ITE). Based on ITE land use code #221, Multifamily Housing (Mid-Rise), Table 2 below summarizes the peak-hour traffic that is estimated to be generated by The Bluffs.

**Table 2 Trip Generation Estimate**

LAND USE	NUMBER OF VEHICLE TRIPS					
	WEEKDAY MORNING PEAK HOUR			WEEKDAY AFTERNOON PEAK HOUR		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Multifamily Housing (Mid-Rise), 380 Units	35	98	133	89	59	148

*Trip Generation, 11th Edition. Institute of Transportation Engineers, 2021 (ITE #221)*

The land use code used in this study is for general multifamily housing and provides a conservative estimate of trip generation since it reflects residents who are more active and generate more trips than a typical elderly housing community. For comparison, trips were also estimated using the Senior Adult Housing – Multifamily (ITE #252) land use code. The total trips generated during the morning and afternoon peak hours were found to be 110 and 114, respectively. This study uses the higher trip numbers shown in Table 2 to be conservative. As discussed later in the Capacity Analysis section of this document, the conservative trip estimates produce no notable traffic impact on the study area.

The geographic distribution of the site-generated traffic was estimated based on review of Census Journey-to-Work data and our understanding of the surrounding roadway system. It is estimated that approximately 20 percent of the new site traffic will access the site via Foxon Road to/from the east, made up of 5 percent each north and south on Totoket Road and 10 percent east on Foxon Road. It is estimated

that approximately 80 percent of the site-generated traffic will access the site via Foxon Road to/from the west, including 5 percent using River Road, 25 percent using North High Street, and 50 percent to/from the west on Foxon Road.

Figures 3 and 4 illustrate the site-generated traffic volume distribution and site-generated trips for the proposed development during the weekday morning and afternoon peak hours, respectively.

### **Future Traffic**

For the purpose of this study, a future horizon year of 2023 was used for analysis. The existing traffic volumes were projected to year 2023 using an annual growth rate of 1.0 percent, which was suggested by CTDOT's Bureau of Policy and Planning. Discussions with CTDOT and the Towns of East Haven and North Branford indicate that there are no approved significant developments within the study area at this time to include in the background traffic volumes. The future background (no-build) volumes for the weekday morning and afternoon peak periods, which do not include site-generated traffic, are shown in Figure 5.

The estimated site traffic volumes generated by the proposed development were added to the 2023 background traffic volumes to derive the future combined (build) traffic volumes. The combined traffic volumes reflect future roadway traffic volumes with the proposed development in place and are used in analyses to determine roadway adequacy. Figure 6 depicts the 2023 combined traffic volumes for the weekday morning and weekday afternoon peak hours along the adjacent roads.

### **Capacity Analysis**

The study intersections were evaluated by means of capacity analysis techniques. Levels of Service (LOS) were then determined, which are qualitative measures of the efficiency of operations in terms of delay and inconvenience to motorists. A description of the various LOS designations, A through F, is given in the Appendix. LOS A describes operations with very low average control delay per vehicle while LOS F describes operations with long average delays. The analysis worksheets are also enclosed in the Appendix. Table 3 summarizes the findings of future LOS at the study intersections without (background conditions) and with (combined conditions) the estimated new traffic from The Bluffs.

As can be seen in Table 3, most movements at the study intersections are expected to operate at LOS C or better. One traffic movement, the northbound left/through at River Road, shows a degradation in LOS from C to D with the addition of the proposed site traffic during the afternoon peak hour. However, this is the result of a negligible increase in delay, which would be imperceptible to motorists. The same is true for the degradation of overall LOS from B to C at this intersection during the morning peak hour. While a minor timing change could reverse this result, the small increase in delay, the day-to-day variability of traffic, and the conservative approach we used leads us to not recommend any modifications to signal timing. Elsewhere, traffic capacity will be imperceptibly affected by traffic from The Bluffs as well. Thus, The Bluffs is not expected to have any notable traffic impact.

**Table 3 Capacity Analysis Summary**

INTERSECTION	LEVEL OF SERVICE			
	WEEKDAY MORNING PEAK HOUR		WEEKDAY AFTERNOON PEAK HOUR	
	BACKGROUND	COMBINED	BACKGROUND	COMBINED
<b>SIGNALIZED</b>				
<b>Route 80 at Wheelbarrow Lane/River Road</b>				
Eastbound Left	B	B	A	A
Eastbound Through/Right	C	C	B	B
Westbound Left	B	B	A	A
Westbound Through/Right	C	C	B	B
Northbound Left/Through	C	C	C	D
Northbound Right	A	A	A	A
Southbound Left/Through	C	C	C	C
Southbound Right	A	A	A	A
<b>Overall LOS</b>	<b>B</b>	<b>C</b>	<b>B</b>	<b>B</b>
<b>Route 80 at Totoket Road</b>				
Eastbound Left/Through/Right	C	C	D	D
Westbound Left	A	A	B	B
Westbound Through/Right	A	A	B	B
Northbound Left/Through/Right	C	C	D	D
Southbound Left/Through/Right	C	C	C	C
<b>Overall LOS</b>	<b>C</b>	<b>C</b>	<b>C</b>	<b>C</b>
<b>UNSIGNALIZED</b>				
<b>Proposed Access Road at Route 80</b>				
Eastbound Left from Route 80		A		A
Southbound Left/Right from site drive		B		C
<b>Route 80 at North High Street</b>				
Westbound Left	A	A	A	A
Northbound Left/Right	C	C	C	C
<b>Branhaven Drive at Route 80</b>				
Eastbound Left/Through/Right	A	A	A	A
Westbound Left/Through/Right	A	A	A	A
Northbound Left/Through/Right	C	C	C	C
Southbound Left/Through/Right	C	C	D	D

### **Summary**

A study was conducted to assess the traffic impact of the proposed multifamily housing development to be located at the former Girl Scouts campgrounds north of Route 80 (Foxon Road) in East Haven,

Connecticut. A study of existing traffic conditions was undertaken through a detailed field reconnaissance and data assembly effort. Traffic generated by The Bluffs was estimated based on review of industry standard data. Future traffic conditions were estimated with and without the development in place, and capacity analysis of future scenarios was performed. No notable impacts to motorist delay and vehicle queueing at the study intersections are expected to be caused by The Bluffs.

Based on our analysis, it is our opinion that the surrounding roadway system will be able to accommodate new traffic that would be generated by The Bluffs. We hope this study is useful to you and the Town of East Haven in assessing the traffic aspects of this proposed development. If you have any questions or need any further information, please do not hesitate to contact me.

Sincerely,

**SLR International Corporation**



David G. Sullivan, PE  
US Manager of Traffic & Transportation Planning

#### Figures

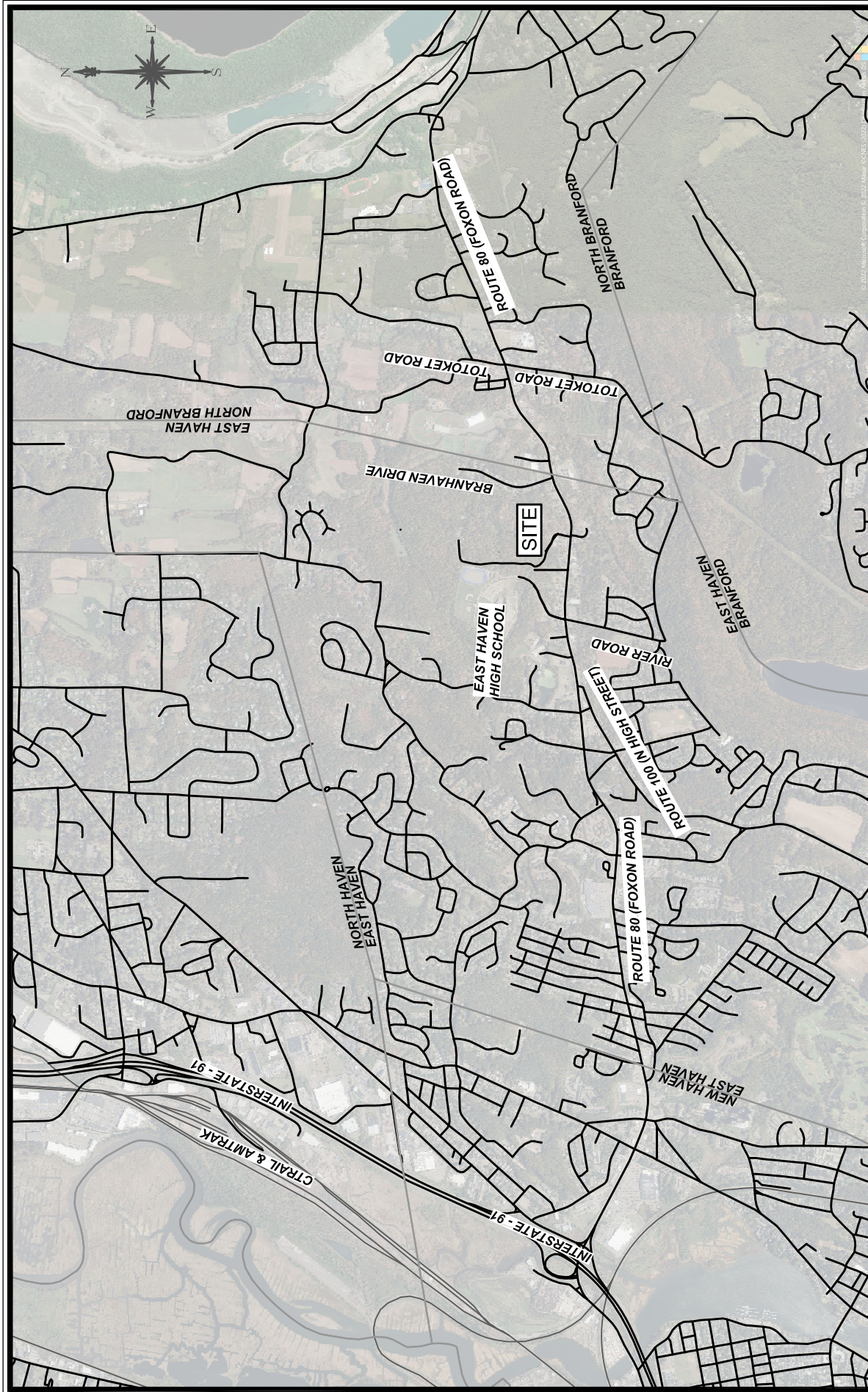
- Figure 1 – Site Location Map
- Figure 2 – Existing Peak-Hour Traffic Volumes
- Figure 3 – Proposed Development Site-Generated Traffic Volume Distribution
- Figure 4 – Proposed Development Site-Generated Trips Assignment
- Figure 5 – Background (2023) Conditions Peak-Hour Traffic Volumes
- Figure 6 – Combined (2023) Conditions Peak-Hour Traffic Volumes

#### Appendix

- Peak-Hour Traffic Counts
- LOS Designation Descriptions
- *Synchro* Analysis Worksheets

