INTERSECTION CONTROL EVALUATION REPORT FOR

Mantorville Avenue (TH 57) & Main Street
Mantorville Avenue (TH 57) & CSAH 34

KASSON, MINNESOTA

Prepared for:
City of Kasson, MN
2020

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Eric J. Tott, P.E.

05/05/2020 — Date

54543 — License. No.

whks
engineers + planners + land surveyors

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Project Description

This intersection control evaluation (ICE) has been prepared for the intersections of Mantorville Avenue (TH 57) / Main Street and Mantorville Avenue (TH 57) / CSAH 34 in the City of Kasson, Dodge County, Minnesota. This report applies the signal justification warrants, as outlined in the Manual on Uniform Traffic Control Devices (MUTCD) and uses engineering methods outlined in the Highway Capacity Manual 6th Edition.

Currently, the area surrounding the intersections is commercial. The analyzed intersections are at the east end of the downtown business district. There is a railroad crossing between the two intersections approximately 80 feet south of Main Street. The analyzed intersections are approximately 2200 feet north of the Mantorville Avenue (TH 57) interchange with US Highway 14.

ICE reports are used to determine which type of intersection control may be the most appropriate for the intersection based on several factors such as warrants, safety and site conditions. Specifically, this report will look at whether side-street stop, multi-way stop, traffic signal, or a roundabout is the most appropriate method of traffic control for the intersections.

Location

The intersections of Mantorville Avenue (TH 57) / Main Street and Mantorville Avenue (TH 57) / CSAH 34 are located in the City of Kasson, Minnesota. The study area lies in the east central region of Dodge County. See Figure 1.

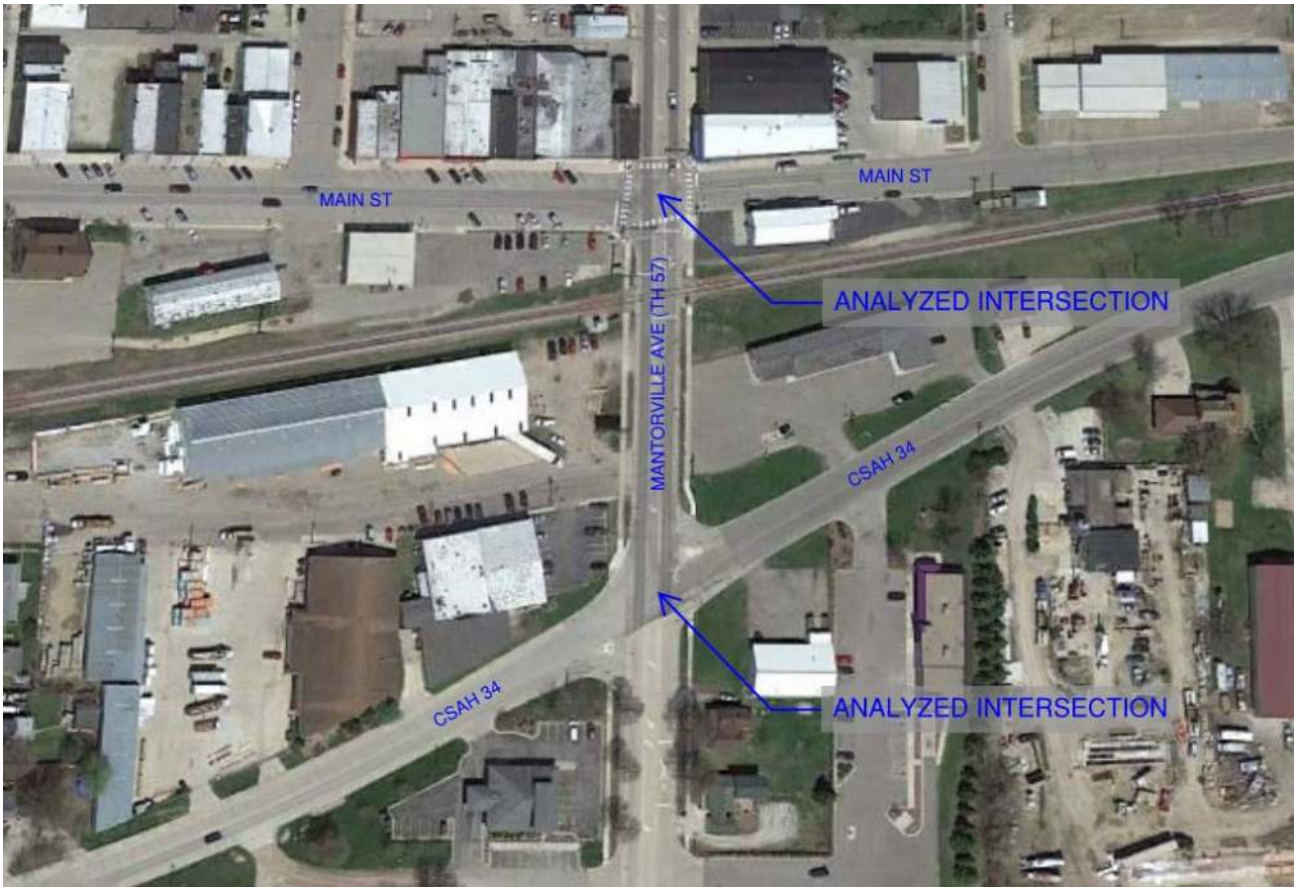


FIGURE 1 – Location Map

Existing Intersection Characteristics

Mantorville Avenue (TH 57) / Main Street
Mantorville Avenue is a north-south route. The side street, Main Street, is an east-west route. Currently the intersection is a four-leg intersection operating under signalized control. The northbound and southbound approaches consist of one lane in each direction with left turn lanes. The eastbound and westbound approaches consist of one shared lane in each direction. See Figure 2 for existing lane configuration. The speed limit on Mantorville Avenue is 30 mph. The speed limit on Main Street is 30 mph.

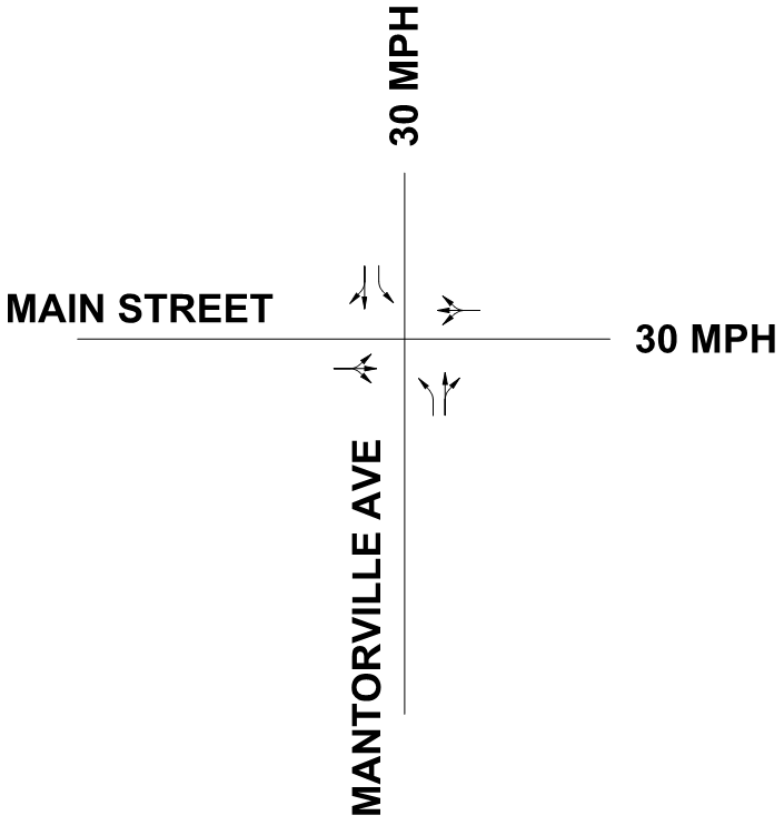


FIGURE 2 – Existing Lane Configuration - Mantorville Avenue (TH 57) / Main Street

Mantorville Avenue (TH 57) / CSAH 34

Mantorville Avenue is a north-south route. The side street, CSAH 34, is an east-west route. Currently the intersection is a four-leg intersection operating under two-way stop control. The northbound and southbound approaches consist of one lane in each direction with left turn lanes. The eastbound and westbound approaches consist of one lane in each direction with right turn lanes. See Figure 3 for existing lane configuration. The speed limit on Mantorville Avenue is 30 mph. The speed limit on CSAH 34 is 35 mph.

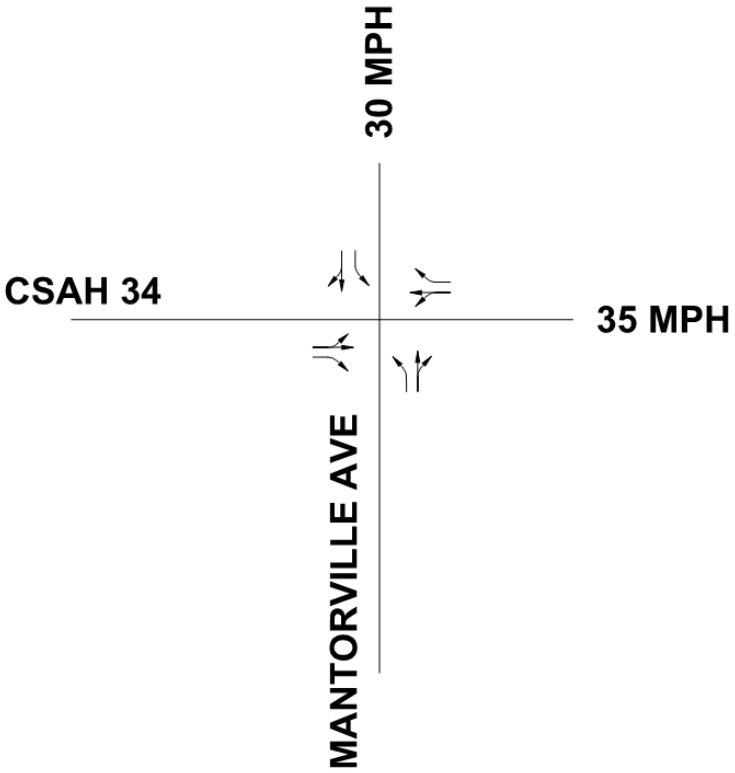


FIGURE 3 – Existing Lane Configuration - Mantorville Avenue (TH 57) / CSAH 34

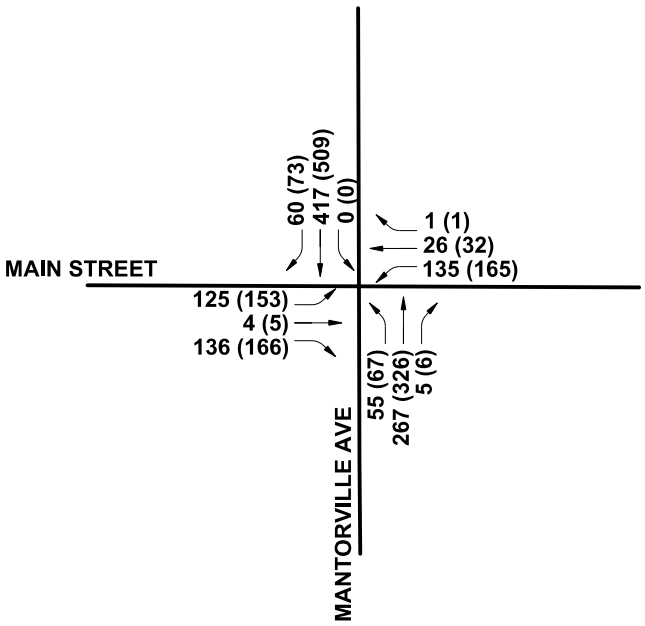
Traffic Volumes

Mantorville Avenue (TH 57) / Main Street
Directional intersection traffic volumes were obtained from intersection traffic counts performed Tuesday December 18, 2018. Traffic counts were performed from 6 AM to 7 PM. The AM peak hour occurred from 7 AM to 8 AM. The PM peak hour occurred from 5 PM to 6 PM. The growth factor used for the future traffic was 1% per year. Using a 1% compound growth factor, the traffic count volumes were factored up to obtain 2020 and design year (2040) volumes. See Appendix A for the traffic count data.

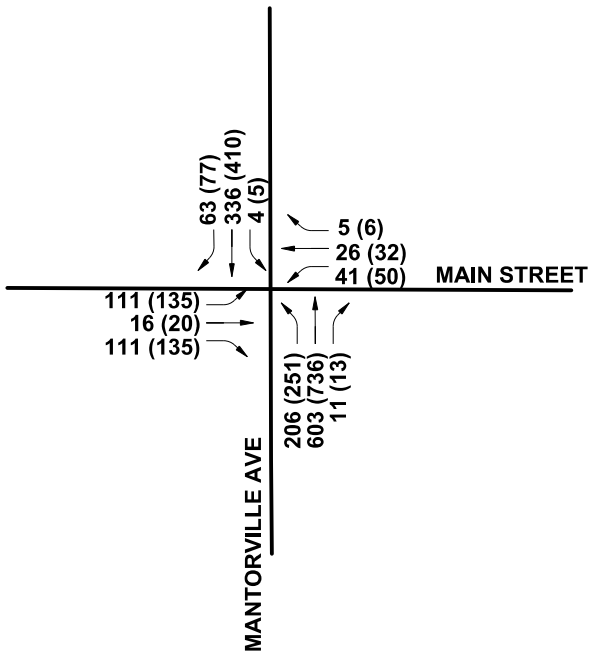
See Figure 4 for a summary of the 2020 and 2040 volumes for each intersection traffic movement.