15956.p0001.mr2322.ltr.docx



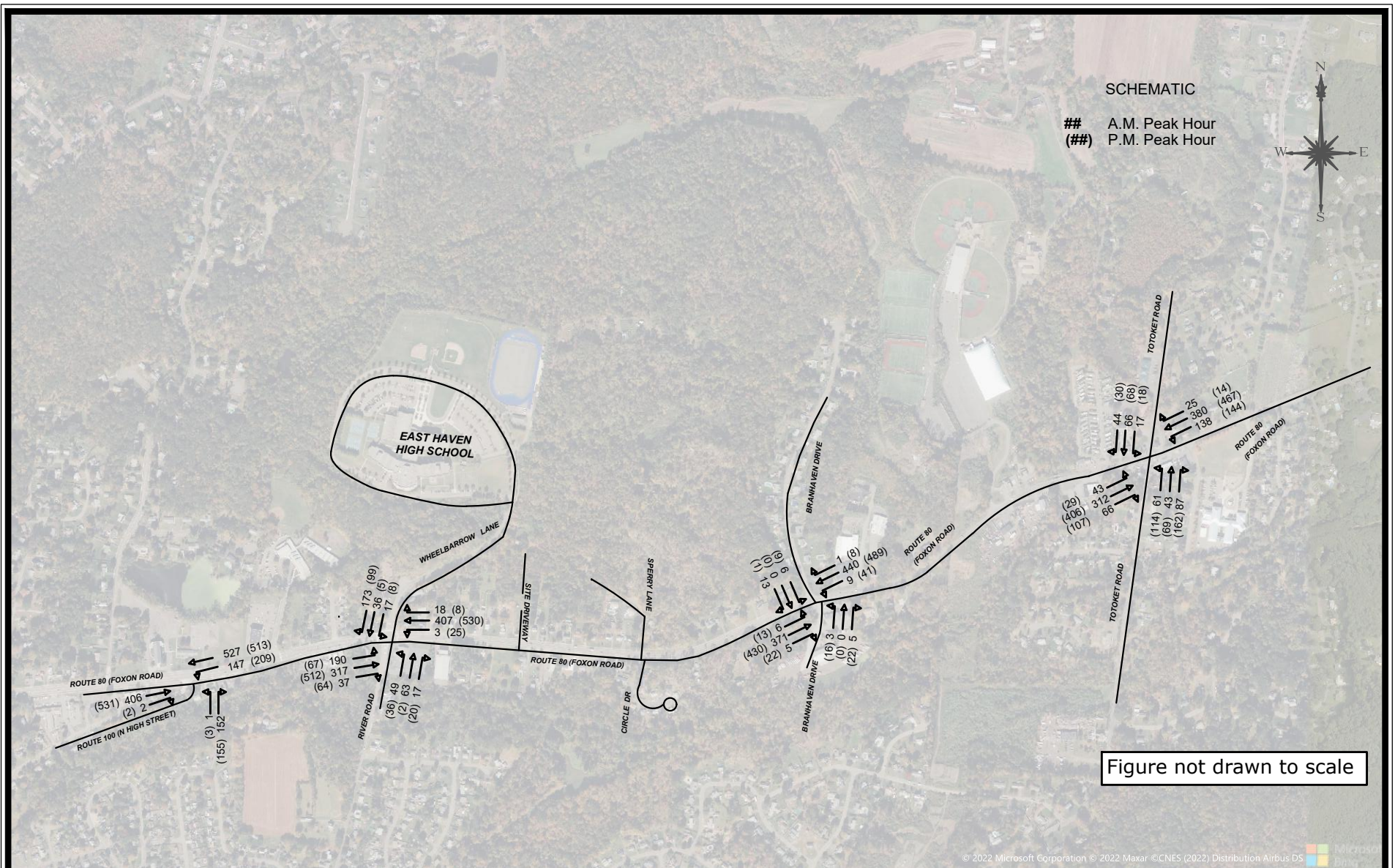


## SITE LOCATION

Proposed Elderly Multifamily Housing Development  
 161 Foxon Road  
 East Haven, Connecticut

FIGURE 1





## EXISTING PEAK HOUR TRAFFIC VOLUMES (2022)

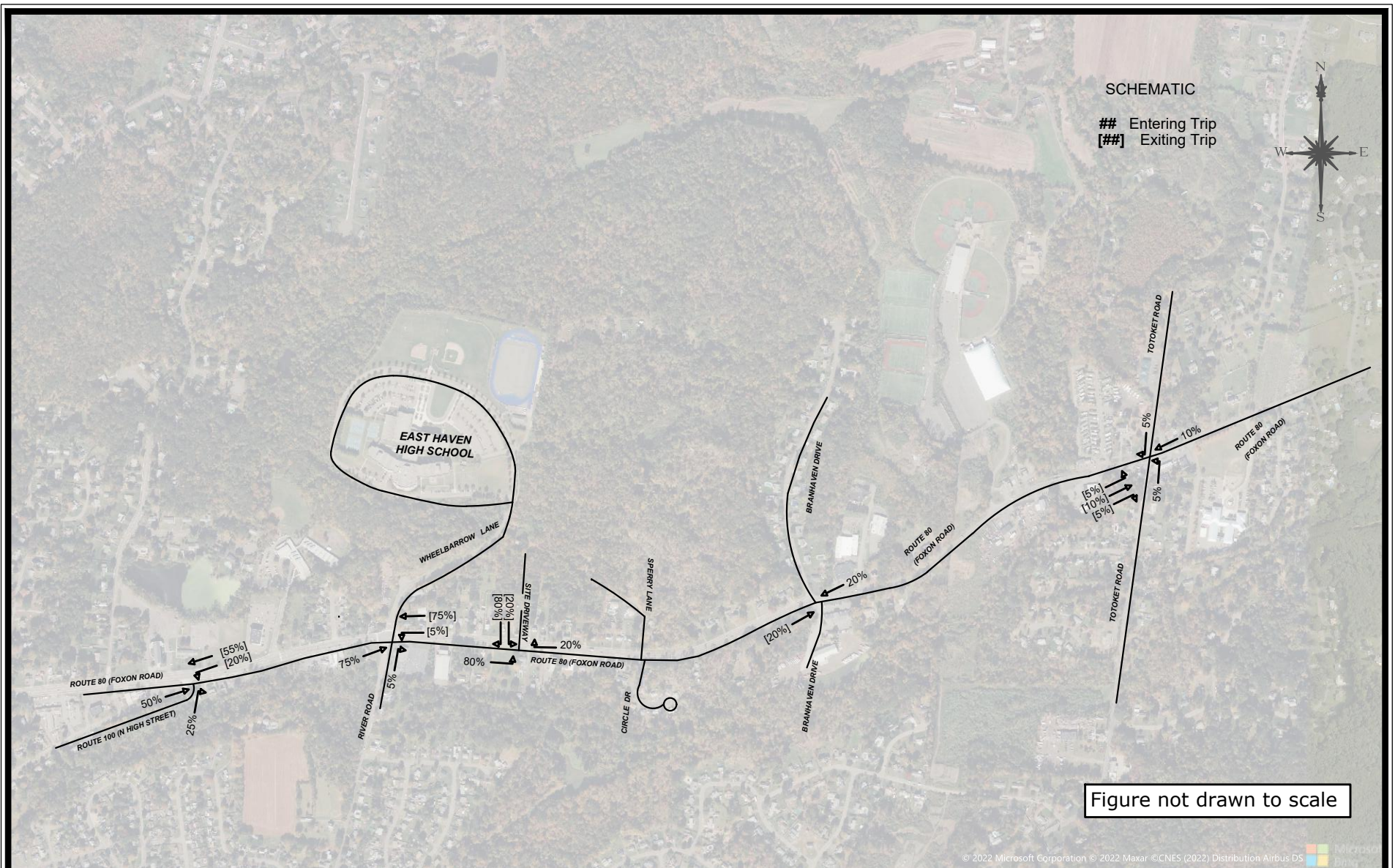
Proposed Elderly Multifamily Housing Development  
 161 Foxon Road  
 East Haven, Connecticut

FIGURE 2

**SLR**

195 CHURCH STREET, 7TH FLOOR  
 NEW HAVEN, CT 06510  
 203.344.7887  
 SLRCONSULTING.COM



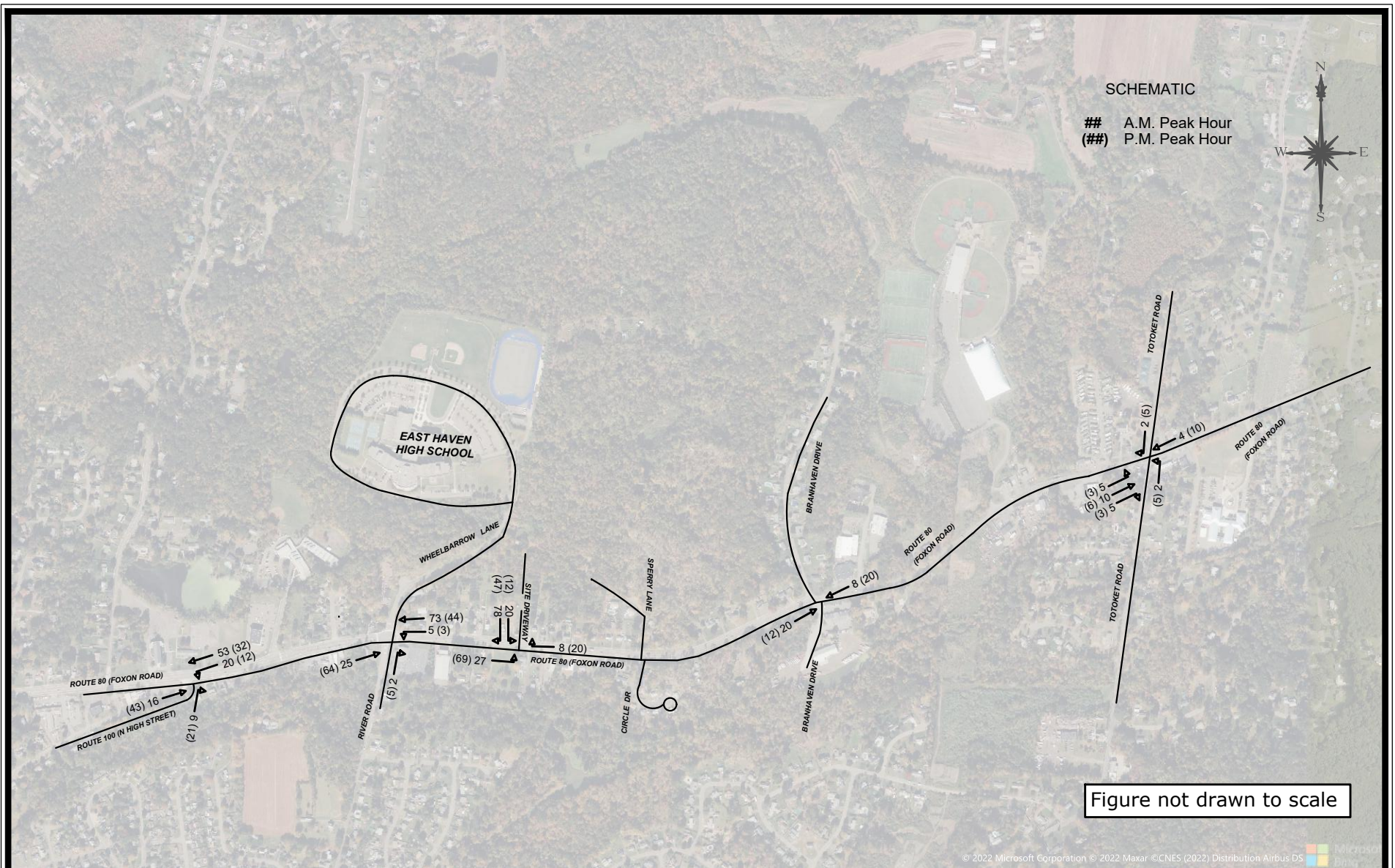


## SITE-GENERATED TRAFFIC VOLUME DISTRIBUTION

Proposed Elderly Multifamily Housing Development  
161 Foxon Road  
East Haven, Connecticut

FIGURE 3





## SITE-GENERATED TRAFFIC VOLUMES

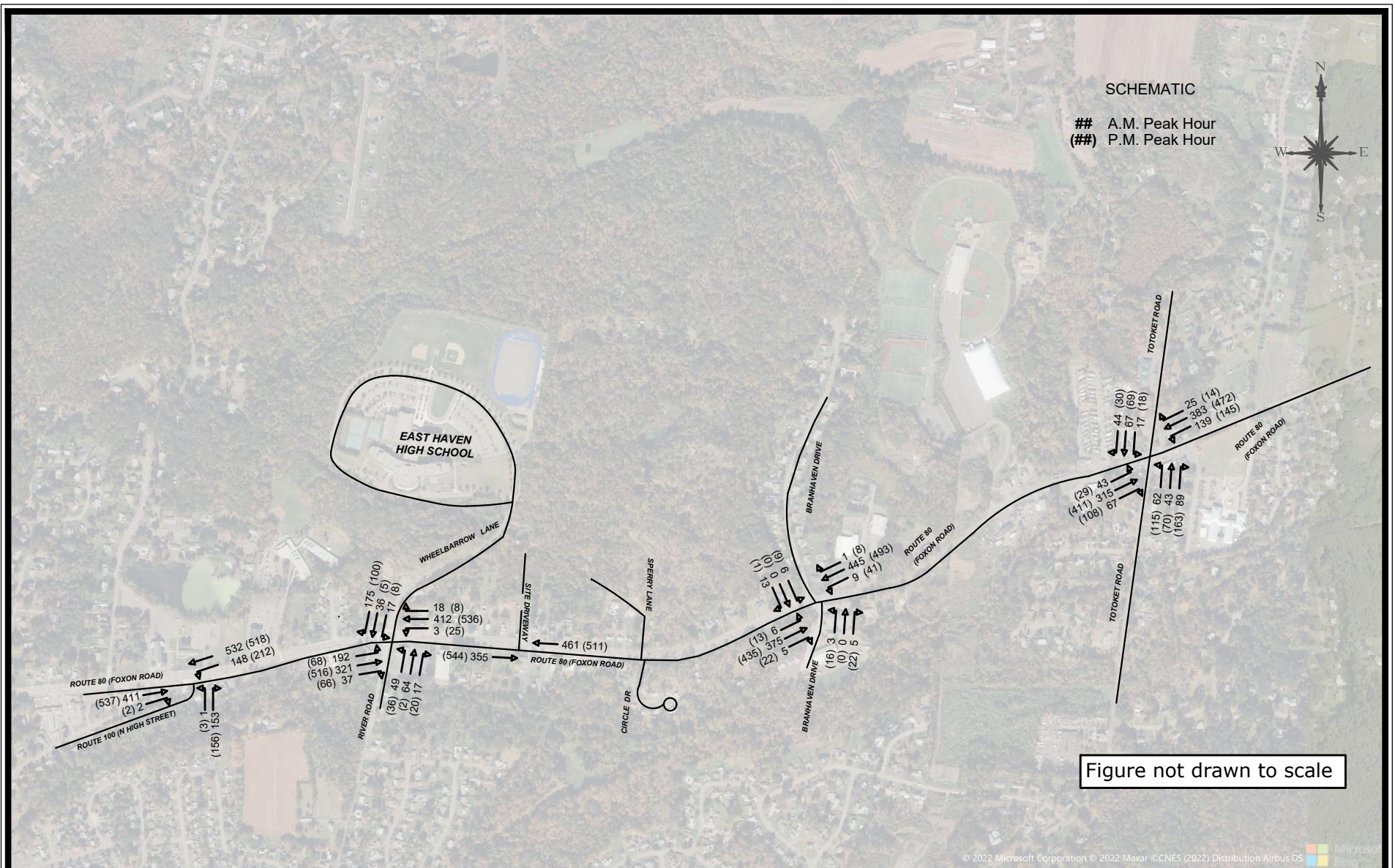
Proposed Elderly Multifamily Housing Development  
 161 Foxon Road  
 East Haven, Connecticut

FIGURE 4

**SLR**

195 CHURCH STREET, 7TH FLOOR  
 NEW HAVEN, CT 06510  
 203.344.7887  
 SLRCONSULTING.COM



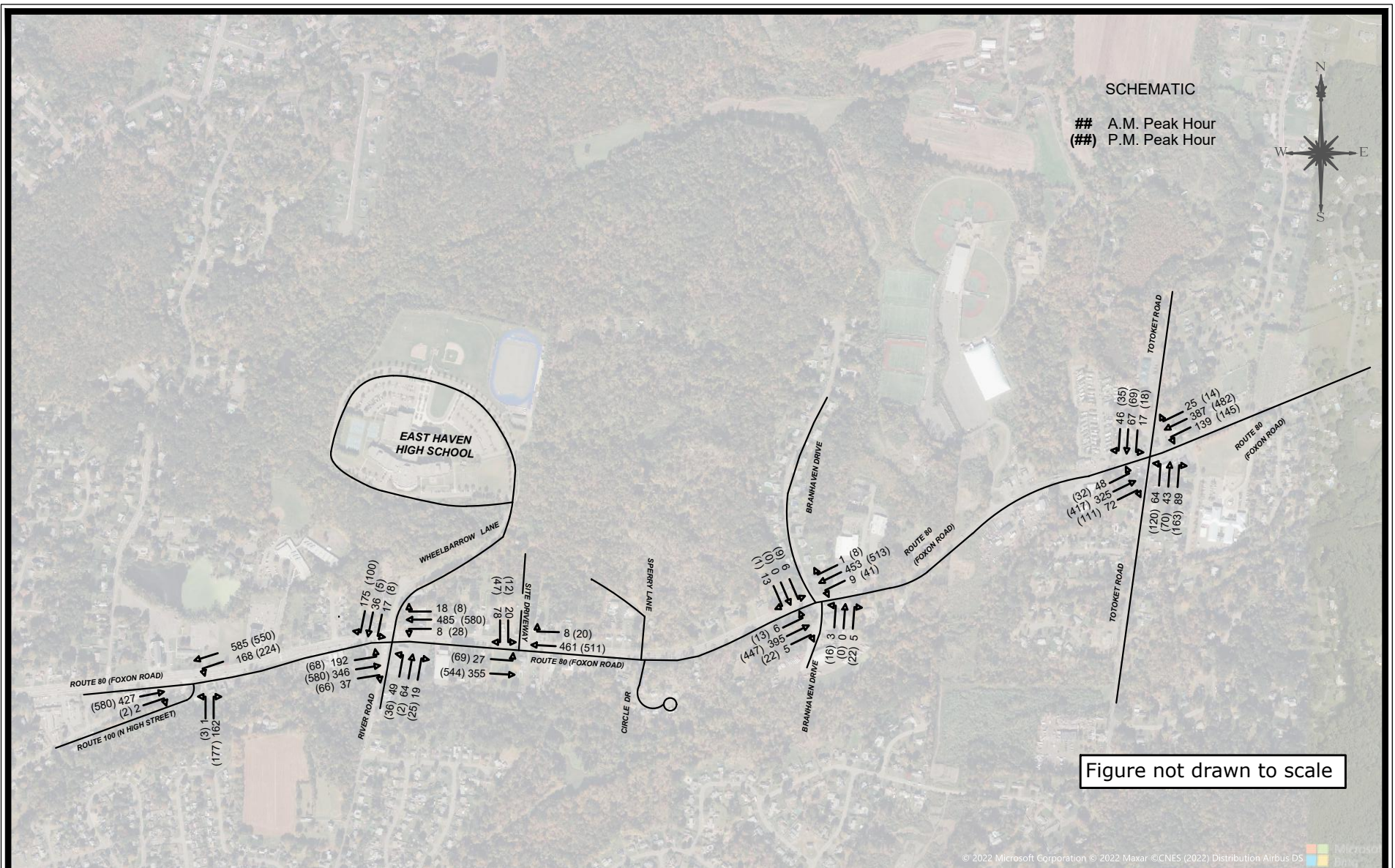


## NO-BUILD PEAK HOUR TRAFFIC VOLUMES (2023)

Proposed Elderly Multifamily Housing Development  
161 Foxon Road  
East Haven, Connecticut

FIGURE 5





## BUILD PEAK HOUR TRAFFIC VOLUMES (2023)

Proposed Elderly Multifamily Housing Development  
161 Foxon Road  
East Haven, Connecticut

FIGURE 6

# **APPENDIX**

Intersection: Route 80 at North High Street

Start Date: 1/13/2022

Start Time: 7:00:00 AM

End Time: 5:45:00 PM

Comment 1: TRAFFIC COUNTS

Comment 2: PEAK HOUR

Start Time	SOUTHBOUND				RTE. 80 WESTBOUND				NORTH HIGH ST. NORTHBOUND				FOXON RD. EASTBOUND				
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
07:00 AM	0	0	0	0	20	100	0	0	0	1	22	0	0	85	1	0	
07:15 AM	0	0	0	0	53	137	3	0	0	0	67	0	0	96	1	0	
07:30 AM	0	0	0	0	22	119	0	0	0	0	20	0	0	72	0	0	
07:45 AM	0	0	0	0	28	93	0	0	1	0	20	0	0	94	0	0	
08:00 AM	0	0	0	0	18	97	0	0	0	0	35	0	0	81	0	0	
08:15 AM	0	0	0	0	10	91	0	0	0	0	28	0	0	102	1	0	
08:30 AM	0	0	0	0	23	91	0	0	0	0	23	0	0	108	0	0	
08:45 AM	0	0	0	0	29	133	0	0	0	0	42	0	0	91	0	0	
09:00 AM	0	0	0	0	4	14	0	0	0	0	1	0	0	9	0	0	
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
04:00 PM	0	0	0	0	35	101	0	0	1	0	31	0	0	109	0	0	
04:15 PM	0	0	0	0	32	114	0	0	3	1	34	0	0	93	0	0	
04:30 PM	0	0	0	0	34	98	0	0	0	0	32	0	0	96	1	0	
04:45 PM	0	0	0	0	45	111	0	0	1	0	33	0	0	121	1	0	
05:00 PM	0	0	0	0	42	109	0	0	0	0	34	0	0	111	0	0	
05:15 PM	0	0	0	0	61	105	0	0	1	0	36	0	0	119	0	0	
05:30 PM	0	0	0	0	34	118	0	0	1	0	32	0	0	108	1	0	
05:45 PM	0	0	0	0	26	99	0	0	2	0	27	0	0	103	0	0	