Mantorville Avenue (TH 57) / CSAH 34
Directional intersection traffic volumes were obtained from MnDOT. The traffic counts were performed Monday September 9, 2019. Traffic counts were performed from 6 AM to 9:15 AM and 3 PM to 7:45. The AM peak hour occurred from 6:45 AM to 7:45 AM. The PM peak hour occurred from 4:45 PM to 5:45 PM. The growth factor used for the future traffic was 1% per year. Using a 1% compound growth factor, the traffic count volumes were factored up to obtain 2020 and design year (2040) volumes. See Appendix A for the traffic count data.

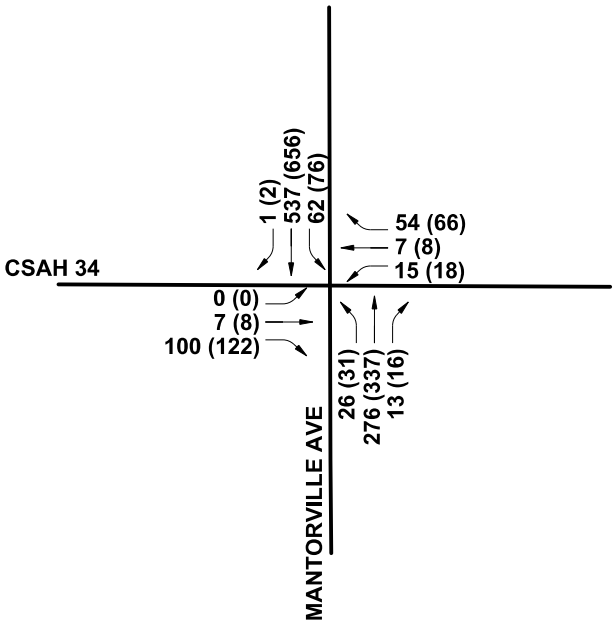
See Figure 4 for a summary of the 2020 and 2040 volumes for each intersection traffic movement.



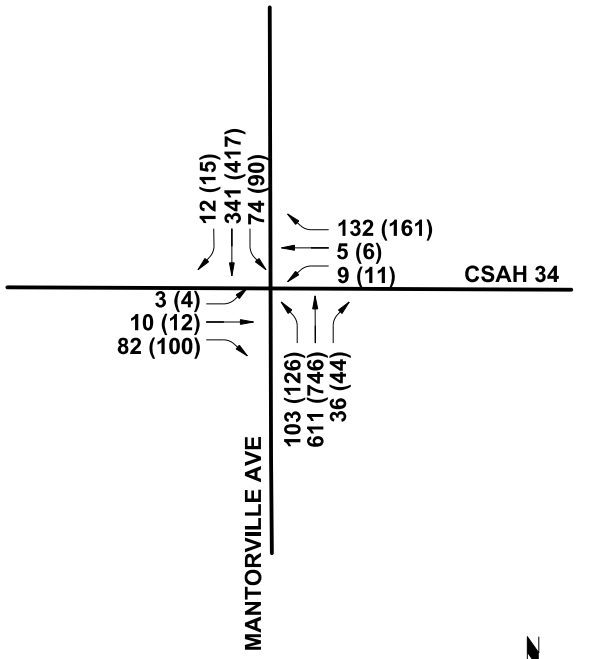
AM PEAK HOUR TRAFFIC



PM PEAK HOUR TRAFFIC



AM PEAK HOUR TRAFFIC



PM PEAK HOUR TRAFFIC

NOT TO SCALE

LEGEND

MOVEMENT DESIGNATION

22 (40) 2020 (2040) PEAK VOLUME

ICE REPORT MANTORVILLE AVE (TH 57) & MAIN ST MANTORVILLE AVE (TH 57) & CSAH 34 KASSON, MN	TRAFFIC SUMMARY HOURLY VOLUMES FIGURE 4	whks engineers + planners + land surveyors

Intersection Analyses

The capacity of the intersections was analyzed using the procedures outlined in the *Highway Capacity Manual 6th Edition* (HCM), the intersections were modeled using Synchro Studio 11 with SimTraffic 11 and Sidra Intersection 8.0. The results of the analysis for each scenario follow.

Level of Service (LOS) at intersections is primarily a function of peak hour turning movement volumes, intersection lane configuration, and traffic control. For intersection analysis, the HCM defines LOS in terms of the average control delay at the intersection in seconds per vehicle. Level of service is broken down into letter grades, with LOS A representing good operations and LOS F representing poor operations. LOS E is considered to be at capacity. MnDOT policy is that LOS D is acceptable in urban areas. Table 1 shows the level of service correlations to seconds of delay for signalized intersections and stop control (unsignalized) intersections. Currently in the United States, roundabout control is also categorized as unsignalized.

LOS	Signalized Intersection Control Delay (seconds/vehicle)	Unsignalized Intersection Control Delay (seconds/vehicle)
A	≤ 10 sec.	≤ 10 sec.
B	10 - 20 sec.	10 - 15 sec.
C	20 - 35 sec.	15 - 25 sec.
D	35 - 55 sec.	25 - 35 sec.
E	55 - 80 sec.	35 - 50 sec.
F	> 80 sec.	> 50 sec.

TABLE 1 – Intersection LOS Criteria

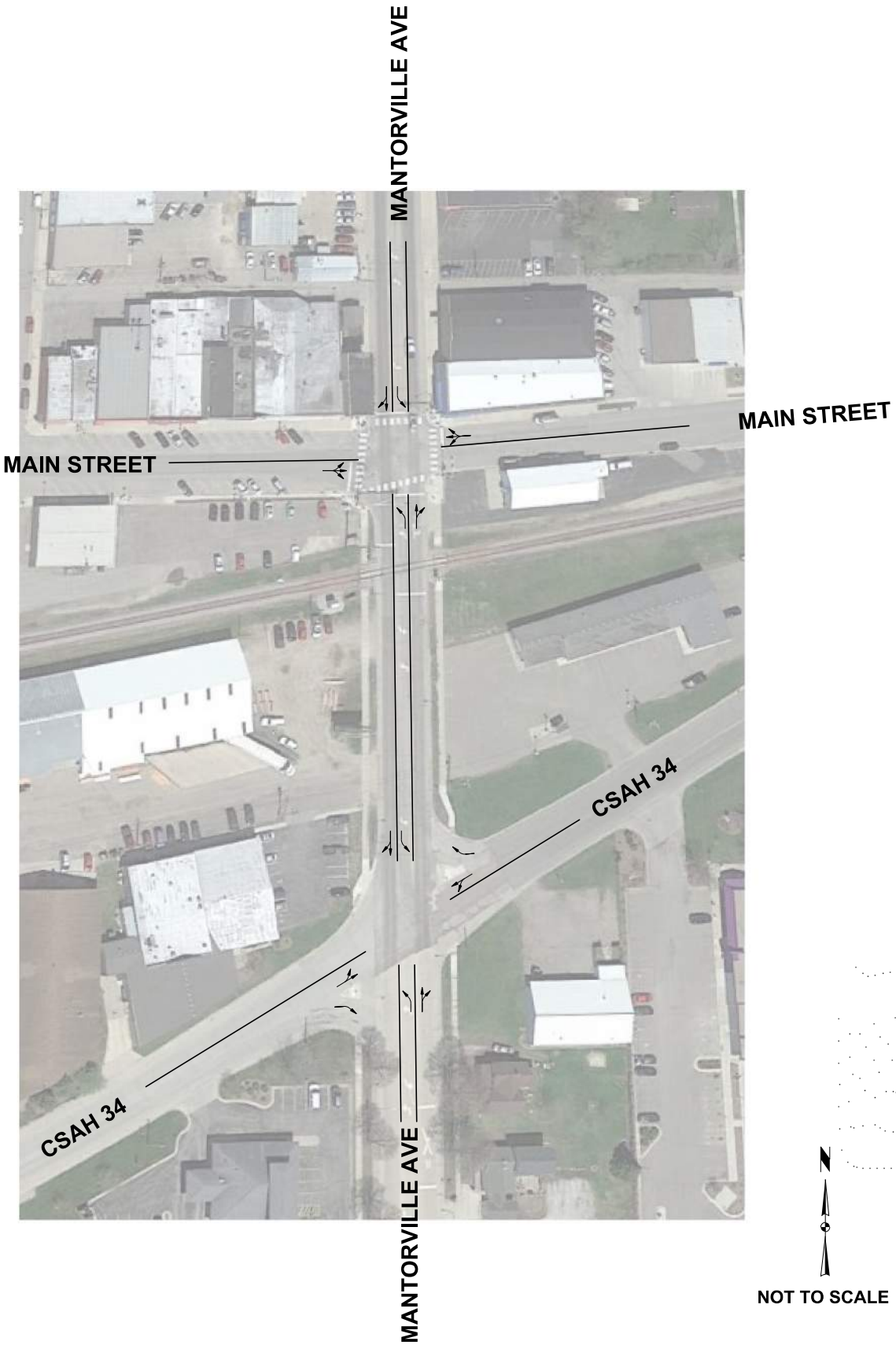
Lane Configuration

The existing lane configuration was used for the side-street stop, all-way stop and traffic signal analysis. See Figure 5 for the lane configuration.

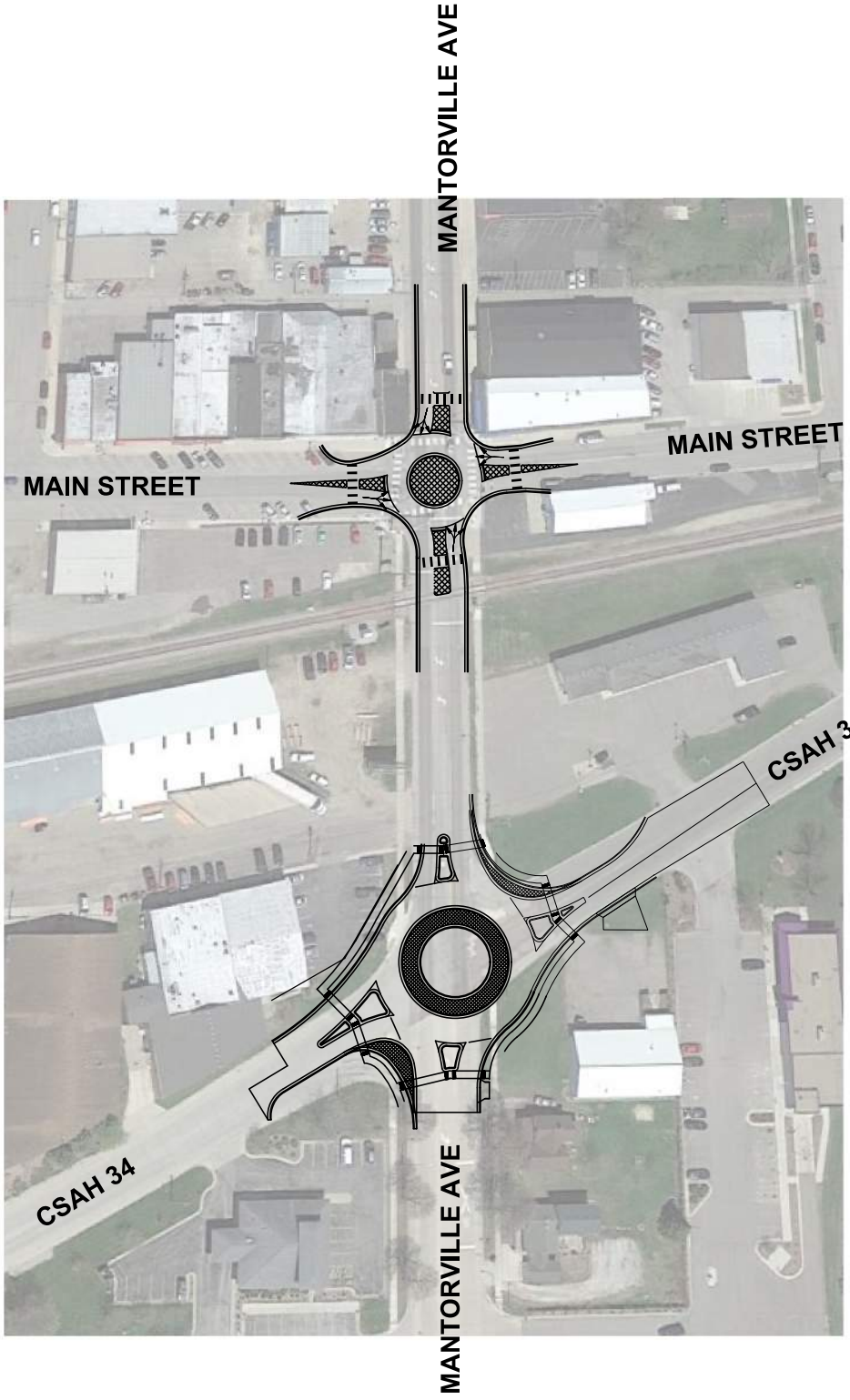
Based on a preliminary geometric analysis, a mini roundabout is feasible for the Mantorville Avenue (TH 57) / Main Street intersection but a single lane roundabout is not feasible based on the close proximity to the railroad crossing.

A single lane roundabout is feasible at the Mantorville Avenue (TH 57) / CSAH 34 intersection.

See Figure 6 for the proposed roundabout lane configuration.