Intersection: Route 80 at River Rd/Wheelbarrow Lane

Start Date: 1/13/2022

Start Time: 7:00:00 AM

End Time: 5:45:00 PM

Comment 1: TRAFFIC COUNTS

Comment 2: PEAK HOUR

Start Time	WHEELBARROW LA. SOUTHBOUND				RTE. 80 WESTBOUND				RIVER RD. NORTHBOUND				FOXON RD. EASTBOUND				
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
07:00 AM	5	14	33	0	1	80	3	0	5	20	4	0	50	53	12	0	
07:15 AM	6	16	84	1	0	80	3	0	6	33	5	0	81	59	13	0	
07:30 AM	2	1	23	0	1	92	5	0	19	1	4	0	23	74	3	0	
07:45 AM	2	0	9	0	1	95	5	0	12	0	2	0	11	87	4	0	
08:00 AM	0	0	10	0	1	92	3	0	13	0	1	0	11	81	4	0	
08:15 AM	0	0	9	0	1	83	3	0	8	0	6	0	7	111	7	0	
08:30 AM	0	0	5	0	2	92	0	0	13	0	2	0	12	83	6	0	
08:45 AM	0	0	11	0	3	85	2	0	13	1	1	0	30	72	5	0	
09:00 AM	0	0	1	0	0	3	0	0	0	0	0	0	0	4	0	0	
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
04:00 PM	3	0	10	0	1	100	1	0	5	0	4	0	8	119	13	0	
04:15 PM	0	0	11	0	7	102	1	0	5	0	6	0	15	105	12	0	
04:30 PM	5	0	13	0	7	108	1	0	4	0	4	0	8	93	15	0	
04:45 PM	2	0	14	0	6	117	2	0	12	0	4	0	12	120	12	0	
05:00 PM	2	4	18	0	6	113	2	0	7	2	5	0	20	102	9	0	
05:15 PM	0	0	35	0	6	107	2	0	7	0	2	0	20	117	16	0	
05:30 PM	3	0	19	0	4	121	1	0	5	0	6	0	6	104	19	0	
05:45 PM	2	0	4	0	3	108	1	0	9	0	1	0	5	104	13	0	

Intersection: Route 80 at Branhaven Drive

Start Date: 1/13/2022

Start Time: 7:00:00 AM

End Time: 5:45:00 PM

Comment 1: TRAFFIC COUNTS

Comment 2: PEAK HOUR

Start Time	BRANHAVEN DR. SOUTHBOUND				RTE. 80 WESTBOUND				ANTHONY JOHNS DRIVEWAY NORTHBOUND				FOXON RD. EASTBOUND				
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
07:00 AM	4	0	4	0	1	89	0	0	0	0	1	0	1	80	1	0	
07:15 AM	0	0	2	0	0	89	0	0	0	0	1	0	0	67	0	0	
07:30 AM	1	0	1	0	5	93	0	0	0	0	0	0	1	74	1	0	
07:45 AM	0	0	1	0	1	103	1	0	1	0	1	0	1	92	1	0	
08:00 AM	0	0	1	0	1	84	0	0	0	0	1	0	0	74	1	0	
08:15 AM	0	0	2	0	2	77	0	0	1	0	1	0	0	110	0	0	
08:30 AM	0	0	1	0	0	79	0	0	0	0	0	0	5	68	0	0	
08:45 AM	1	0	1	0	2	75	0	0	0	0	0	0	0	63	2	0	
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
04:00 PM	0	0	0	0	8	106	3	0	2	0	3	0	2	110	3	0	
04:15 PM	0	0	2	0	9	105	0	0	4	0	3	0	3	106	3	0	
04:30 PM	2	0	1	0	3	109	0	0	1	0	3	0	3	94	2	0	
04:45 PM	2	0	0	0	4	114	0	0	1	0	6	0	4	115	1	0	
05:00 PM	1	0	0	0	11	106	1	0	4	0	4	0	3	85	4	0	
05:15 PM	4	0	1	0	13	105	5	0	5	0	7	0	1	83	9	0	
05:30 PM	1	0	0	0	5	98	1	0	3	0	2	0	3	90	3	0	
05:45 PM	1	0	1	0	4	90	4	0	6	0	8	0	2	84	7	0	

Intersection: Route 80 at Totoket Road

Start Date: 1/13/2022

Start Time: 7:00:00 AM

End Time: 5:45:00 PM

Comment 1: TRAFFIC COUNTS

Comment 2: PEAK HOUR

Start Time	TOTOKET RD. SOUTHBOUND				RTE. 80 WESTBOUND				TOTOKET RD. NORTHBOUND				FOXON RD. EASTBOUND				
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
07:00 AM	0	12	10	0	22	81	9	0	11	10	12	0	8	69	11	0	
07:15 AM	9	13	13	0	25	82	8	0	12	15	20	0	21	68	12	0	
07:30 AM	1	15	5	0	32	81	4	0	12	7	23	0	2	60	16	0	
07:45 AM	5	16	7	0	38	84	1	0	17	5	21	0	6	68	18	0	
08:00 AM	1	16	2	1	23	65	1	0	24	3	27	0	1	64	13	0	
08:15 AM	4	8	3	0	36	66	5	0	12	10	20	0	3	74	15	0	
08:30 AM	6	14	2	0	22	68	0	0	19	6	21	0	2	69	20	0	
08:45 AM	7	13	6	0	26	67	6	0	23	7	25	0	5	58	5	0	
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
04:00 PM	10	15	5	0	35	99	5	0	14	16	30	0	3	84	21	0	
04:15 PM	5	17	7	0	32	96	6	0	24	11	37	0	7	89	26	0	
04:30 PM	7	14	5	0	34	105	1	0	15	21	30	0	5	73	26	0	
04:45 PM	3	13	7	0	24	101	3	0	25	12	38	0	9	91	19	0	
05:00 PM	4	14	9	0	34	105	4	0	31	20	39	0	6	93	27	0	
05:15 PM	3	22	7	0	31	107	3	0	23	13	41	0	5	89	23	0	
05:30 PM	6	10	3	0	36	88	2	1	20	15	23	0	5	78	24	0	
05:45 PM	6	9	7	0	22	113	0	0	23	18	19	0	5	73	19	0	

# LEVEL OF SERVICE FOR SIGNALIZED INTERSECTIONS (MOTORIZED VEHICLE MODE)

Level of service for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, geometrics, traffic, and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions: in the absence of traffic control, geometric delay, any incidents, and any other vehicles. Specifically, LOS criteria for traffic signals are stated in terms of the average control delay per vehicle, typically for a 15-min analysis period. Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group. The criteria are given below.

LEVEL-OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS MOTORIZED VEHICLE MODE		
LOS By Volume-to-Capacity Ratio <sup>1</sup>		CONTROL DELAY (s/veh)
v/c ≤ 1.0	v/c > 1.0	
A	F	≤ 10
B	F	> 10 AND ≤ 20
C	F	> 20 AND ≤ 35
D	F	> 35 AND ≤ 55
E	F	> 55 AND ≤ 80
F	F	> 80

<sup>1</sup> For approach-based and intersection-wide assessments, LOS is defined solely by control delay.

Specific descriptions of each LOS for signalized intersections are provided below:

**Level of Service A** describes operations with a control delay of 10 s/veh and 20 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If LOS A is the result of favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.

**Level of Service B** describes operations with control delay between 10 and 20 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

**Level of Service C** describes operations with control delay between 20 and 35 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual *cycle failures* (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.

**Level of Service D** describes operations with control delay between 35 and 55 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

**Level of Service E** describes operations with control delay between 55 and 80 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

**Level of Service F** describes operations with control delay exceeding 80 s/veh or a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

Reference: Highway Capacity Manual 6, Transportation Research Board, 2016.

# LEVEL OF SERVICE

## FOR TWO-WAY





### STOP SIGN CONTROLLED INTERSECTIONS





The level of service for a TWSC (two-way stop controlled) intersection is determined by the computed or measured control delay and is defined for each minor movement. Level of service is not defined for the intersection as a whole. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. LOS criteria are given in the Table. LOS criteria are given below:

<b>LEVEL-OF SERVICE CRITERIA FOR AWSC INTERSECTIONS</b>	
<b>LOS<sup>1</sup></b>	<b>CONTROL DELAY (s/veh)</b>
<b>A</b>	<b><math>\leq 10</math></b>
<b>B</b>	<b><math>&gt; 10 \text{ AND } \leq 15</math></b>
<b>C</b>	<b><math>&gt; 15 \text{ AND } \leq 25</math></b>
<b>D</b>	<b><math>&gt; 25 \text{ AND } \leq 35</math></b>
<b>E</b>	<b><math>&gt; 35 \text{ AND } \leq 50</math></b>
<b>F</b>	<b><math>&gt; 50</math></b>

Note: LOS criteria apply to each lane on a given approach and to each approach on the minor street.  
 LOS is not calculated for major-street approaches or for the intersection as a whole.  
 LOS F is assigned to a movement if the volume-to-capacity ratio exceeds 1.0, regardless of the control delay

Reference: Highway Capacity Manual Version 6.0, Transportation Research Board, 2016.






