ICE REPORT MANTORVILLE AVE (TH 57) & MAIN ST MANTORVILLE AVE (TH 57) & CSAH 34 KASSON, MN	EXISTING LANE CONFIGURATION FIGURE 5	whks engineers + planners + land surveyors



NOT TO SCALE

ICE REPORT MANTORVILLE AVE (TH 57) & MAIN ST MANTORVILLE AVE (TH 57) & CSAH 34 KASSON, MN	ROUNDABOUT LANE CONFIGURATION FIGURE 6	whks engineers + planners + land surveyors

2020 Existing Traffic Volumes Capacity Analysis

The intersections were analyzed using the Synchro/SimTraffic and Sidra Intersection software programs, which use the Highway Capacity Manual (HCM) methodology. The intersections were analyzed using the 2020 traffic volumes. The intersection control types analyzed include side-street stop, an all-way stop, traffic signal and roundabout control. A summary of the detailed LOS results for each intersection control type are shown in the Appendix B.

Side-Street Stop Control

Mantorville Avenue (TH 57) / Main Street
During the AM and PM peak hours, the eastbound and westbound movements will operate at a LOS F. See Figure 7 for LOS. See Table 2 for LOS Summary.

Mantorville Avenue (TH 57) / CSAH 34
During the AM peak hour, all movements are expected to operate at satisfactory levels of service. During the PM peak hour, the eastbound and westbound movements will operate at a LOS F. See Figure 7 for LOS. See Table 3 for LOS Summary.

All-Way Stop Control

Mantorville Avenue (TH 57) / Main Street
During the AM peak hour, the southbound movements will operate at a LOS F. During the PM peak hour, the northbound through movement will operate at a LOS F and the southbound through movement will operate at a LOS E. See Figure 8 for LOS. See Table 2 for LOS Summary.

Mantorville Avenue (TH 57) / CSAH 34
During the AM peak hour, the southbound movements will operate at a LOS E. During the PM peak hour, the northbound through movement will operate at a LOS F. See Figure 8 for LOS. See Table 3 for LOS Summary.

Signal Control

Mantorville Avenue (TH 57) / Main Street
During the AM and PM peak hours, all movements are expected to operate at satisfactory levels of service. See Figure 9 for LOS. See Table 2 for LOS Summary.

Mantorville Avenue (TH 57) / CSAH 34
During the AM and PM peak hours, all movements are expected to operate at satisfactory levels of service. See Figure 9 for LOS. See Table 3 for LOS Summary.

Roundabout Control

Mantorville Avenue (TH 57) / Main Street
During the AM and PM peak hours, all movements are expected to operate at satisfactory levels of service. See Figure 10 for LOS. See Table 2 for LOS Summary.

Mantorville Avenue (TH 57) / CSAH 34
During the AM and PM peak hours, all movements are expected to operate at satisfactory levels of service. See Figure 10 for LOS. See Table 3 for LOS Summary.

Mantorville Avenue (TH 57) / Main Street

2020 Level of Service									
		Side Street Stop		All-Way Stop		Traffic Signal		Roundabout	
		AM	PM	AM	PM	AM	PM	AM	PM
APPROACH	NB	A	A	C	F	B	B	A	C
	SB	A	A	F	E	C	B	A	A
	EB	F	F	C	C	C	C	B	A
	WB	F	F	C	B	B	C	A	B
Intersection LOS				E	F	B	B	A	B

Acceptable LOS Degrading LOS Failing LOS

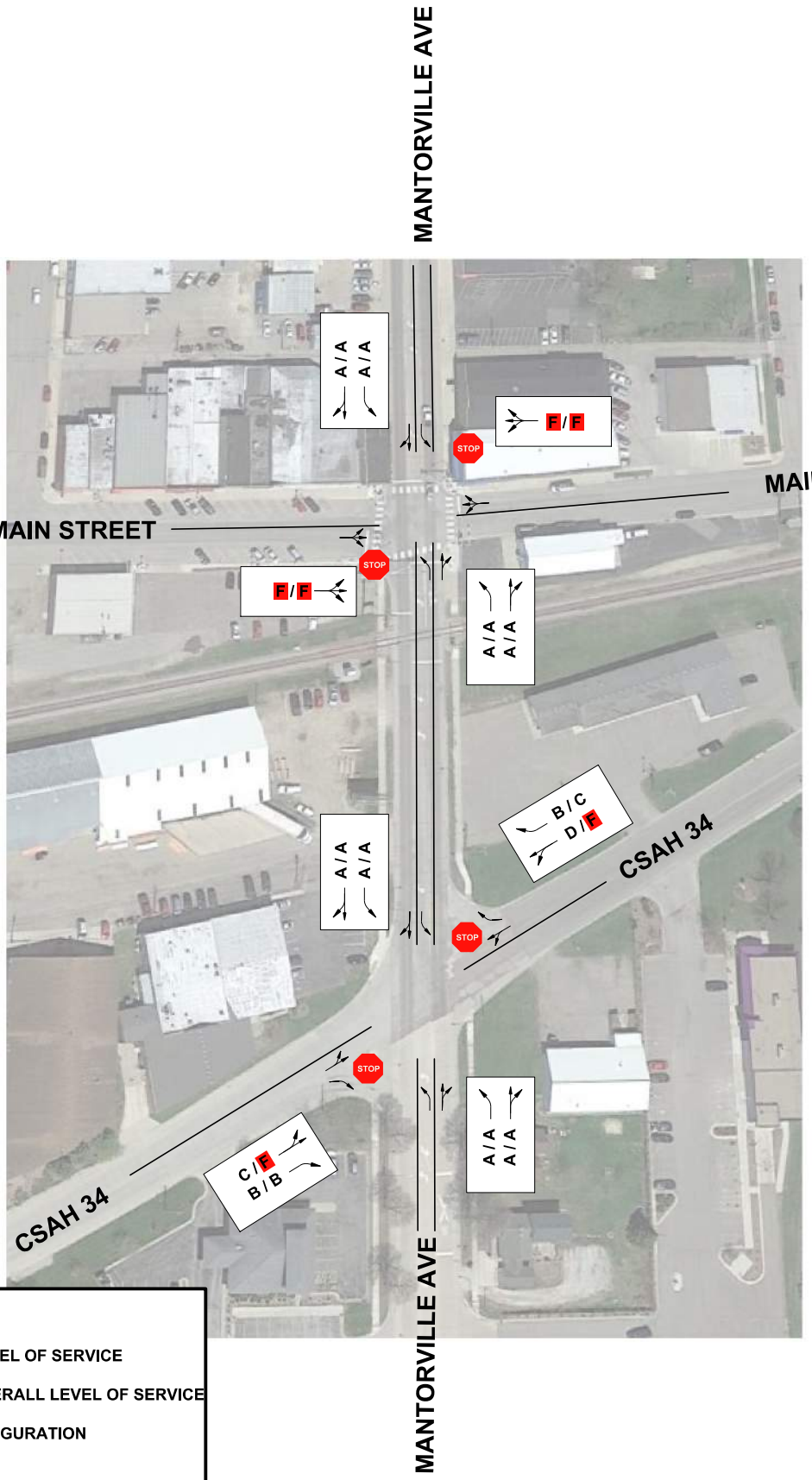
TABLE 2 – 2020 LOS Summary

Mantorville Avenue (TH 57) / CSAH 34

2020 Level of Service									
		Side Street Stop		All-Way Stop		Traffic Signal		Roundabout	
		AM	PM	AM	PM	AM	PM	AM	PM
APPROACH	NB	A	A	B	F	C	B	A	B
	SB	A	A	E	C	B	A	A	A
	EB	C	F	B	B	B	C	A	A
	WB	D	F	B	B	B	C	A	A
Intersection LOS				D	F	B	B	A	A