Intersection						
Int Delay, s/veh	2.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	357	2	129	463	1	133
Future Vol, veh/h	357	2	129	463	1	133
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	225	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	73	73	73	73	73	73
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	489	3	177	634	1	182
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	492	0	1479	491
Stage 1	-	-	-	-	491	-
Stage 2	-	-	-	-	988	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1071	-	138	578
Stage 1	-	-	-	-	615	-
Stage 2	-	-	-	-	361	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1071	-	115	578
Mov Cap-2 Maneuver	-	-	-	-	115	-
Stage 1	-	-	-	-	615	-
Stage 2	-	-	-	-	301	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		2		14.5	
HCM LOS					B	
Minor Lane/Major Mvmt		NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		561	-	-	1071	-
HCM Lane V/C Ratio		0.327	-	-	0.165	-
HCM Control Delay (s)		14.5	-	-	9	-
HCM Lane LOS		B	-	-	A	-
HCM 95th %tile Q(veh)		1.4	-	-	0.6	-

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	326	4	8	387	1	3	0	4	5	0	11
Future Vol, veh/h	5	326	4	8	387	1	3	0	4	5	0	11
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	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	370	5	9	440	1	3	0	5	6	0	13
Major/Minor	Major1	Major2		Minor1		Minor2						
Conflicting Flow All	441	0	0	375	0	0	850	844	373	846	846	441
Stage 1	-	-	-	-	-	-	385	385	-	459	459	-
Stage 2	-	-	-	-	-	-	465	459	-	387	387	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1119	-	-	1183	-	-	280	300	673	282	299	616
Stage 1	-	-	-	-	-	-	638	611	-	582	566	-
Stage 2	-	-	-	-	-	-	578	566	-	637	610	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1119	-	-	1183	-	-	271	295	673	276	294	616
Mov Cap-2 Maneuver	-	-	-	-	-	-	271	295	-	276	294	-
Stage 1	-	-	-	-	-	-	634	607	-	578	560	-
Stage 2	-	-	-	-	-	-	561	560	-	628	606	-
Approach	EB	WB		NB		SB						
HCM Control Delay, s	0.1	0.2		13.9		13.4						
HCM LOS				B		B						
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	411	1119	-	-	1183	-	-	445				
HCM Lane V/C Ratio	0.019	0.005	-	-	0.008	-	-	0.041				
HCM Control Delay (s)	13.9	8.2	0	-	8.1	0	-	13.4				
HCM Lane LOS	B	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1				



Lanes, Volumes, Timings  
2: River Rd/Wheelbarrow Ln & Route 80

No build AM peak\_2023  
02/23/2022

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3
Lane Configurations													
Traffic Volume (vph)	167	279	32	3	358	16	43	56	15	15	31	152	
Future Volume (vph)	167	279	32	3	358	16	43	56	15	15	31	152	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	300		0	90		0	0		150	0		170	
Storage Lanes	1		0	1		0	0		1	0		1	
Taper Length (ft)	25			60			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.985			0.994				0.850			0.850	
Flt Protected	0.950			0.950				0.979			0.984		
Satd. Flow (prot)	1770	1835	0	1770	3518	0	0	1824	1583	0	1833	1583	
Flt Permitted	0.375			0.514				0.830			0.867		
Satd. Flow (perm)	699	1835	0	957	3518	0	0	1546	1583	0	1615	1583	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		5			4				72			208	
Link Speed (mph)		45			45			25			25		
Link Distance (ft)		1427			448			391			385		
Travel Time (s)		21.6			6.8			10.7			10.5		
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	
Adj. Flow (vph)	229	382	44	4	490	22	59	77	21	21	42	208	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	229	426	0	4	512	0	0	136	21	0	63	208	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pt+ov	Perm	NA	pt+ov	
Protected Phases	1	6		5	2			4	4 5		4	1 4	3
Permitted Phases	6			2			4			4			
Detector Phase	1	6		5	2		4	4	4 5	4	4	1 4	
Switch Phase													
Minimum Initial (s)	5.0	15.0		5.0	15.0		7.0	7.0		7.0	7.0		5.0
Minimum Split (s)	9.0	21.9		9.0	21.9		12.3	12.3		12.3	12.3		27.0
Total Split (s)	16.0	41.9		14.0	41.9		35.3	35.3		35.3	35.3		27.0
Total Split (%)	13.3%	34.9%		11.6%	34.9%		29.4%	29.4%		29.4%	29.4%		22%
Yellow Time (s)	3.0	5.0		3.0	5.0		3.7	3.7		3.7	3.7		4.0
All-Red Time (s)	1.0	1.9		1.0	1.9		1.6	1.6		1.6	1.6		0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0		
Total Lost Time (s)	4.0	6.9		4.0	6.9			5.3			5.3		
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lag	Lag		Lead
Lead-Lag Optimize?													
Recall Mode	None	Min		None	Min		None	None		None	None		None
Act Effct Green (s)	34.4	28.2		26.9	18.1			12.1	22.1		12.1	26.7	
Actuated g/C Ratio	0.57	0.47		0.45	0.30			0.20	0.37		0.20	0.45	
v/c Ratio	0.41	0.49		0.01	0.48			0.44	0.03		0.19	0.25	
Control Delay	11.8	18.1		11.3	21.2			29.2	0.1		25.3	3.7	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	11.8	18.1		11.3	21.2			29.2	0.1		25.3	3.7	
LOS	B	B		B	C			C	A		C	A	
Approach Delay		15.9			21.1			25.3			8.7		
Approach LOS		B			C			C			A		
Stops (vph)	74	205		2	277			76	0		35	15	
Fuel Used(gal)	3	7		0	8			1	0		1	1	
CO Emissions (g/hr)	200	460		4	553			85	4		37	47	
NOx Emissions (g/hr)	39	89		1	107			16	1		7	9	
VOC Emissions (g/hr)	46	107		1	128			20	1		8	11	
Dilemma Vehicles (#)	0	22		0	26			0	0		0	0	
Queue Length 50th (ft)	25	64		1	62			34	0		15	0	
Queue Length 95th (ft)	116	264		6	160			111	0		59	19	
Internal Link Dist (ft)		1347			368			311			305		
Turn Bay Length (ft)	300			90					150			170	
Base Capacity (vph)	638	1252		665	2269			854	922		892	1019	
Starvation Cap Reductn	0	0		0	0			0	0		0	0	
Spillback Cap Reductn	0	0		0	0			0	0		0	0	
Storage Cap Reductn	0	0		0	0			0	0		0	0	
Reduced v/c Ratio	0.36	0.34		0.01	0.23			0.16	0.02		0.07	0.20	







Intersection Summary

Area Type: Other

Cycle Length: 120.2


















Actuated Cycle Length: 59.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 17.3	Intersection LOS: B
Intersection Capacity Utilization 47.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: River Rd/Wheelbarrow Ln & Route 80

 Ø1	 Ø2	 Ø3	 Ø4
16 s	41.9 s	27 s	35.3 s
 Ø5	 Ø6		
14 s	41.9 s		

Lanes, Volumes, Timings  
4: Totoket Rd & Route 80

No build AM peak\_2023  
02/23/2022

													Ø3
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3
Lane Configurations													
Traffic Volume (vph)	37	274	58	121	333	22	54	37	77	15	58	38	
Future Volume (vph)	37	274	58	121	333	22	54	37	77	15	58	38	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	11	12	12	12	16	12	12	16	12	
Storage Length (ft)	0		0	100		0	0		0	0		0	
Storage Lanes	0		0	1		0	0		0	0		0	
Taper Length (ft)	25			60			25			25			
Lane Util. Factor	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		0.979			0.991			0.938			0.954		
Flt Protected		0.995		0.950				0.984			0.993		
Satd. Flow (prot)	0	1815	0	1711	1846	0	0	1949	0	0	2000	0	
Flt Permitted		0.923		0.444				0.872			0.956		
Satd. Flow (perm)	0	1683	0	799	1846	0	0	1727	0	0	1925	0	
Right Turn on Red			No			Yes			Yes			No	
Satd. Flow (RTOR)					4			38					
Link Speed (mph)		45			45			25			25		
Link Distance (ft)		2685			684			503			419		
Travel Time (s)		40.7			10.4			13.7			11.4		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	40	298	63	132	362	24	59	40	84	16	63	41	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	401	0	132	386	0	0	183	0	0	120	0	
Turn Type	Perm	NA		D,P+P	NA		Perm	NA		Perm	NA		
Protected Phases		2		1	1 2			4			4		3
Permitted Phases	2			2			4			4			
Detector Phase	2	2		1	1 2		4	4		4	4		
Switch Phase													
Minimum Initial (s)	15.0	15.0		5.0			9.0	9.0		9.0	9.0		7.0
Minimum Split (s)	21.7	21.7		9.0			13.6	13.6		13.6	13.6		21.0
Total Split (s)	41.7	41.7		14.0			29.6	29.6		29.6	29.6		21.0
Total Split (%)	39.2%	39.2%		13.2%			27.8%	27.8%		27.8%	27.8%		20%
Yellow Time (s)	4.4	4.4		3.0			3.3	3.3		3.3	3.3		4.0
All-Red Time (s)	2.3	2.3		1.0			1.3	1.3		1.3	1.3		0.0
Lost Time Adjust (s)		0.0		0.0				0.0			0.0		
Total Lost Time (s)		6.7		4.0				4.6			4.6		
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lag	Lag		Lead
Lead-Lag Optimize?													
Recall Mode	Min	Min		Min			None	None		None	None		None
Act Effct Green (s)		21.3		33.8	38.1			11.8			11.8		
Actuated g/C Ratio		0.34		0.55	0.62			0.19			0.19		
v/c Ratio		0.69		0.23	0.34			0.51			0.33		
Control Delay		26.3		8.3	8.5			26.2			28.2		
Queue Delay		0.0		0.0	0.0			0.0			0.0		
Total Delay		26.3		8.3	8.5			26.2			28.2		
LOS		C		A	A			C			C		
Approach Delay		26.3			8.4			26.2			28.2		
Approach LOS		C			A			C			C		
Stops (vph)		291		48	151			108			85		
Fuel Used(gal)		12		1	4			2			1		
CO Emissions (g/hr)		841		93	284			142			94		
NOx Emissions (g/hr)		164		18	55			28			18		
VOC Emissions (g/hr)		195		22	66			33			22		
Dilemma Vehicles (#)		25		0	29			0			0		
Queue Length 50th (ft)		107		12	42			42			34		
Queue Length 95th (ft)		325		75	212			152			120		
Internal Link Dist (ft)		2605			604			423			339		
Turn Bay Length (ft)				100									
Base Capacity (vph)		1030		611	1546			776			841		
Starvation Cap Reductn		0		0	0			0			0		
Spillback Cap Reductn		0		0	0			0			0		
Storage Cap Reductn		0		0	0			0			0		
Reduced v/c Ratio		0.39		0.22	0.25			0.24			0.14		

Intersection Summary

Area Type: Other

Cycle Length: 106.3	
Actuated Cycle Length: 61.8	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 18.9	Intersection LOS: B
Intersection Capacity Utilization 67.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: Totoket Rd & Route 80
























Intersection						
Int Delay, s/veh	2.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↱	↱	↱	
Traffic Vol, veh/h	467	2	184	450	3	136
Future Vol, veh/h	467	2	184	450	3	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	225	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	492	2	194	474	3	143
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	494	0	1355	493
Stage 1	-	-	-	-	493	-
Stage 2	-	-	-	-	862	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1070	-	165	576
Stage 1	-	-	-	-	614	-
Stage 2	-	-	-	-	414	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1070	-	135	576
Mov Cap-2 Maneuver	-	-	-	-	135	-
Stage 1	-	-	-	-	614	-
Stage 2	-	-	-	-	339	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		2.6		14.2	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	538	-	-	1070	-	
HCM Lane V/C Ratio	0.272	-	-	0.181	-	
HCM Control Delay (s)	14.2	-	-	9.1	-	
HCM Lane LOS	B	-	-	A	-	
HCM 95th %tile Q(veh)	1.1	-	-	0.7	-	