Acceptable LOS Degrading LOS Failing LOS

TABLE 3 – 2020 LOS Summary



LEGEND

X / X AM / PM LEVEL OF SERVICE

X / X AM / PM OVERALL LEVEL OF SERVICE

LANE CONFIGURATION

NOT TO SCALE

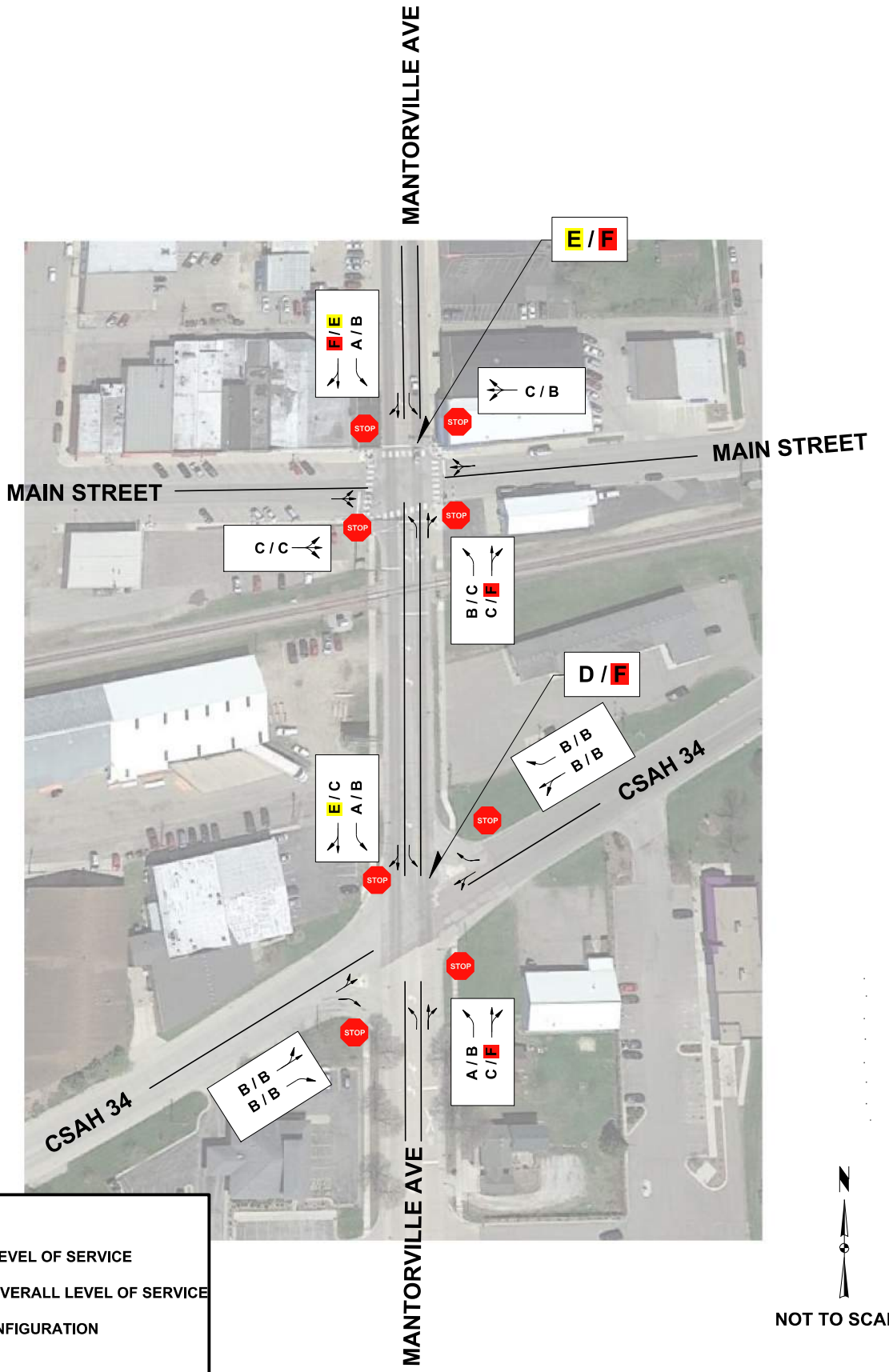
ICE REPORT
MANTORVILLE AVE (TH 57) & MAIN ST
MANTORVILLE AVE (TH 57) & CSAH 34

KASSON, MN

2020 SIDE STREET STOP CONTROL
LEVEL OF SERVICE

FIGURE 7

whks
engineers + planners + land surveyors



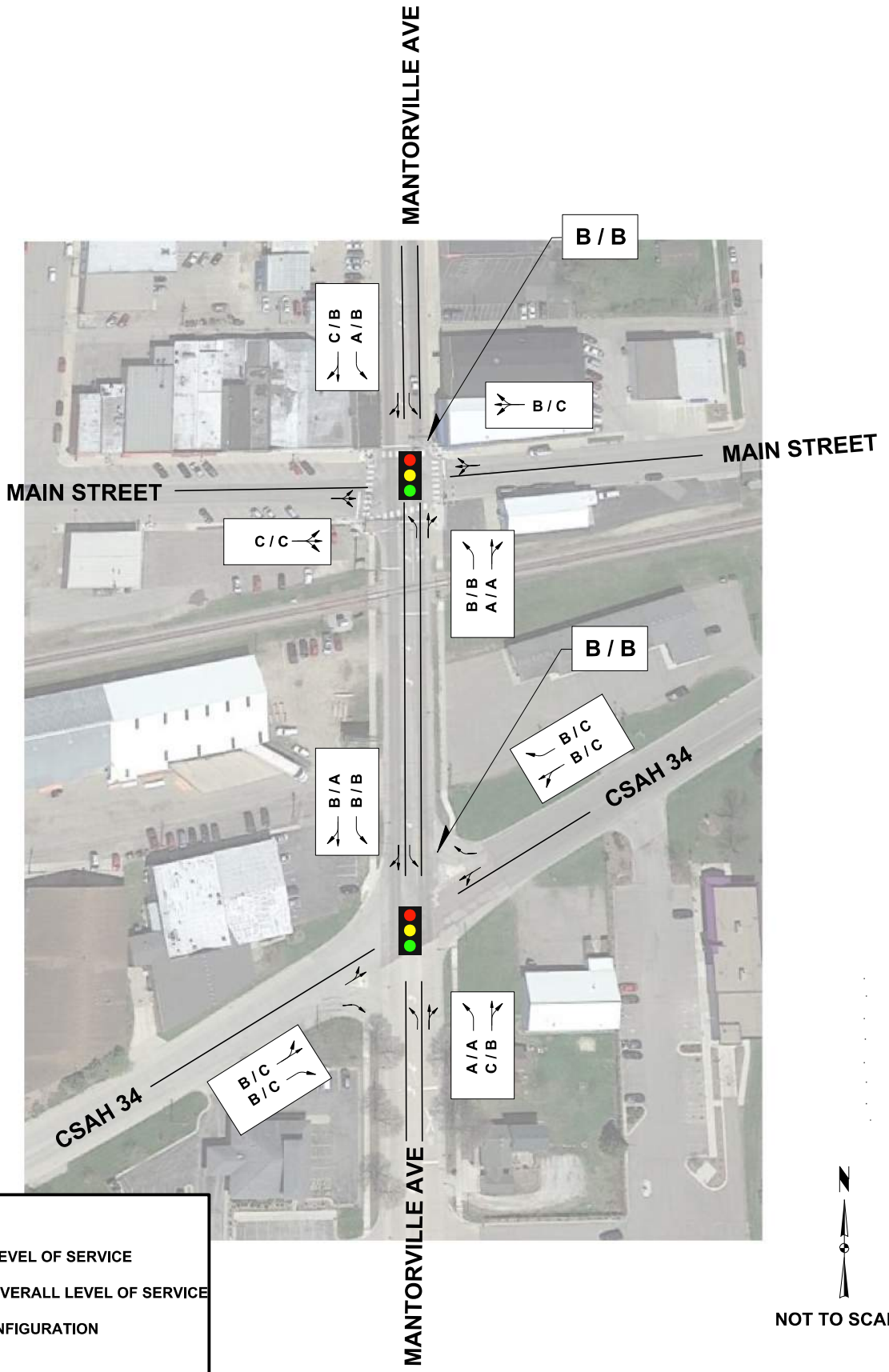
ICE REPORT
MANTORVILLE AVE (TH 57) & MAIN ST
MANTORVILLE AVE (TH 57) & CSAH 34

KASSON, MN

2020 ALL-WAY STOP CONTROL
LEVEL OF SERVICE

FIGURE 8

whks
engineers + planners + land surveyors



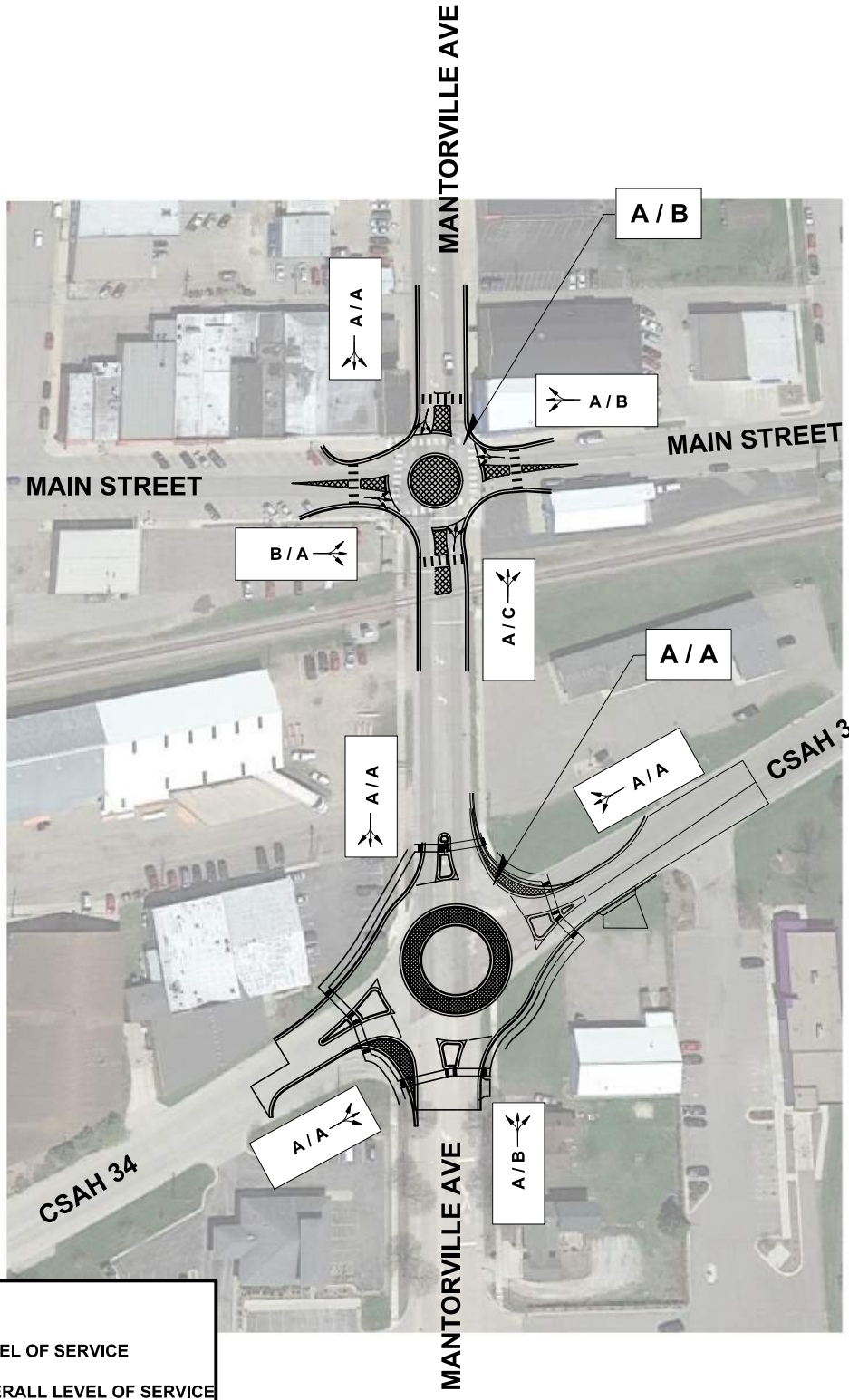
ICE REPORT
MANTORVILLE AVE (TH 57) & MAIN ST
MANTORVILLE AVE (TH 57) & CSAH 34

KASSON, MN

2020 SIGNALIZED CONTROL
LEVEL OF SERVICE

FIGURE 9

whks
engineers + planners + land surveyors



LEGEND

X / X AM / PM LEVEL OF SERVICE

X / X AM / PM OVERALL LEVEL OF SERVICE

LANE CONFIGURATION

NOT TO SCALE

ICE REPORT MANTORVILLE AVE (TH 57) & MAIN ST MANTORVILLE AVE (TH 57) & CSAH 34 KASSON, MN	2020 ROUNDABOUT CONTROL LEVEL OF SERVICE FIGURE 10	whks engineers + planners + land surveyors

2040 Traffic Volumes Capacity Analysis

The intersections were analyzed using the Synchro/SimTraffic and Sidra Intersection software programs, which use the Highway Capacity Manual (HCM) methodology. The intersections were analyzed using the 2040 traffic volumes. A summary of the detailed LOS results is shown in Appendix C.

Side-Street Stop Control

Mantorville Avenue (TH 57) / Main Street
Side-Street stop control does not provide an acceptable Level of Service for 2020 traffic, therefore was not analyzed for 2040 traffic.

Mantorville Avenue (TH 57) / CSAH 34
Side-Street stop control does not provide an acceptable Level of Service for 2020 traffic, therefore was not analyzed for 2040 traffic.

All-Way Stop Control

Mantorville Avenue (TH 57) / Main Street
All-way stop control does not provide an acceptable Level of Service for 2020 traffic, therefore was not analyzed for 2040 traffic.

Mantorville Avenue (TH 57) / CSAH 34
All-way stop control does not provide an acceptable Level of Service for 2020 traffic, therefore was not analyzed for 2040 traffic.

Signal Control

Mantorville Avenue (TH 57) / Main Street
During the AM peak hour, the intersection is expected to operate at an overall LOS C. The individual movements during the AM peak hour are also expected to operate at satisfactory levels of service.

During the PM peak hour, the intersection is expected to operate at an overall LOS B. The individual movements during the PM peak hour are also expected to operate at satisfactory levels of service.

See Figure 11 for LOS. See Table 4 for LOS Summary.

Mantorville Avenue (TH 57) / CSAH 34
During the AM peak hour, the intersection is expected to operate at an overall LOS B. The individual movements during the AM peak hour are also expected to operate at satisfactory levels of service.

During the PM peak hour, the intersection is expected to operate at an overall LOS B. The individual movements during the PM peak hour are also expected to operate at satisfactory levels of service.

See Figure 11 for LOS. See Table 5 for LOS Summary.

Roundabout Control

Mantorville Avenue (TH 57) / Main Street
During the AM peak hour, the intersection is expected to operate at an overall LOS B. The individual movements during the AM peak hour are also expected to operate at satisfactory levels of service.

During the PM peak hour, the intersection is expected to operate at an overall LOS D. The northbound approach is expected to operate at a LOS E. All other movements are expected to operate at satisfactory levels of service.

See Figure 12 for LOS. See Table 4 for LOS Summary.

Mantorville Avenue (TH 57) / CSAH 34
During the AM peak hour, the intersection is expected to operate at an overall LOS A. The individual movements during the AM peak hour are also expected to operate at satisfactory levels of service.

During the PM peak hour, the intersection is expected to operate at an overall LOS C. The individual movements during the PM peak hour are also expected to operate at satisfactory levels of service.

See Figure 12 for LOS. See Table 5 for LOS Summary.

Based on this analysis, traffic signal control and roundabout control are suitable methods of control for this intersection.

Mantorville Avenue (TH 57) / Main Street

2040 Level of Service									
		Side Street Stop		All-Way Stop		Traffic Signal		Roundabout	
		AM	PM	AM	PM	AM	PM	AM	PM
APPROACH	NB					B	B	A	E
	SB					D	C	B	B
	EB					C	C	C	A
	WB					C	C	A	B
Intersection LOS						C	B	B	D

Acceptable LOS Degrading LOS Failing LOS

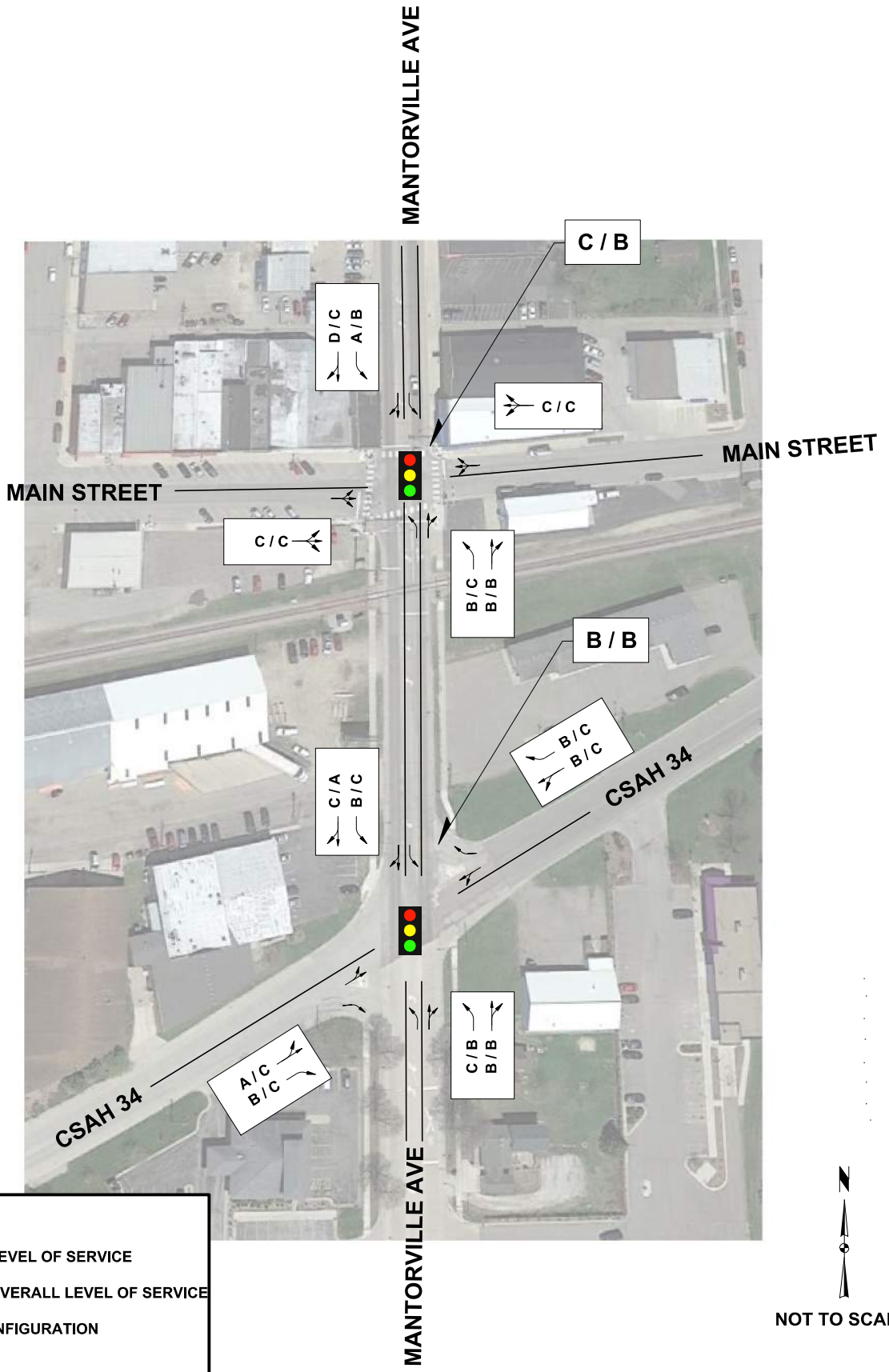
TABLE 4 – 2040 LOS Summary

Mantorville Avenue (TH 57) / CSAH 34

2040 Level of Service									
		Side Street Stop		All-Way Stop		Traffic Signal		Roundabout	
		AM	PM	AM	PM	AM	PM	AM	PM
APPROACH	NB					C	B	A	C
	SB					C	C	B	A
	EB					B	C	A	A
	WB					B	C	A	B
Intersection LOS						B	B	A	C

Acceptable LOS Degrading LOS Failing LOS

TABLE 5 – 2040 LOS Summary



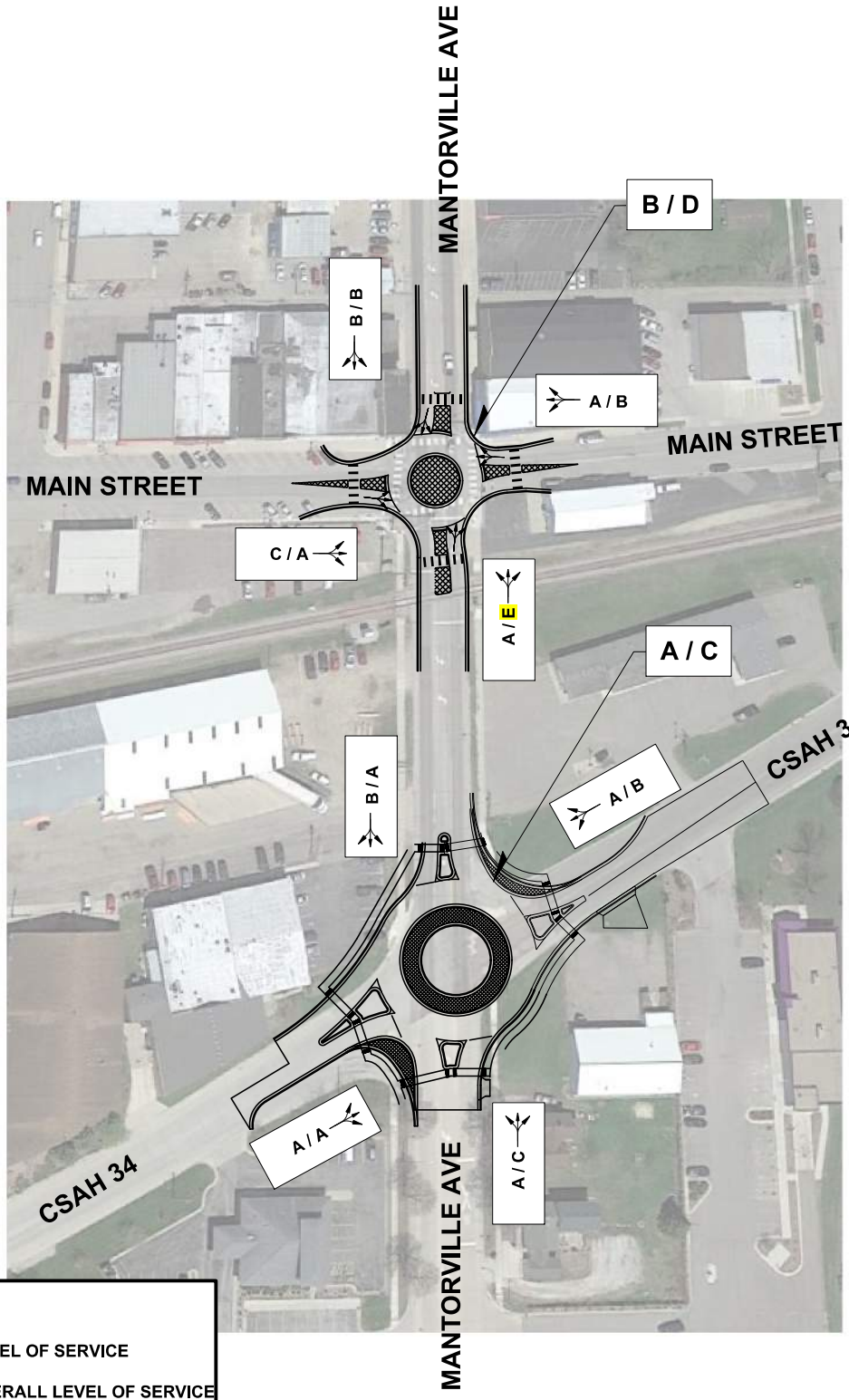
ICE REPORT
MANTORVILLE AVE (TH 57) & MAIN ST
MANTORVILLE AVE (TH 57) & CSAH 34

KASSON, MN

2040 SIGNALIZED CONTROL
LEVEL OF SERVICE

FIGURE 11

whks
engineers + planners + land surveyors



LEGEND

X / X AM / PM LEVEL OF SERVICE

X / X AM / PM OVERALL LEVEL OF SERVICE

LANE CONFIGURATION

NOT TO SCALE

ICE REPORT MANTORVILLE AVE (TH 57) & MAIN ST MANTORVILLE AVE (TH 57) & CSAH 34 KASSON, MN	2040 ROUNDABOUT CONTROL LEVEL OF SERVICE FIGURE 12	whks engineers + planners + land surveyors

Warrant Analysis

A warrant analysis was performed in accordance with the Minnesota Manual on Uniform Traffic Control Devices (MnMUTCD). A warrant analysis was performed for a multi-way stop application and for a traffic signal control at the intersection using 2040 traffic.

Multi-way Stop Control

The multi-way stop application warrant was analyzed for the intersections. Warrants are met for both intersections. A detailed warrant analysis for multi-way stop applications can be found in Appendix D.

Traffic Signal Control

A signal warrant analysis was also completed for the intersections. For this analysis the MnMUTCD signal Warrants 1-9 were evaluated for this intersection. For this analysis, the right turning traffic from the minor leg was discounted in the warrant analysis. The traffic signal warrants were analyzed for the intersections and warrants are met. A detailed warrant analysis for signalized applications can be found in Appendix D.

Roundabout Control

Warrants are met for multi-way stop control and traffic signal control for both intersections; therefore, roundabouts are also warranted.

Crash data was obtained from MnDOT MNCMAT2.

Mantorville Avenue (TH 57) / Main Street
There were twenty-three crashes at the intersection of Mantorville Avenue (TH 57) and Main Street from 2010 to 2019. The majority of the crashes were rear end (10) and angle (4). See Appendix E for detailed crash data.

Based on the crash data provided at this location, there is a need to address safety. Rear end and angle crashes are classified as a severe crash type.

General discussion on the type of traffic control and how it affects an intersections safety is listed below.

Mantorville Avenue (TH 57) / CSAH 34
There were twenty-five crashes at the intersection of Mantorville Avenue (TH 57) and CSAH 34 from 2010 to 2019. The majority of the crashes were rear end (8) and other (6). See Appendix E for detailed crash data.

Based on the crash data provided at this location, there is a need to address safety. Rear end crashes are classified as a severe crash type.

General discussion on the type of traffic control and how it affects an intersections safety is listed below.

Side-Street Stop Control

Side-street stop control does not provide an acceptable Level of Service for the amount of traffic at these intersections. Motorists will observe high delays and not receive adequate gaps in traffic. This is not an acceptable type of control for the intersections.

All-Way Stop Control

All-way stop control does not provide an acceptable Level of Service for the amount of traffic at these intersections. Motorists will observe high delays and not receive adequate gaps in traffic. This is not an acceptable type of control for the intersections.

Traffic Signal Control

Traffic signal control allows traffic to flow smoother and safer when used in proper situations. Rear end crashes at signalized intersections can be reduced by optimizing the signal timing, eliminating turn movements such as right turn on red, employing signal coordination with neighboring signals, implementing speed cameras and reducing speed limits.

Roundabout Control

Studies show that roundabout control improves safety in the following ways:

1. Slower vehicle speeds
2. The number of conflict points is decreased
3. Accidents are less severe

Installing a roundabout is a good traffic calming technique. Reduced vehicle speed is achieved by controlling geometrics and, therefore, speed reduction can be realized at all times of the day and during various traffic volumes. Roundabout control is a flexible type of control that handles varying traffic volumes efficiently.

Installing a roundabout may reduce crashes by 44% (p. 30, DRCRF[(1)]) and may reduce property damage only crashes by 42% and injuries by 82% (p. 31, DRCRF[(1)]). Actual crash reductions may vary due to site-specific factors.

Railroad Crossing

The existing Mantorville Avenue (TH 57) / Main Street intersection is approximately 80 feet north of an at-grade railroad crossing. At-grade railroad crossings near an intersection present safety issues for all types of intersection control. Problems include vehicle queues backing up into the intersection or onto the railroad tracks. Queues spilling back from a rail blockage into the roundabout can fill the circulatory roadway and temporarily prevent movement on any approach.

The current train volumes are low. There are four trains per day traveling at 40 mph. The at-grade crossing already has gates and signals installed to
control vehicles on Mantorville Avenue. Should the volume of trains increase in the future, the following measures can be taken to provide safe operation and additional capacity:

Traffic Signal Control

- Coordinate signal with the railroad crossing signal to provide enough time for northbound vehicles to clear the intersection.
- Provide additional signage to warn drivers not to stop on tracks.
- Provide an area for northbound vehicles to move into if they get caught on the tracks.
- Provide additional storage for northbound Mantorville Avenue.

Roundabout Control

- Add an additional lane to provide additional queue storage and a way for vehicles to pass other vehicles waiting in the queue.
- Signalize the roundabout approach to hold vehicles while queue clears.
- Provide an area for vehicles to move into if they get caught on the tracks.

None of these measures described are included in the proposed configurations and are not anticipated to be required at this time for current volumes or trains. If the volumes of trains increase in the future, changes can be made at that time.

For all types of control, the close proximity of an at-grade railroad crossing may present safety issues for semi-tractor trailers. The current proposed geometry does not provide adequate space between the stop bar and the railroad crossing for a southbound semi-tractor trailer (either WB-62 or WB-67). The proposed roundabout will allow northbound traffic to clear the tracks prior to the train arriving.

Access Control

To improve safety at the Mantorville Avenue (TH 57) / Main Street intersection, closing the existing access on the southeast side of the intersection should be considered. Access to the property can be allowed from Main Street at the east end of the property.

Site Review

Right of way

With traffic signal or roundabout control, the intersections can be constructed within the existing right-of-way.

Findings and Recommendations

Capacity Analysis

For both intersections, side-street stop control and all-way stop control does not provide an acceptable Level of Service for current or future traffic.

Capacity analyses show that signalized control would provide acceptable Levels of Service for current and future traffic.

Capacity analyses show that roundabout control would provide acceptable Levels of Service for current and future traffic. During the PM peak hour at Mantorville Avenue (TH 57) / Main Street intersection the northbound approach LOS will be slightly degraded to a LOS E. Studies to determine the capacity of mini roundabouts in the United States are limited at this time. It is anticipated that the capacity of mini roundabouts will be higher than what the software currently estimates as drivers become more familiar with mini roundabouts. MnDOT has stated that they have several mini roundabouts in high traffic areas that are operating very well.

It is desirable to have both intersections controlled with the same type of control to improve traffic flow through the corridor. If there is one signalized intersection and one roundabout, for instance, a platoon may be created by the signalized intersection and create a long queue at the roundabout intersection.

Warrant Analysis

For both intersections, multi-way stop and traffic signal warrants are met for design year volumes. Therefore, roundabout control is also warranted.

Safety Analysis

Based on the crash data provided, specific safety issues do need to be addressed in the proposed improvements.

Roundabouts offer significant safety benefits in comparison to signalized intersections. Roundabouts provide an overall reduction in vehicle speed, eliminate dangerous intersections, such as red-light running, and remove some of the most serious conflict points including angle, left turn, and head-on crashes. [2]

Regarding the close proximity to the railroad at the Mantorville Avenue (TH 57) / Main Street intersection, both a traffic signal and a roundabout can provide safety benefits for vehicles at the railroad crossing. The traffic signal timing can be set to accommodate vehicles clearing the railroad tracks. The yield condition at a roundabout will allow vehicles to clear the railroad crossing.

Geometric Analysis

With traffic signal or roundabout control, the intersections can be constructed within the existing right-of-way.

Based on preliminary geometric analysis, a mini roundabout is feasible for the Mantorville Avenue (TH 57) / Main Street intersection. A single lane roundabout is feasible at the Mantorville Avenue (TH 57) / CSAH 34 intersection.

Cost Analysis

The estimated construction cost for signalized intersections with associated roadway improvements is estimated to be $1,084,600.
The estimated construction cost for roundabout intersections with associated roadway improvements is estimated to be $1,015,900.

Costs do not include engineering.

Summary of Analysis

The appropriate type of intersection control is based on multiple factors and analyses. The side-street stop control and all-way stop control do not provide an acceptable Level of Service; therefore, side-street stop control and all-way stop control would not be acceptable methods of control. The capacity analyses show that signalized and roundabout control would provide acceptable Levels of Service. MnDOT warrants are met for design year volumes for signalized and roundabout control.

Based on the crash data provided, there are specific safety issues that need to be addressed in the proposed improvements. For these intersections, it is recommended that roundabout control be implemented.

References

(1) Geni Bahar, Maurice Masliah, Rhys Wolff, Peter Park, Desktop Reference for Crash Reduction Factors, Report No. FHWA-SA-08-011 (Washington, D.C.: US Department of Transportation Federal Highway Administration, 2008).

(2) Christopher W. Jenks et. al, ROUNDABOUTS: An Informational Guide, Second Edition, Report No. 672 (Washington, D.C.: US Department of Transportation Federal Highway Administration, 2010), p.3-33.