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	11	378	19	36	429	7	14	0	19	8	0	1
Future Vol, veh/h	11	378	19	36	429	7	14	0	19	8	0	1
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	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	411	21	39	466	8	15	0	21	9	0	1
Major/Minor	Major1	Major2		Minor1		Minor2						
Conflicting Flow All	474	0	0	432	0	0	995	998	422	1004	1004	470
Stage 1	-	-	-	-	-	-	446	446	-	548	548	-
Stage 2	-	-	-	-	-	-	549	552	-	456	456	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1088	-	-	1128	-	-	224	244	632	220	242	594
Stage 1	-	-	-	-	-	-	591	574	-	521	517	-
Stage 2	-	-	-	-	-	-	520	515	-	584	568	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1088	-	-	1128	-	-	213	229	632	203	227	594
Mov Cap-2 Maneuver	-	-	-	-	-	-	213	229	-	203	227	-
Stage 1	-	-	-	-	-	-	582	565	-	513	493	-
Stage 2	-	-	-	-	-	-	495	491	-	556	559	-
Approach	EB	WB		NB		SB						
HCM Control Delay, s	0.2	0.6		16.6		22.2						
HCM LOS				C		C						
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	345	1088	-	-	1128	-	-	219				
HCM Lane V/C Ratio	0.104	0.011	-	-	0.035	-	-	0.045				
HCM Control Delay (s)	16.6	8.3	0	-	8.3	0	-	22.2				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.1				

Lanes, Volumes, Timings  
2: River Rd/Wheelbarrow Ln & Route 80

No build PM peak\_2023  
02/23/2022

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3
Lane Configurations													
Traffic Volume (vph)	59	449	57	22	466	7	31	2	17	7	4	87	
Future Volume (vph)	59	449	57	22	466	7	31	2	17	7	4	87	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	300		0	90		0	0		150	0		170	
Storage Lanes	1		0	1		0	0		1	0		1	
Taper Length (ft)	25			60			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.983			0.998				0.850			0.850	
Flt Protected	0.950			0.950				0.955			0.969		
Satd. Flow (prot)	1770	1831	0	1770	3532	0	0	1779	1583	0	1805	1583	
Flt Permitted	0.430			0.414				0.731			0.787		
Satd. Flow (perm)	801	1831	0	771	3532	0	0	1362	1583	0	1466	1583	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		5			1				72			91	
Link Speed (mph)		45			45			25			25		
Link Distance (ft)		1421			460			391			385		
Travel Time (s)		21.5			7.0			10.7			10.5		
Peak Hour Factor	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)	61	468	59	23	485	7	32	2	18	7	4	91	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	61	527	0	23	492	0	0	34	18	0	11	91	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pt+ov	Perm	NA	pt+ov	
Protected Phases	1	6		5	2			4	4 5		4	1 4	3
Permitted Phases	6			2			4			4			
Detector Phase	1	6		5	2		4	4	4 5	4	4	1 4	
Switch Phase													
Minimum Initial (s)	5.0	15.0		5.0	15.0		7.0	7.0		7.0	7.0		5.0
Minimum Split (s)	9.0	21.9		9.0	21.9		12.3	12.3		12.3	12.3		27.0
Total Split (s)	16.0	41.9		14.0	41.9		35.3	35.3		35.3	35.3		27.0
Total Split (%)	13.3%	34.9%		11.6%	34.9%		29.4%	29.4%		29.4%	29.4%		22%
Yellow Time (s)	3.0	5.0		3.0	5.0		3.7	3.7		3.7	3.7		4.0
All-Red Time (s)	1.0	1.9		1.0	1.9		1.6	1.6		1.6	1.6		0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0		
Total Lost Time (s)	4.0	6.9		4.0	6.9			5.3			5.3		
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lag	Lag		Lead
Lead-Lag Optimize?													
Recall Mode	None	Min		None	Min		None	None		None	None		None
Act Effct Green (s)	35.0	31.8		32.6	27.1			8.3	15.9		8.3	17.5	
Actuated g/C Ratio	0.65	0.59		0.60	0.50			0.15	0.29		0.15	0.32	
v/c Ratio	0.10	0.49		0.04	0.28			0.16	0.04		0.05	0.16	
Control Delay	7.1	15.3		7.4	13.5			29.8	0.1		29.1	6.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	7.1	15.3		7.4	13.5			29.8	0.1		29.1	6.6	
LOS	A	B		A	B			C	A		C	A	
Approach Delay		14.5			13.3			19.5			9.0		
Approach LOS		B			B			B			A		
Stops (vph)	23	305		11	277			30	0		13	16	
Fuel Used(gal)	1	10		0	8			0	0		0	0	
CO Emissions (g/hr)	64	702		24	585			30	4		11	32	
NOx Emissions (g/hr)	12	137		5	114			6	1		2	6	
VOC Emissions (g/hr)	15	163		5	136			7	1		2	8	
Dilemma Vehicles (#)	0	34		0	31			0	0		0	0	
Queue Length 50th (ft)	5	67		2	46			7	0		2	0	
Queue Length 95th (ft)	38	#409		19	158			49	0		23	37	
Internal Link Dist (ft)		1341			380			311			305		
Turn Bay Length (ft)	300			90					150			170	
Base Capacity (vph)	772	1393		715	2542			840	1003		904	1051	
Starvation Cap Reductn	0	0		0	0			0	0		0	0	
Spillback Cap Reductn	0	0		0	0			0	0		0	0	
Storage Cap Reductn	0	0		0	0			0	0		0	0	
Reduced v/c Ratio	0.08	0.38		0.03	0.19			0.04	0.02		0.01	0.09	







Intersection Summary

Area Type: Other

Cycle Length: 120.2

Actuated Cycle Length: 54.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 13.8	Intersection LOS: B
Intersection Capacity Utilization 53.3%	ICU Level of Service A
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



















Splits and Phases: 2: River Rd/Wheelbarrow Ln & Route 80

 Ø1	 Ø2	 Ø3	 Ø4
16 s	41.9 s	27 s	35.3 s
 Ø5	 Ø6		
14 s	41.9 s		



Lanes, Volumes, Timings  
4: Totoket Rd & Route 80

No build PM peak\_2023  
02/23/2022

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3
Lane Configurations													
Traffic Volume (vph)	25	357	94	126	410	12	100	61	142	16	60	26	
Future Volume (vph)	25	357	94	126	410	12	100	61	142	16	60	26	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	11	12	12	12	16	12	12	16	12	
Storage Length (ft)	0		0	100		0	0		0	0		0	
Storage Lanes	0		0	1		0	0		0	0		0	
Taper Length (ft)	25			60			25			25			
Lane Util. Factor	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		0.973			0.996			0.937			0.965		
Flt Protected		0.997		0.950				0.984			0.992		
Satd. Flow (prot)	0	1807	0	1711	1855	0	0	1946	0	0	2021	0	
Flt Permitted		0.959		0.343				0.850			0.915		
Satd. Flow (perm)	0	1738	0	618	1855	0	0	1681	0	0	1864	0	
Right Turn on Red			No			Yes			Yes			No	
Satd. Flow (RTOR)					2			39					
Link Speed (mph)		45			45			25			25		
Link Distance (ft)		2664			684			503			419		
Travel Time (s)		40.4			10.4			13.7			11.4		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Adj. Flow (vph)	27	392	103	138	451	13	110	67	156	18	66	29	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	522	0	138	464	0	0	333	0	0	113	0	
Turn Type	Perm	NA		D,P+P	NA		Perm	NA		Perm	NA		
Protected Phases		2		1	1 2			4			4		3
Permitted Phases	2			2			4			4			
Detector Phase	2	2		1	1 2		4	4		4	4		
Switch Phase													
Minimum Initial (s)	15.0	15.0		5.0			9.0	9.0		9.0	9.0		7.0
Minimum Split (s)	21.7	21.7		9.0			13.6	13.6		13.6	13.6		21.0
Total Split (s)	41.7	41.7		14.0			29.6	29.6		29.6	29.6		21.0
Total Split (%)	39.2%	39.2%		13.2%			27.8%	27.8%		27.8%	27.8%		20%
Yellow Time (s)	4.4	4.4		3.0			3.3	3.3		3.3	3.3		4.0
All-Red Time (s)	2.3	2.3		1.0			1.3	1.3		1.3	1.3		0.0
Lost Time Adjust (s)		0.0		0.0				0.0			0.0		
Total Lost Time (s)		6.7		4.0				4.6			4.6		
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lag	Lag		Lead
Lead-Lag Optimize?													
Recall Mode	Min	Min		Min			None	None		None	None		None
Act Effct Green (s)		30.4		43.4	47.6			19.2			19.2		
Actuated g/C Ratio		0.39		0.55	0.60			0.24			0.24		
v/c Ratio		0.78		0.29	0.41			0.76			0.25		
Control Delay		33.1		11.1	11.9			38.6			28.4		
Queue Delay		0.0		0.0	0.0			0.0			0.0		
Total Delay		33.1		11.1	11.9			38.6			28.4		
LOS		C		B	B			D			C		
Approach Delay		33.1			11.7			38.6			28.4		
Approach LOS		C			B			D			C		
Stops (vph)		365		54	210			227			76		
Fuel Used(gal)		16		2	6			5			1		
CO Emissions (g/hr)		1115		106	385			318			88		
NOx Emissions (g/hr)		217		21	75			62			17		
VOC Emissions (g/hr)		258		25	89			74			20		
Dilemma Vehicles (#)		25		0	26			0			0		
Queue Length 50th (ft)		203		24	96			133			44		
Queue Length 95th (ft)		#541		87	301			#326			113		
Internal Link Dist (ft)		2584			604			423			339		
Turn Bay Length (ft)				100									
Base Capacity (vph)		805		486	1245			582			617		
Starvation Cap Reductn		0		0	0			0			0		
Spillback Cap Reductn		0		0	0			0			0		
Storage Cap Reductn		0		0	0			0			0		
Reduced v/c Ratio		0.65		0.28	0.37			0.57			0.18		





Intersection Summary

Area Type: Other





Cycle Length: 106.3	
Actuated Cycle Length: 78.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 25.7	Intersection LOS: C
Intersection Capacity Utilization 85.0%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 4: Totoket Rd & Route 80

























Intersection						
Int Delay, s/veh	3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	373	2	149	516	1	142
Future Vol, veh/h	373	2	149	516	1	142
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	225	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	73	73	73	73	73	73
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	511	3	204	707	1	195
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	514	0	1628	513
Stage 1	-	-	-	-	513	-
Stage 2	-	-	-	-	1115	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1052	-	112	561
Stage 1	-	-	-	-	601	-
Stage 2	-	-	-	-	314	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1052	-	90	561
Mov Cap-2 Maneuver	-	-	-	-	90	-
Stage 1	-	-	-	-	601	-
Stage 2	-	-	-	-	253	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		2.1		15.4	
HCM LOS	C					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	541	-	-	1052	-	
HCM Lane V/C Ratio	0.362	-	-	0.194	-	
HCM Control Delay (s)	15.4	-	-	9.2	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	1.6	-	-	0.7	-	