APPENDIX A

Traffic Count Data

11 W Main St - TMC
Tue Dec 18, 2018
Full Length (6AM-7PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 598072, Location: 44.029497, -92.748195

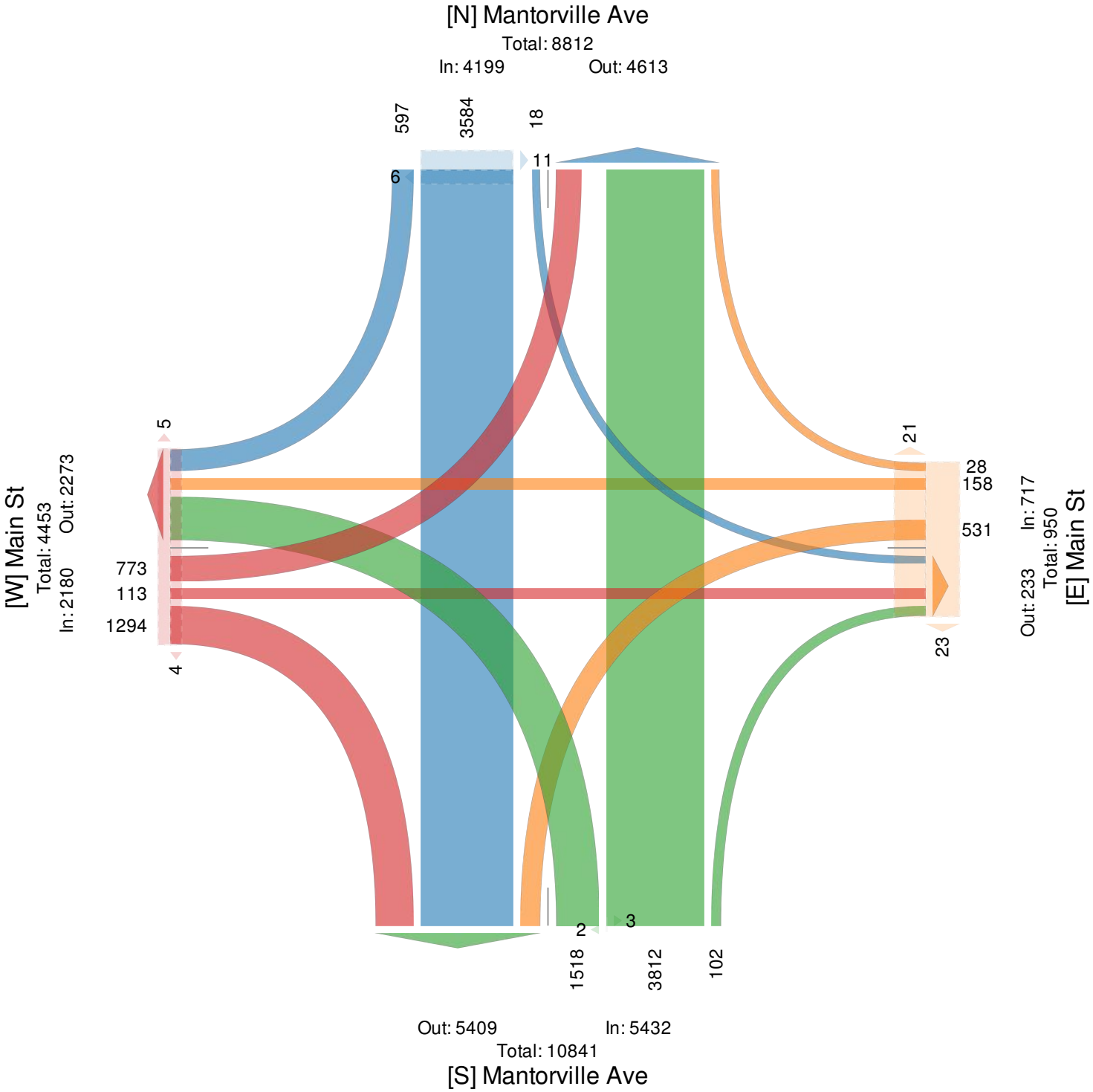
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Mantorville Ave						Main St						Mantorville Ave						Main St						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
2018-12-18 6:00AM	37	353	1	0	**391**	0	2	8	63	0	**73**	0	2	92	28	0	**122**	1	115	3	15	0	**133**	0	**719**
7:00AM	60	417	0	0	**477**	0	1	26	135	0	**162**	2	5	267	55	0	**327**	0	136	4	125	0	**265**	0	**1231**
8:00AM	39	245	1	0	**285**	0	1	10	46	0	**57**	2	6	171	80	0	**257**	0	91	4	25	0	**120**	2	**719**
9:00AM	27	211	1	0	**239**	0	3	6	25	0	**34**	9	8	152	104	0	**264**	0	81	1	25	0	**107**	0	**644**
10:00AM	34	188	3	0	**225**	2	0	7	24	0	**31**	5	8	166	115	0	**289**	0	87	10	32	0	**129**	2	**674**
11:00AM	36	234	0	0	**270**	0	1	9	25	0	**35**	2	6	226	92	0	**324**	1	107	9	33	0	**149**	0	**778**
12:00PM	43	214	1	0	**258**	1	3	11	27	0	**41**	3	9	243	119	0	**371**	0	92	12	40	0	**144**	0	**814**
1:00PM	46	236	2	0	**284**	4	1	8	23	0	**32**	4	11	204	113	0	**328**	1	90	8	45	0	**143**	1	**787**
2:00PM	49	224	1	0	**274**	3	4	3	18	0	**25**	5	12	321	129	0	**462**	0	94	7	55	0	**156**	1	**917**
3:00PM	67	364	1	0	**432**	6	2	21	51	0	**74**	5	8	404	170	0	**582**	2	85	13	91	0	**189**	2	**1277**
4:00PM	68	322	2	0	**392**	0	3	17	34	0	**54**	5	13	604	193	0	**810**	0	136	16	118	0	**270**	1	**1526**
5:00PM	63	336	4	0	**403**	1	5	26	41	0	**72**	2	11	603	206	0	**820**	0	111	16	111	0	**238**	0	**1533**
6:00PM	28	240	1	0	**269**	0	2	6	19	0	**27**	0	3	359	114	0	**476**	0	69	10	58	0	**137**	0	**909**
Total	597	3584	18	0	**4199**	17	28	158	531	0	**717**	44	102	3812	1518	0	**5432**	5	1294	113	773	0	**2180**	9	**12528**
% Approach	14.2%	85.4%	0.4%	0%	**-**	-	3.9%	22.0%	74.1%	0%	**-**	-	1.9%	70.2%	27.9%	0%	**-**	-	59.4%	5.2%	35.5%	0%	**-**	-	-
% Total	4.8%	28.6%	0.1%	0%	**33.5%**	-	0.2%	1.3%	4.2%	0%	**5.7%**	-	0.8%	30.4%	12.1%	0%	**43.4%**	-	10.3%	0.9%	6.2%	0%	**17.4%**	-	-
Lights	584	3492	18	0	**4094**	-	28	156	524	0	**708**	-	100	3708	1494	0	**5302**	-	1272	112	743	0	**2127**	-	12231
% Lights	97.8%	97.4%	100%	0%	**97.5%**	-	100%	98.7%	98.7%	0%	**98.7%**	-	98.0%	97.3%	98.4%	0%	**97.6%**	-	98.3%	99.1%	96.1%	0%	**97.6%**	-	97.6%
Single-Unit Trucks	4	43	0	0	**47**	-	0	1	1	0	**2**	-	2	50	15	0	**67**	-	16	1	11	0	**28**	-	144
% Single-Unit Trucks	0.7%	1.2%	0%	0%	**1.1%**	-	0%	0.6%	0.2%	0%	**0.3%**	-	2.0%	1.3%	1.0%	0%	**1.2%**	-	1.2%	0.9%	1.4%	0%	**1.3%**	-	1.1%
Articulated Trucks	1	23	0	0	**24**	-	0	0	0	0	**0**	-	0	26	3	0	**29**	-	5	0	3	0	**8**	-	61
% Articulated Trucks	0.2%	0.6%	0%	0%	**0.6%**	-	0%	0%	0%	0%	**0%**	-	0%	0.7%	0.2%	0%	**0.5%**	-	0.4%	0%	0.4%	0%	**0.4%**	-	0.5%
Buses	8	26	0	0	**34**	-	0	1	6	0	**7**	-	0	28	6	0	**34**	-	1	0	16	0	**17**	-	92
% Buses	1.3%	0.7%	0%	0%	**0.8%**	-	0%	0.6%	1.1%	0%	**1.0%**	-	0%	0.7%	0.4%	0%	**0.6%**	-	0.1%	0%	2.1%	0%	**0.8%**	-	0.7%
Bicycles on Road	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	17	-	-	-	-	-	44	-	-	-	-	-	5	-	-	-	-	-	9	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

11 W Main St - TMC
Tue Dec 18, 2018
Full Length (6AM-7PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 598072, Location: 44.029497, -92.748195

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



11 W Main St - TMC
Tue Dec 18, 2018
AM Peak (7AM - 8AM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 598072, Location: 44.029497, -92.748195

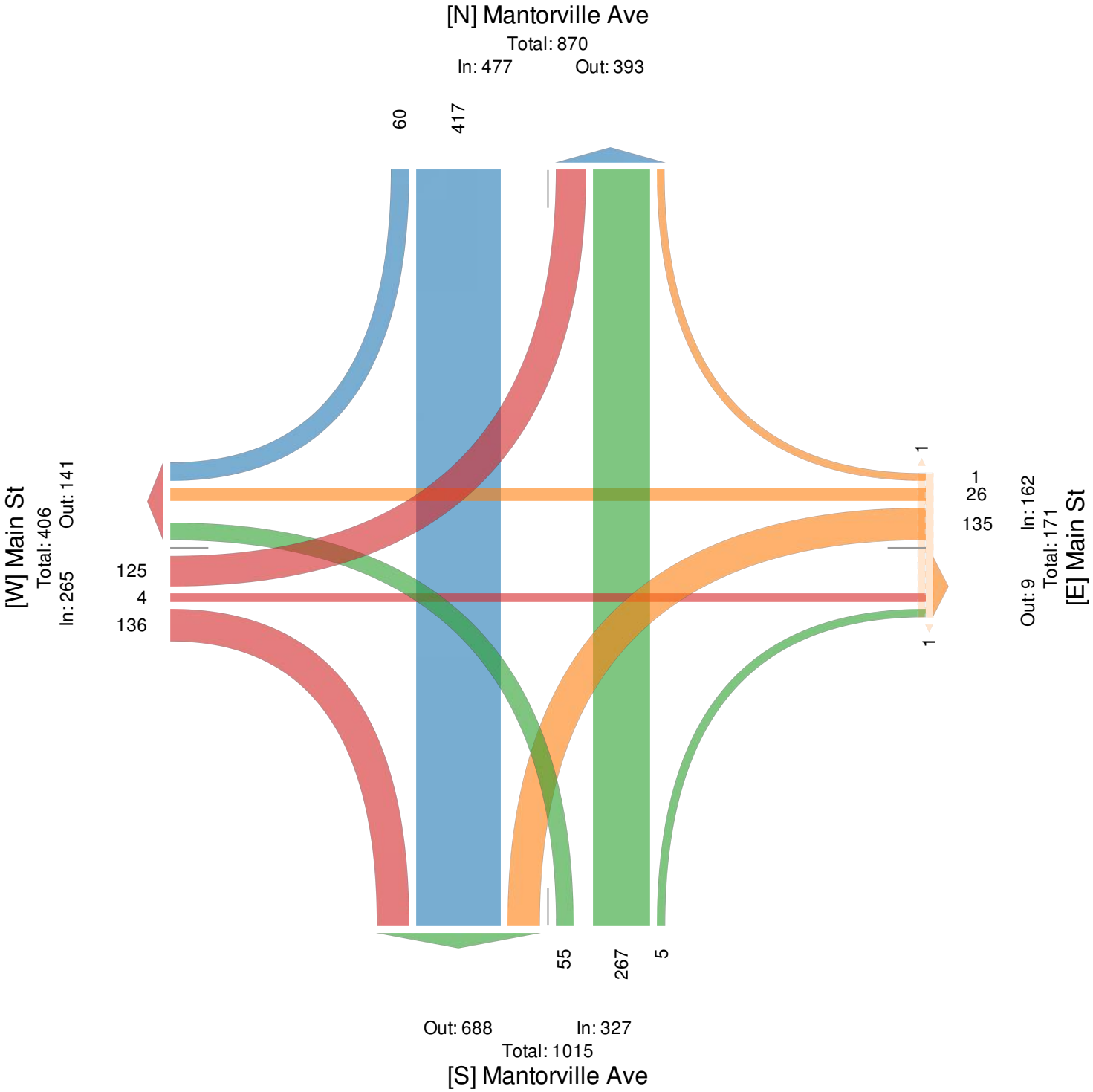
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Mantorville Ave						Main St						Mantorville Ave						Main St						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
2018-12-18 7:00AM	16	107	0	0	**123**	0	0	3	25	0	**28**	1	2	52	9	0	**63**	0	42	1	19	0	**62**	0	**276**
7:15AM	13	106	0	0	**119**	0	1	3	37	0	**41**	1	0	75	12	0	**87**	0	42	0	40	0	**82**	0	**329**
7:30AM	8	111	0	0	**119**	0	0	10	42	0	**52**	0	0	70	11	0	**81**	0	30	1	42	0	**73**	0	**325**
7:45AM	23	93	0	0	**116**	0	0	10	31	0	**41**	0	3	70	23	0	**96**	0	22	2	24	0	**48**	0	**301**
Total	60	417	0	0	**477**	0	1	26	135	0	**162**	2	5	267	55	0	**327**	0	136	4	125	0	**265**	0	**1231**
% Approach	12.6%	87.4%	0%	0%	**-**	-	0.6%	16.0%	83.3%	0%	**-**	-	1.5%	81.7%	16.8%	0%	**-**	-	51.3%	1.5%	47.2%	0%	**-**	-	**-**
% Total	4.9%	33.9%	0%	0%	**38.7%**	-	0.1%	2.1%	11.0%	0%	**13.2%**	-	0.4%	21.7%	4.5%	0%	**26.6%**	-	11.0%	0.3%	10.2%	0%	**21.5%**	-	**-**
PHF	0.652	0.939	-	-	**0.970**	-	0.250	0.650	0.804	-	**0.779**	-	0.417	0.890	0.598	-	**0.852**	-	0.810	0.500	0.744	-	**0.808**	-	0.935
Lights	59	410	0	0	**469**	-	1	26	134	0	**161**	-	5	257	55	0	**317**	-	136	4	118	0	**258**	-	1205
% Lights	98.3%	98.3%	0%	0%	**98.3%**	-	100%	100%	99.3%	0%	**99.4%**	-	100%	96.3%	100%	0%	**96.9%**	-	100%	100%	94.4%	0%	**97.4%**	-	97.9%
Single-Unit Trucks	0	4	0	0	**4**	-	0	0	0	0	**0**	-	0	1	0	0	**1**	-	0	0	1	0	**1**	-	6
% Single-Unit Trucks	0%	1.0%	0%	0%	**0.8%**	-	0%	0%	0%	0%	**0%**	-	0%	0.4%	0%	0%	**0.3%**	-	0%	0%	0.8%	0%	**0.4%**	-	0.5%
Articulated Trucks	0	1	0	0	**1**	-	0	0	0	0	**0**	-	0	2	0	0	**2**	-	0	0	1	0	**1**	-	4
% Articulated Trucks	0%	0.2%	0%	0%	**0.2%**	-	0%	0%	0%	0%	**0%**	-	0%	0.7%	0%	0%	**0.6%**	-	0%	0%	0.8%	0%	**0.4%**	-	0.3%
Buses	1	2	0	0	**3**	-	0	0	1	0	**1**	-	0	7	0	0	**7**	-	0	0	5	0	**5**	-	16
% Buses	1.7%	0.5%	0%	0%	**0.6%**	-	0%	0%	0.7%	0%	**0.6%**	-	0%	2.6%	0%	0%	**2.1%**	-	0%	0%	4.0%	0%	**1.9%**	-	1.3%
Bicycles on Road	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

11 W Main St - TMC
Tue Dec 18, 2018
AM Peak (7AM - 8AM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 598072, Location: 44.029497, -92.748195

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



11 W Main St - TMC
Tue Dec 18, 2018
Midday Peak (1:45PM - 2:45PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 598072, Location: 44.029497, -92.748195

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Mantorville Ave						Main St						Mantorville Ave						Main St						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
2018-12-18 1:45PM	9	54	1	0	**64**	1	0	2	8	0	**10**	1	4	50	30	0	**84**	0	20	1	11	0	**32**	1	**190**
2:00PM	17	49	0	0	**66**	0	0	0	5	0	**5**	1	5	77	29	0	**111**	0	23	1	9	0	**33**	0	**215**
2:15PM	10	57	1	0	**68**	1	2	0	2	0	**4**	1	2	59	36	0	**97**	0	24	2	14	0	**40**	0	**209**
2:30PM	5	56	0	0	**61**	0	1	1	6	0	**8**	0	1	76	35	0	**112**	0	21	0	12	0	**33**	1	**214**
Total	41	216	2	0	**259**	2	3	3	21	0	**27**	3	12	262	130	0	**404**	0	88	4	46	0	**138**	2	**828**
% Approach	15.8%	83.4%	0.8%	0%	-	-	11.1%	11.1%	77.8%	0%	-	-	3.0%	64.9%	32.2%	0%	-	-	63.8%	2.9%	33.3%	0%	-	-	-
% Total	5.0%	26.1%	0.2%	0%	**31.3%**	-	0.4%	0.4%	2.5%	0%	**3.3%**	-	1.4%	31.6%	15.7%	0%	**48.8%**	-	10.6%	0.5%	5.6%	0%	**16.7%**	-	-
PHF	0.603	0.947	0.500	-	**0.952**	-	0.375	0.375	0.656	-	**0.675**	-	0.600	0.851	0.903	-	**0.902**	-	0.917	0.500	0.821	-	**0.863**	-	0.963
Lights	41	213	2	0	**256**	-	3	3	21	0	**27**	-	12	254	127	0	**393**	-	87	4	42	0	**133**	-	809
% Lights	100%	98.6%	100%	0%	**98.8%**	-	100%	100%	100%	0%	**100%**	-	100%	96.9%	97.7%	0%	**97.3%**	-	98.9%	100%	91.3%	0%	**96.4%**	-	97.7%
Single-Unit Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	5	1	0	**6**	-	0	0	2	0	**2**	-	8
% Single-Unit Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	1.9%	0.8%	0%	**1.5%**	-	0%	0%	4.3%	0%	**1.4%**	-	1.0%
Articulated Trucks	0	1	0	0	**1**	-	0	0	0	0	**0**	-	0	2	0	0	**2**	-	1	0	0	0	**1**	-	4
% Articulated Trucks	0%	0.5%	0%	0%	**0.4%**	-	0%	0%	0%	0%	**0%**	-	0%	0.8%	0%	0%	**0.5%**	-	1.1%	0%	0%	0%	**0.7%**	-	0.5%
Buses	0	2	0	0	**2**	-	0	0	0	0	**0**	-	0	1	2	0	**3**	-	0	0	2	0	**2**	-	7
% Buses	0%	0.9%	0%	0%	**0.8%**	-	0%	0%	0%	0%	**0%**	-	0%	0.4%	1.5%	0%	**0.7%**	-	0%	0%	4.3%	0%	**1.4%**	-	0.8%
Bicycles on Road	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	2	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

11 W Main St - TMC
Tue Dec 18, 2018
Midday Peak (1:45PM - 2:45PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 598072, Location: 44.029497, -92.748195

GEWALT HAMILTON ASSOCIATES, INC.
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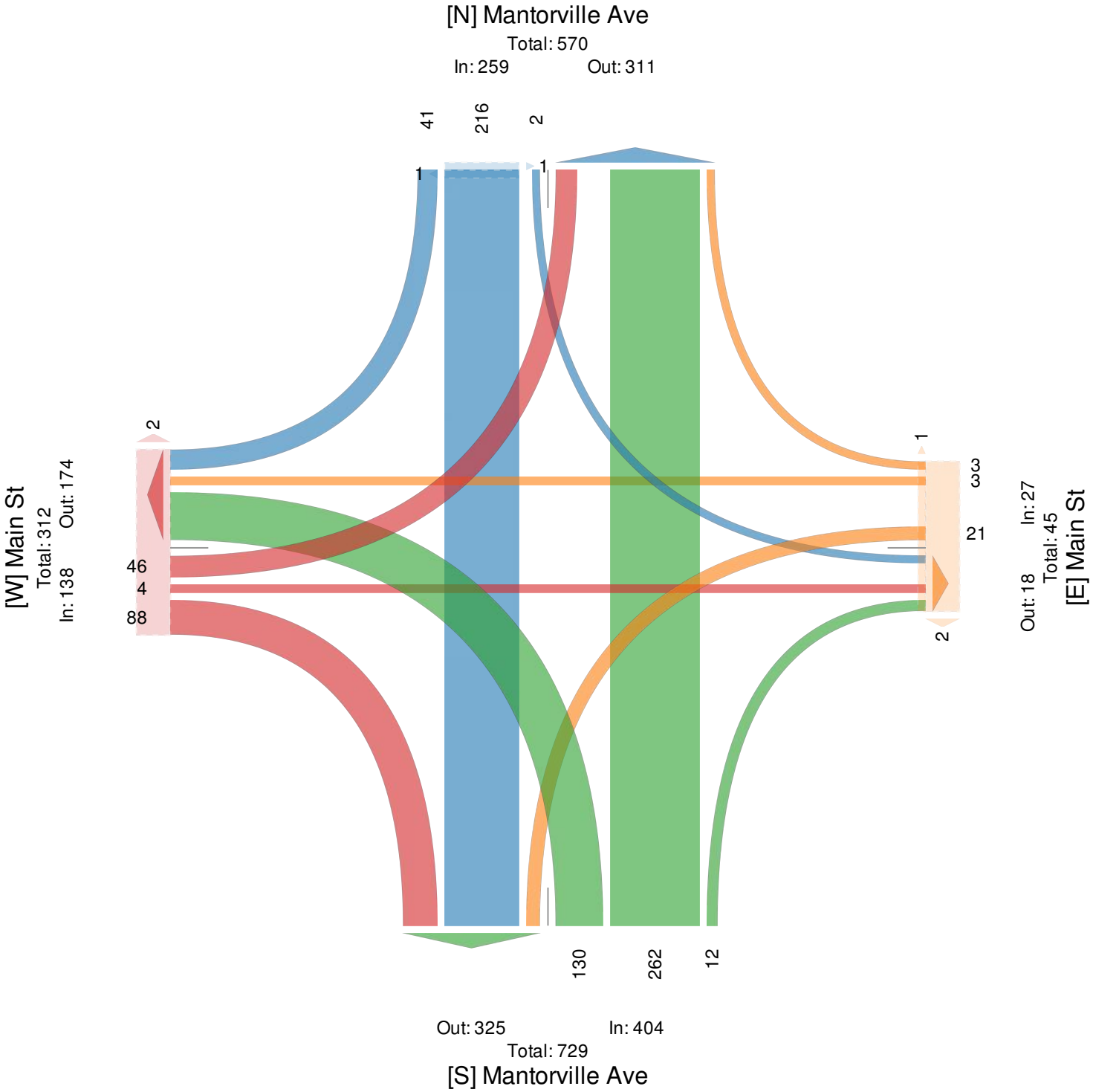
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



11 W Main St - TMC
Tue Dec 18, 2018
PM Peak (5PM - 6PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 598072, Location: 44.029497, -92.748195

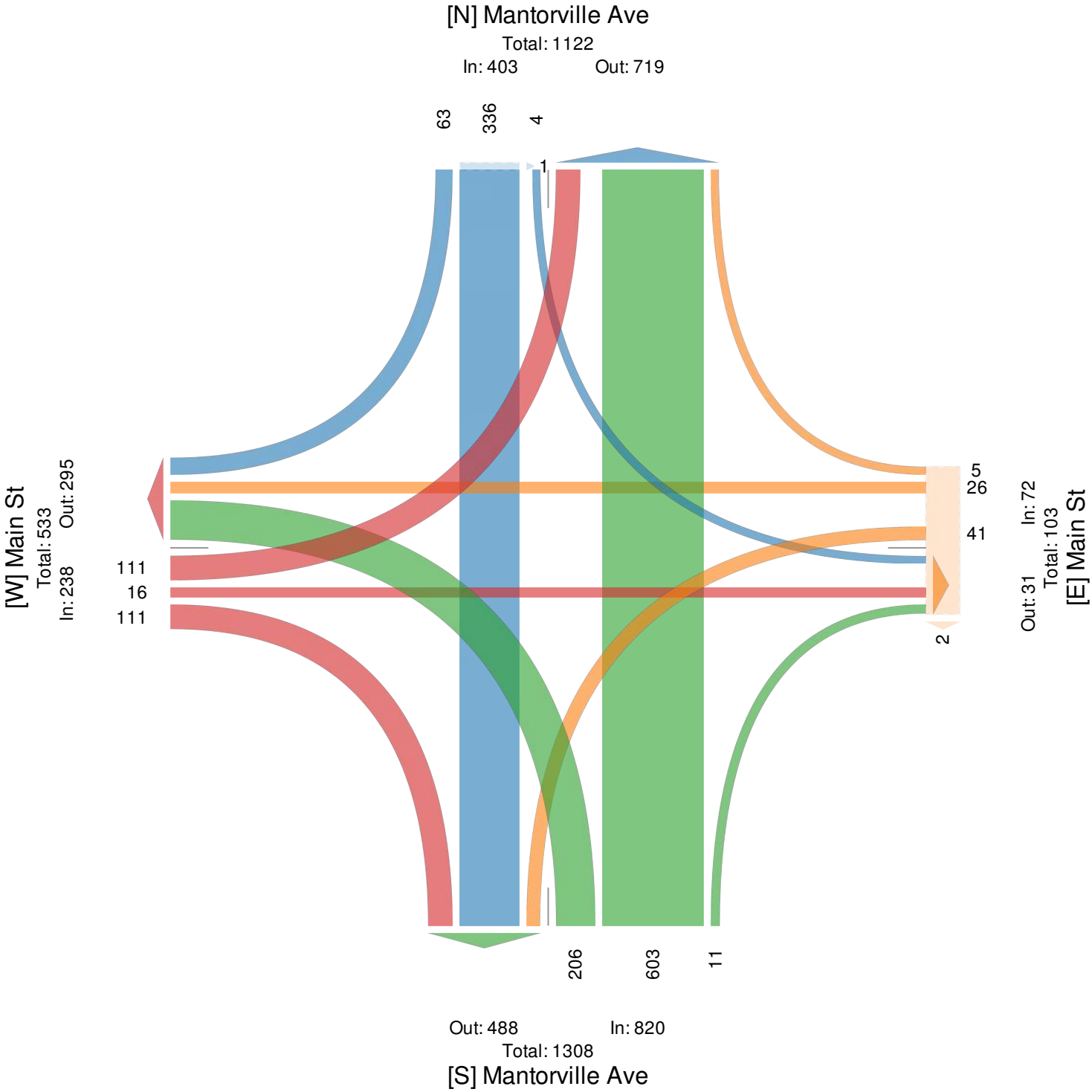
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Mantorville Ave						Main St						Mantorville Ave						Main St						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
2018-12-18 5:00PM	12	70	0	0	**82**	1	3	8	9	0	**20**	2	3	119	54	0	**176**	0	40	6	32	0	**78**	0	**356**
5:15PM	13	73	0	0	**86**	0	0	4	10	0	**14**	0	2	154	50	0	**206**	0	21	4	34	0	**59**	0	**365**
5:30PM	21	81	2	0	**104**	0	1	6	12	0	**19**	0	2	168	54	0	**224**	0	25	3	22	0	**50**	0	**397**
5:45PM	17	112	2	0	**131**	0	1	8	10	0	**19**	0	4	162	48	0	**214**	0	25	3	23	0	**51**	0	**415**
Total	63	336	4	0	**403**	1	5	26	41	0	**72**	2	11	603	206	0	**820**	0	111	16	111	0	**238**	0	**1533**
% Approach	15.6%	83.4%	1.0%	0%	**-**	-	6.9%	36.1%	56.9%	0%	**-**	-	1.3%	73.5%	25.1%	0%	**-**	-	46.6%	6.7%	46.6%	0%	**-**	-	-
% Total	4.1%	21.9%	0.3%	0%	**26.3%**	-	0.3%	1.7%	2.7%	0%	**4.7%**	-	0.7%	39.3%	13.4%	0%	**53.5%**	-	7.2%	1.0%	7.2%	0%	**15.5%**	-	-
PHF	0.750	0.750	0.500	-	**0.769**	-	0.417	0.813	0.854	-	**0.900**	-	0.688	0.897	0.954	-	**0.915**	-	0.694	0.667	0.816	-	**0.763**	-	0.923
Lights	63	334	4	0	**401**	-	5	26	40	0	**71**	-	11	597	204	0	**812**	-	111	16	111	0	**238**	-	1522
% Lights	100%	99.4%	100%	0%	**99.5%**	-	100%	100%	97.6%	0%	**98.6%**	-	100%	99.0%	99.0%	0%	**99.0%**	-	100%	100%	100%	0%	**100%**	-	99.3%
Single-Unit Trucks	0	1	0	0	**1**	-	0	0	0	0	**0**	-	0	3	2	0	**5**	-	0	0	0	0	**0**	-	6
% Single-Unit Trucks	0%	0.3%	0%	0%	**0.2%**	-	0%	0%	0%	0%	**0%**	-	0%	0.5%	1.0%	0%	**0.6%**	-	0%	0%	0%	0%	**0%**	-	0.4%
Articulated Trucks	0	1	0	0	**1**	-	0	0	0	0	**0**	-	0	2	0	0	**2**	-	0	0	0	0	**0**	-	3
% Articulated Trucks	0%	0.3%	0%	0%	**0.2%**	-	0%	0%	0%	0%	**0%**	-	0%	0.3%	0%	0%	**0.2%**	-	0%	0%	0%	0%	**0%**	-	0.2%
Buses	0	0	0	0	**0**	-	0	0	1	0	**1**	-	0	1	0	0	**1**	-	0	0	0	0	**0**	-	2
% Buses	0%	0%	0%	0%	**0%**	-	0%	0%	2.4%	0%	**1.4%**	-	0%	0.2%	0%	0%	**0.1%**	-	0%	0%	0%	0%	**0%**	-	0.1%
Bicycles on Road	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