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	346	4	8	395	1	3	0	4	5	0	11
Future Vol, veh/h	5	346	4	8	395	1	3	0	4	5	0	11
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	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	393	5	9	449	1	3	0	5	6	0	13
Major/Minor	Major1	Major2		Minor1		Minor2						
Conflicting Flow All	450	0	0	398	0	0	882	876	396	878	878	450
Stage 1	-	-	-	-	-	-	408	408	-	468	468	-
Stage 2	-	-	-	-	-	-	474	468	-	410	410	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1110	-	-	1161	-	-	267	287	653	268	287	609
Stage 1	-	-	-	-	-	-	620	597	-	575	561	-
Stage 2	-	-	-	-	-	-	571	561	-	619	595	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1110	-	-	1161	-	-	258	282	653	263	282	609
Mov Cap-2 Maneuver	-	-	-	-	-	-	258	282	-	263	282	-
Stage 1	-	-	-	-	-	-	616	593	-	571	555	-
Stage 2	-	-	-	-	-	-	554	555	-	610	591	-
Approach	EB	WB		NB		SB						
HCM Control Delay, s	0.1	0.2		14.3		13.7						
HCM LOS				B		B						
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	394	1110	-	-	1161	-	-	432				
HCM Lane V/C Ratio	0.02	0.005	-	-	0.008	-	-	0.042				
HCM Control Delay (s)	14.3	8.3	0	-	8.1	0	-	13.7				
HCM Lane LOS	B	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1				

Intersection						
Int Delay, s/veh	1.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	27	309	401	8	20	78
Future Vol, veh/h	27	309	401	8	20	78
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	336	436	9	22	85
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	445	0	-	0	835	441
Stage 1	-	-	-	-	441	-
Stage 2	-	-	-	-	394	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1115	-	-	-	338	616
Stage 1	-	-	-	-	648	-
Stage 2	-	-	-	-	681	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1115	-	-	-	327	616
Mov Cap-2 Maneuver	-	-	-	-	327	-
Stage 1	-	-	-	-	627	-
Stage 2	-	-	-	-	681	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.7	0		13.7		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1115	-	-	-	522	
HCM Lane V/C Ratio	0.026	-	-	-	0.204	
HCM Control Delay (s)	8.3	0	-	-	13.7	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.8	

Lanes, Volumes, Timings  
2: River Rd/Wheelbarrow Ln & Route 80

Build AM peak\_2023  
02/23/2022

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3
Lane Configurations													
Traffic Volume (vph)	167	304	32	8	431	16	43	56	17	15	31	152	
Future Volume (vph)	167	304	32	8	431	16	43	56	17	15	31	152	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	300		0	90		0	0		150	0		170	
Storage Lanes	1		0	1		0	0		1	0		1	
Taper Length (ft)	25			60			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.986			0.995				0.850			0.850	
Flt Protected	0.950			0.950				0.979			0.984		
Satd. Flow (prot)	1770	1837	0	1770	3522	0	0	1824	1583	0	1833	1583	
Flt Permitted	0.312			0.498				0.830			0.868		
Satd. Flow (perm)	581	1837	0	928	3522	0	0	1546	1583	0	1617	1583	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		5			3				72			208	
Link Speed (mph)		45			45			25			25		
Link Distance (ft)		1427			448			391			385		
Travel Time (s)		21.6			6.8			10.7			10.5		
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	
Adj. Flow (vph)	229	416	44	11	590	22	59	77	23	21	42	208	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	229	460	0	11	612	0	0	136	23	0	63	208	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pt+ov	Perm	NA	pt+ov	
Protected Phases	1	6		5	2			4	4 5		4	1 4	3
Permitted Phases	6			2			4			4			
Detector Phase	1	6		5	2		4	4	4 5	4	4	1 4	
Switch Phase													
Minimum Initial (s)	5.0	15.0		5.0	15.0		7.0	7.0		7.0	7.0		5.0
Minimum Split (s)	9.0	21.9		9.0	21.9		12.3	12.3		12.3	12.3		27.0
Total Split (s)	16.0	41.9		14.0	41.9		35.3	35.3		35.3	35.3		27.0
Total Split (%)	13.3%	34.9%		11.6%	34.9%		29.4%	29.4%		29.4%	29.4%		22%
Yellow Time (s)	3.0	5.0		3.0	5.0		3.7	3.7		3.7	3.7		4.0
All-Red Time (s)	1.0	1.9		1.0	1.9		1.6	1.6		1.6	1.6		0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0		
Total Lost Time (s)	4.0	6.9		4.0	6.9			5.3			5.3		
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lag	Lag		Lead
Lead-Lag Optimize?													
Recall Mode	None	Min		None	Min		None	None		None	None		None
Act Effct Green (s)	35.1	28.9		27.6	18.8			12.3	22.4		12.3	26.9	
Actuated g/C Ratio	0.58	0.48		0.45	0.31			0.20	0.37		0.20	0.44	
v/c Ratio	0.45	0.53		0.02	0.56			0.43	0.04		0.19	0.26	
Control Delay	12.5	18.7		11.0	22.3			29.5	0.1		25.7	3.8	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	12.5	18.7		11.0	22.3			29.5	0.1		25.7	3.8	
LOS	B	B		B	C			C	A		C	A	
Approach Delay		16.7			22.1			25.3			8.9		
Approach LOS		B			C			C			A		
Stops (vph)	73	223		5	340			76	0		35	15	
Fuel Used(gal)	3	7		0	10			1	0		1	1	
CO Emissions (g/hr)	201	501		10	675			85	4		37	47	
NOx Emissions (g/hr)	39	97		2	131			17	1		7	9	
VOC Emissions (g/hr)	47	116		2	156			20	1		9	11	
Dilemma Vehicles (#)	0	23		0	30			0	0		0	0	
Queue Length 50th (ft)	26	72		1	78			34	0		15	0	
Queue Length 95th (ft)	117	293		11	193			111	0		58	20	
Internal Link Dist (ft)		1347			368			311			305		
Turn Bay Length (ft)	300			90					150			170	
Base Capacity (vph)	594	1236		656	2240			842	911		881	1009	
Starvation Cap Reductn	0	0		0	0			0	0		0	0	
Spillback Cap Reductn	0	0		0	0			0	0		0	0	
Storage Cap Reductn	0	0		0	0			0	0		0	0	
Reduced v/c Ratio	0.39	0.37		0.02	0.27			0.16	0.03		0.07	0.21	







Intersection Summary

Area Type: Other

Cycle Length: 120.2


















Actuated Cycle Length: 60.8	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.56	
Intersection Signal Delay: 18.2	Intersection LOS: B
Intersection Capacity Utilization 47.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: River Rd/Wheelbarrow Ln & Route 80

 Ø1	 Ø2	 Ø3	 Ø4
16 s	41.9 s	27 s	35.3 s
 Ø5	 Ø6		
14 s	41.9 s		

Lanes, Volumes, Timings  
4: Totoket Rd & Route 80

Build AM peak\_2023  
02/23/2022

													Ø3
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3
Lane Configurations													
Traffic Volume (vph)	42	284	63	121	337	22	56	37	77	15	58	40	
Future Volume (vph)	42	284	63	121	337	22	56	37	77	15	58	40	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	11	12	12	12	16	12	12	16	12	
Storage Length (ft)	0		0	100		0	0		0	0		0	
Storage Lanes	0		0	1		0	0		0	0		0	
Taper Length (ft)	25			60			25			25			
Lane Util. Factor	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		0.978			0.991			0.939			0.952		
Flt Protected		0.995		0.950				0.984			0.993		
Satd. Flow (prot)	0	1813	0	1711	1846	0	0	1951	0	0	1996	0	
Flt Permitted		0.914		0.431				0.863			0.956		
Satd. Flow (perm)	0	1665	0	776	1846	0	0	1711	0	0	1921	0	
Right Turn on Red			No			Yes			Yes			No	
Satd. Flow (RTOR)					4			37					
Link Speed (mph)		45			45			25			25		
Link Distance (ft)		2685			684			503			419		
Travel Time (s)		40.7			10.4			13.7			11.4		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	46	309	68	132	366	24	61	40	84	16	63	43	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	423	0	132	390	0	0	185	0	0	122	0	
Turn Type	Perm	NA		D,P+P	NA		Perm	NA		Perm	NA		
Protected Phases		2		1	1 2			4			4		3
Permitted Phases	2			2			4			4			
Detector Phase	2	2		1	1 2		4	4		4	4		
Switch Phase													
Minimum Initial (s)	15.0	15.0		5.0			9.0	9.0		9.0	9.0		7.0
Minimum Split (s)	21.7	21.7		9.0			13.6	13.6		13.6	13.6		21.0
Total Split (s)	41.7	41.7		14.0			29.6	29.6		29.6	29.6		21.0
Total Split (%)	39.2%	39.2%		13.2%			27.8%	27.8%		27.8%	27.8%		20%
Yellow Time (s)	4.4	4.4		3.0			3.3	3.3		3.3	3.3		4.0
All-Red Time (s)	2.3	2.3		1.0			1.3	1.3		1.3	1.3		0.0
Lost Time Adjust (s)		0.0		0.0				0.0			0.0		
Total Lost Time (s)		6.7		4.0				4.6			4.6		
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lag	Lag		Lead
Lead-Lag Optimize?													
Recall Mode	Min	Min		Min			None	None		None	None		None
Act Effct Green (s)		22.5		35.0	39.3			12.0			12.0		
Actuated g/C Ratio		0.36		0.55	0.62			0.19			0.19		
v/c Ratio		0.71		0.23	0.34			0.52			0.34		
Control Delay		27.1		8.3	8.5			27.3			28.9		
Queue Delay		0.0		0.0	0.0			0.0			0.0		
Total Delay		27.1		8.3	8.5			27.3			28.9		
LOS		C		A	A			C			C		
Approach Delay		27.1			8.5			27.3			28.9		
Approach LOS		C			A			C			C		
Stops (vph)		308		47	152			112			87		
Fuel Used(gal)		13		1	4			2			1		
CO Emissions (g/hr)		892		93	287			147			97		
NOx Emissions (g/hr)		173		18	56			29			19		
VOC Emissions (g/hr)		207		21	67			34			23		
Dilemma Vehicles (#)		26		0	28			0			0		
Queue Length 50th (ft)		117		13	44			45			36		
Queue Length 95th (ft)		351		75	217			155			122		
Internal Link Dist (ft)		2605			604			423			339		
Turn Bay Length (ft)				100									
Base Capacity (vph)		993		603	1544			750			818		
Starvation Cap Reductn		0		0	0			0			0		
Spillback Cap Reductn		0		0	0			0			0		
Storage Cap Reductn		0		0	0			0			0		
Reduced v/c Ratio		0.43		0.22	0.25			0.25			0.15		

Intersection Summary

Area Type: Other







Cycle Length: 106.3	
Actuated Cycle Length: 63.2	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 19.5	Intersection LOS: B
Intersection Capacity Utilization 69.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: Totoket Rd & Route 80
























Intersection						
Int Delay, s/veh	3.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↱	↱	↱	
Traffic Vol, veh/h	510	2	196	482	3	157
Future Vol, veh/h	510	2	196	482	3	157
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	225	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	537	2	206	507	3	165
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	539	0	1457	538
Stage 1	-	-	-	-	538	-
Stage 2	-	-	-	-	919	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1029	-	143	543
Stage 1	-	-	-	-	585	-
Stage 2	-	-	-	-	389	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1029	-	114	543
Mov Cap-2 Maneuver	-	-	-	-	114	-
Stage 1	-	-	-	-	585	-
Stage 2	-	-	-	-	311	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		2.7		15.6	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	507	-	-	1029	-	
HCM Lane V/C Ratio	0.332	-	-	0.201	-	
HCM Control Delay (s)	15.6	-	-	9.4	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	1.4	-	-	0.7	-	

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	11	390	19	36	449	7	14	0	19	8	0	1
Future Vol, veh/h	11	390	19	36	449	7	14	0	19	8	0	1
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	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	424	21	39	488	8	15	0	21	9	0	1
Major/Minor	Major1	Major2		Minor1		Minor2						
Conflicting Flow All	496	0	0	445	0	0	1030	1033	435	1039	1039	492
Stage 1	-	-	-	-	-	-	459	459	-	570	570	-
Stage 2	-	-	-	-	-	-	571	574	-	469	469	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1068	-	-	1115	-	-	212	232	621	209	231	577
Stage 1	-	-	-	-	-	-	582	566	-	506	505	-
Stage 2	-	-	-	-	-	-	506	503	-	575	561	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1068	-	-	1115	-	-	202	218	621	192	217	577
Mov Cap-2 Maneuver	-	-	-	-	-	-	202	218	-	192	217	-
Stage 1	-	-	-	-	-	-	573	558	-	498	481	-
Stage 2	-	-	-	-	-	-	481	479	-	548	553	-
Approach	EB	WB		NB		SB						
HCM Control Delay, s	0.2	0.6		17.2		23.3						
HCM LOS				C		C						
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	330	1068	-	-	1115	-	-	207				
HCM Lane V/C Ratio	0.109	0.011	-	-	0.035	-	-	0.047				
HCM Control Delay (s)	17.2	8.4	0	-	8.3	0	-	23.3				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	0.1				

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	69	473	444	20	12	47
Future Vol, veh/h	69	473	444	20	12	47
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	75	514	483	22	13	51
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	505	0	-	0	1158	494
Stage 1	-	-	-	-	494	-
Stage 2	-	-	-	-	664	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1060	-	-	-	217	575
Stage 1	-	-	-	-	613	-
Stage 2	-	-	-	-	512	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1060	-	-	-	196	575
Mov Cap-2 Maneuver	-	-	-	-	196	-
Stage 1	-	-	-	-	552	-
Stage 2	-	-	-	-	512	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.1	0		15.3		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1060	-	-	-	413	
HCM Lane V/C Ratio	0.071	-	-	-	0.155	
HCM Control Delay (s)	8.7	0	-	-	15.3	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5	

Lanes, Volumes, Timings  
2: River Rd/Wheelbarrow Ln & Route 80

Build PM peak\_2023  
02/23/2022

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3
Lane Configurations													
Traffic Volume (vph)	59	513	57	25	510	7	31	2	22	7	4	87	
Future Volume (vph)	59	513	57	25	510	7	31	2	22	7	4	87	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	300		0	90		0	0		150	0		170	
Storage Lanes	1		0	1		0	0		1	0		1	
Taper Length (ft)	25			60			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.985			0.998				0.850			0.850	
Flt Protected	0.950			0.950				0.955			0.969		
Satd. Flow (prot)	1770	1835	0	1770	3532	0	0	1779	1583	0	1805	1583	
Flt Permitted	0.433			0.342				0.731			0.787		
Satd. Flow (perm)	807	1835	0	637	3532	0	0	1362	1583	0	1466	1583	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		5			1				72			91	
Link Speed (mph)		45			45			25			25		
Link Distance (ft)		1421			460			391			385		
Travel Time (s)		21.5			7.0			10.7			10.5		
Peak Hour Factor	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)	61	534	59	26	531	7	32	2	23	7	4	91	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	61	593	0	26	538	0	0	34	23	0	11	91	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pt+ov	Perm	NA	pt+ov	
Protected Phases	1	6		5	2			4	4 5		4	1 4	3
Permitted Phases	6			2			4			4			
Detector Phase	1	6		5	2		4	4	4 5	4	4	1 4	
Switch Phase													
Minimum Initial (s)	5.0	15.0		5.0	15.0		7.0	7.0		7.0	7.0		5.0
Minimum Split (s)	9.0	21.9		9.0	21.9		12.3	12.3		12.3	12.3		27.0
Total Split (s)	16.0	41.9		14.0	41.9		35.3	35.3		35.3	35.3		27.0
Total Split (%)	13.3%	34.9%		11.6%	34.9%		29.4%	29.4%		29.4%	29.4%		22%
Yellow Time (s)	3.0	5.0		3.0	5.0		3.7	3.7		3.7	3.7		4.0
All-Red Time (s)	1.0	1.9		1.0	1.9		1.6	1.6		1.6	1.6		0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0		
Total Lost Time (s)	4.0	6.9		4.0	6.9			5.3			5.3		
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lag	Lag		Lead
Lead-Lag Optimize?													
Recall Mode	None	Min		None	Min		None	None		None	None		None
Act Effct Green (s)	41.8	37.1		40.4	34.6			7.9	15.6		7.9	17.2	
Actuated g/C Ratio	0.67	0.60		0.65	0.56			0.13	0.25		0.13	0.28	
v/c Ratio	0.10	0.54		0.05	0.27			0.20	0.05		0.06	0.18	
Control Delay	6.9	16.8		7.1	12.5			33.1	0.2		31.5	7.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0	
Total Delay	6.9	16.8		7.1	12.5			33.1	0.2		31.5	7.0	
LOS	A	B		A	B			C	A		C	A	
Approach Delay		15.9			12.2			19.8			9.7		
Approach LOS		B			B			B			A		
Stops (vph)	20	334		11	276			31	0		13	16	
Fuel Used(gal)	1	11		0	9			0	0		0	0	
CO Emissions (g/hr)	61	793		26	609			32	5		11	33	
NOx Emissions (g/hr)	12	154		5	118			6	1		2	6	
VOC Emissions (g/hr)	14	184		6	141			7	1		3	8	
Dilemma Vehicles (#)	0	33		0	29			0	0		0	0	
Queue Length 50th (ft)	5	134		2	51			11	0		3	0	
Queue Length 95th (ft)	38	#526		20	173			49	0		23	38	
Internal Link Dist (ft)		1341			380			311			305		
Turn Bay Length (ft)	300			90					150			170	
Base Capacity (vph)	764	1265		638	2340			693	842		746	884	
Starvation Cap Reductn	0	0		0	0			0	0		0	0	
Spillback Cap Reductn	0	0		0	0			0	0		0	0	
Storage Cap Reductn	0	0		0	0			0	0		0	0	
Reduced v/c Ratio	0.08	0.47		0.04	0.23			0.05	0.03		0.01	0.10	







Intersection Summary

Area Type: Other

Cycle Length: 120.2


















Actuated Cycle Length: 62.3	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 14.1	Intersection LOS: B
Intersection Capacity Utilization 56.7%	ICU Level of Service B
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 2: River Rd/Wheelbarrow Ln & Route 80

 Ø1	 Ø2	 Ø3	 Ø4
16 s	41.9 s	27 s	35.3 s
 Ø5	 Ø6		
14 s	41.9 s		

Lanes, Volumes, Timings  
4: Totoket Rd & Route 80

Build PM peak\_2023  
02/23/2022

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø3
Lane Configurations													
Traffic Volume (vph)	28	363	97	126	420	12	105	61	142	16	60	31	
Future Volume (vph)	28	363	97	126	420	12	105	61	142	16	60	31	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	11	12	12	12	16	12	12	16	12	
Storage Length (ft)	0		0	100		0	0		0	0		0	
Storage Lanes	0		0	1		0	0		0	0		0	
Taper Length (ft)	25			60			25			25			
Lane Util. Factor	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		0.973			0.996			0.938			0.961		
Flt Protected		0.997		0.950				0.983			0.992		
Satd. Flow (prot)	0	1807	0	1711	1855	0	0	1947	0	0	2013	0	
Flt Permitted		0.952		0.341				0.837			0.917		
Satd. Flow (perm)	0	1725	0	614	1855	0	0	1657	0	0	1860	0	
Right Turn on Red			No			Yes			Yes			No	
Satd. Flow (RTOR)					2			38					
Link Speed (mph)		45			45			25			25		
Link Distance (ft)		2664			684			503			419		
Travel Time (s)		40.4			10.4			13.7			11.4		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Adj. Flow (vph)	31	399	107	138	462	13	115	67	156	18	66	34	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	537	0	138	475	0	0	338	0	0	118	0	
Turn Type	Perm	NA		D,P+P	NA		Perm	NA		Perm	NA		
Protected Phases		2		1	1 2			4			4		3
Permitted Phases	2			2			4			4			
Detector Phase	2	2		1	1 2		4	4		4	4		
Switch Phase													
Minimum Initial (s)	15.0	15.0		5.0			9.0	9.0		9.0	9.0		7.0
Minimum Split (s)	21.7	21.7		9.0			13.6	13.6		13.6	13.6		21.0
Total Split (s)	41.7	41.7		14.0			29.6	29.6		29.6	29.6		21.0
Total Split (%)	39.2%	39.2%		13.2%			27.8%	27.8%		27.8%	27.8%		20%
Yellow Time (s)	4.4	4.4		3.0			3.3	3.3		3.3	3.3		4.0
All-Red Time (s)	2.3	2.3		1.0			1.3	1.3		1.3	1.3		0.0
Lost Time Adjust (s)		0.0		0.0				0.0			0.0		
Total Lost Time (s)		6.7		4.0				4.6			4.6		
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lag	Lag		Lead
Lead-Lag Optimize?													
Recall Mode	Min	Min		Min			None	None		None	None		None
Act Effct Green (s)		32.4		45.4	49.5			20.0			20.0		
Actuated g/C Ratio		0.40		0.56	0.61			0.25			0.25		
v/c Ratio		0.78		0.29	0.42			0.78			0.26		
Control Delay		33.4		11.2	12.1			40.6			28.7		
Queue Delay		0.0		0.0	0.0			0.0			0.0		
Total Delay		33.4		11.2	12.1			40.6			28.7		
LOS		C		B	B			D			C		
Approach Delay		33.4			11.9			40.6			28.7		
Approach LOS		C			B			D			C		
Stops (vph)		372		54	218			231			80		
Fuel Used(gal)		16		2	6			5			1		
CO Emissions (g/hr)		1147		106	398			332			92		
NOx Emissions (g/hr)		223		21	77			65			18		
VOC Emissions (g/hr)		266		25	92			77			21		
Dilemma Vehicles (#)		26		0	26			0			0		
Queue Length 50th (ft)		218		24	104			140			48		
Queue Length 95th (ft)		#567		87	310			#340			117		
Internal Link Dist (ft)		2584			604			423			339		
Turn Bay Length (ft)				100									
Base Capacity (vph)		764		481	1190			550			588		
Starvation Cap Reductn		0		0	0			0			0		
Spillback Cap Reductn		0		0	0			0			0		
Storage Cap Reductn		0		0	0			0			0		
Reduced v/c Ratio		0.70		0.29	0.40			0.61			0.20		

Intersection Summary

Area Type: Other

Cycle Length: 106.3	
Actuated Cycle Length: 81.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 26.4	Intersection LOS: C
Intersection Capacity Utilization 86.5%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 4: Totoket Rd & Route 80