11 W Main St - TMC
Tue Dec 18, 2018
PM Peak (5PM - 6PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 598072, Location: 44.029497, -92.748195

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



File Path	C:\Users\Public\Documents\COUNTpro\Study Files\	
File Name	2019_0909_183509_021A	
Date	9/9/2019	
Start Time	18:30	
Interval	15	
Site Code		
NB Street		
SB Street		
EB Street		
WB Street		

	A	B	C	D	E	H	I	J	M	N	O	R	S	T	V
1	**Time**		**SB Right**	**SB Thru**	**SB Left**	**WB Right**	**WB Thru**	**WB Left**	**NB Right**	**NB Thru**	**NB Left**	**EB Right**	**EB Thru**	**EB Left**	**Totals**
2	06:00		0	55	4	5	0	1	2	19	1	14	2	0	**103**
3	06:15		1	128	13	3	1	3	2	25	3	21	1	0	**201**
4	06:30		2	136	14	11	3	3	1	32	2	22	1	0	**227**
5	06:45		0	127	15	14	1	1	4	59	9	21	2	0	**253**
6	07:00		0	156	16	15	2	5	3	71	6	20	2	0	**296**
7	07:15		1	116	15	11	2	5	3	75	4	33	1	0	**266**
8	07:30		0	133	15	13	2	4	3	68	6	25	2	0	**272**
9	07:45		0	0	0	0	0	0	0	0	0	0	0	0	**0**
10	08:00		0	0	0	0	0	0	0	0	0	0	0	0	**0**
11	08:15		0	0	0	0	0	0	0	0	0	0	0	0	**0**
12	08:30		0	0	0	0	0	0	0	0	0	0	0	0	**0**
13	08:45		2	47	7	7	1	3	5	24	1	10	0	0	**107**
14	09:00		1	58	8	18	2	4	3	58	9	14	2	0	**177**
15	**AM Pk Hr:**		**1**	**532**	**61**	**53**	**7**	**15**	**13**	**273**	**25**	**99**	**7**	**0**	
16															
17	15:00		4	73	19	18	0	2	3	58	8	11	2	0	**198**
18	15:15		5	91	16	20	3	2	5	126	10	14	1	0	**293**
19	15:30		1	93	24	30	3	2	4	107	10	18	1	0	**293**
20	15:45		1	88	21	30	4	8	3	107	9	16	2	0	**289**
21	16:00		3	86	15	30	2	7	4	109	18	16	1	0	**291**
22	16:15		2	89	15	27	2	3	8	131	27	20	2	0	**326**
23	16:30		8	87	16	34	1	4	2	141	23	26	2	1	**345**
24	16:45		2	72	22	39	1	3	8	156	26	16	3	2	**350**
25	17:00		3	96	18	27	1	2	9	144	26	23	3	0	**352**
26	17:15		4	89	18	36	1	0	8	151	21	19	4	0	**351**
27	17:30		3	81	15	29	2	4	11	154	29	23	0	1	**352**
28	17:45		1	84	12	28	1	1	2	139	18	21	0	0	**307**
29	18:00		0	21	3	6	0	2	3	23	5	2	1	0	**66**
30	18:30		1	33	8	11	1	2	0	36	7	4	0	1	**104**
31	18:45		2	44	6	14	1	5	2	72	10	12	0	0	**168**
32	19:00		1	44	8	13	2	3	4	60	6	12	1	1	**155**
33	19:15		0	36	6	11	0	0	3	50	6	6	0	0	**118**
34	19:30		0	12	3	2	1	1	0	21	1	2	0	0	**43**
35															
36	**PM Pk Hr:**		**12**	**338**	**73**	**131**	**5**	**9**	**36**	**605**	**102**	**81**	**10**	**3**	

APPENDIX B

2020 Intersection Capacity Analysis Reports

Intersection	
Int Delay, s/veh	30.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↱		↰	↱	
Traffic Vol, veh/h	125	4	136	135	26	1	55	267	5	0	417	60
Future Vol, veh/h	125	4	136	135	26	1	55	267	5	0	417	60
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	0	-	-
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	136	4	148	147	28	1	60	290	5	0	453	65

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	913	901	486	975	931	293	518	0	0	295	0	0
Stage 1	486	486	-	413	413	-	-	-	-	-	-	-
Stage 2	427	415	-	562	518	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
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	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	254	278	581	231	267	746	1048	-	-	1266	-	-
Stage 1	563	551	-	616	594	-	-	-	-	-	-	-
Stage 2	606	592	-	512	533	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	222	262	581	163	252	746	1048	-	-	1266	-	-
Mov Cap-2 Maneuver	222	262	-	163	252	-	-	-	-	-	-	-
Stage 1	531	551	-	581	560	-	-	-	-	-	-	-
Stage 2	542	558	-	379	533	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	61.1	125.5	1.5	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1048	-	-	326	174	1266	-	-
HCM Lane V/C Ratio	0.057	-	-	0.884	1.012	-	-	-
HCM Control Delay (s)	8.6	-	-	61.1	125.5	0	-	-
HCM Lane LOS	A	-	-	F	F	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	8.3	8.3	0	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	7	100	15	7	54	26	276	13	62	537	1
Future Vol, veh/h	0	7	100	15	7	54	26	276	13	62	537	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	0	-	-	100	-	-
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	0	8	109	16	8	59	28	300	14	67	584	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1116	1089	585	1140	1082	307	585	0	0	314	0	0
Stage 1	719	719	-	363	363	-	-	-	-	-	-	-
Stage 2	397	370	-	777	719	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
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	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	185	215	511	178	217	733	990	-	-	1246	-	-
Stage 1	420	433	-	656	625	-	-	-	-	-	-	-
Stage 2	629	620	-	390	433	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	155	198	511	128	200	733	990	-	-	1246	-	-
Mov Cap-2 Maneuver	155	198	-	128	200	-	-	-	-	-	-	-
Stage 1	408	410	-	638	608	-	-	-	-	-	-	-
Stage 2	555	603	-	285	410	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.6	17.4	0.7	0.8
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	990	-	-	198	511	145	733	1246	-	-
HCM Lane V/C Ratio	0.029	-	-	0.038	0.213	0.165	0.08	0.054	-	-
HCM Control Delay (s)	8.7	-	-	23.9	13.9	34.7	10.3	8.1	-	-
HCM Lane LOS	A	-	-	C	B	D	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.8	0.6	0.3	0.2	-	-

Intersection	
Int Delay, s/veh	122.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	111	16	111	41	26	5	206	603	11	4	336	63
Future Vol, veh/h	111	16	111	41	26	5	206	603	11	4	336	63
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	0	-	-
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	121	17	121	45	28	5	224	655	12	4	365	68

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1533	1522	399	1585	1550	661	433	0	0	667	0	0
Stage 1	407	407	-	1109	1109	-	-	-	-	-	-	-
Stage 2	1126	1115	-	476	441	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
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	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 95	118	651	88	114	462	1127	-	-	923	-	-
Stage 1	621	597	-	254	285	-	-	-	-	-	-	-
Stage 2	249	283	-	570	577	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 61	94	651	52	91	462	1127	-	-	923	-	-
Mov Cap-2 Maneuver	~ 61	94	-	52	91	-	-	-	-	-	-	-
Stage 1	497	595	-	203	228	-	-	-	-	-	-	-
Stage 2	173	227	-	449	575	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 698.4	277	2.3	0.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1127	-	-	110	66	923	-	-
HCM Lane V/C Ratio	0.199	-	-	2.352	1.186	0.005	-	-
HCM Control Delay (s)	9	-	-	$ 698.4	277	8.9	-	-
HCM Lane LOS	A	-	-	F	F	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	22.8	6.2	0	-	-

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

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	10	82	9	5	132	103	611	36	74	341	12
Future Vol, veh/h	3	10	82	9	5	132	103	611	36	74	341	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	0	-	-	100	-	-
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	3	11	89	10	5	143	112	664	39	80	371	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1520	1465	378	1496	1452	684	384	0	0	703	0	0
Stage 1	538	538	-	908	908	-	-	-	-	-	-	-
Stage 2	982	927	-	588	544	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
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	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	97	128	669	101	130	449	1174	-	-	895	-	-
Stage 1	527	522	-	330	354	-	-	-	-	-	-	-
Stage 2	300	347	-	495	519	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	55	105	669	70	107	449	1174	-	-	895	-	-
Mov Cap-2 Maneuver	55	105	-	70	107	-	-	-	-	-	-	-
Stage 1	477	476	-	299	320	-	-	-	-	-	-	-
Stage 2	182	314	-	382	473	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.1	20.9	1.2	1.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1174	-	-	87	669	80	449	895	-	-
HCM Lane V/C Ratio	0.095	-	-	0.162	0.133	0.19	0.32	0.09	-	-
HCM Control Delay (s)	8.4	-	-	54.2	11.2	60.3	16.7	9.4	-	-
HCM Lane LOS	A	-	-	F	B	F	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.5	0.5	0.7	1.4	0.3	-	-

Intersection	
Intersection Delay, s/veh	40.1
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	125	4	136	135	26	1	55	267	5	0	417	60
Future Vol, veh/h	125	4	136	135	26	1	55	267	5	0	417	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	136	4	148	147	28	1	60	290	5	0	453	65
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	20.3	16.5	20	73
HCM LOS	C	C	C	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	47%	83%	0%	0%
Vol Thru, %	0%	98%	2%	16%	100%	87%
Vol Right, %	0%	2%	51%	1%	0%	13%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	55	272	265	162	0	477
LT Vol	55	0	125	135	0	0
Through Vol	0	267	4	26	0	417
RT Vol	0	5	136	1	0	60
Lane Flow Rate	60	296	288	176	0	518
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.133	0.613	0.582	0.394	0	1.025
Departure Headway (Hd)	8.142	7.614	7.428	8.239	7.208	7.118
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	443	476	490	440	0	513
Service Time	5.842	5.314	5.428	6.239	4.908	4.818
HCM Lane V/C Ratio	0.135	0.622	0.588	0.4	0	1.01
HCM Control Delay	12.1	21.6	20.3	16.5	9.9	73
HCM Lane LOS	B	C	C	C	N	F
HCM 95th-tile Q	0.5	4	3.7	1.8	0	14.8

Intersection	
Intersection Delay, s/veh	26.9
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	7	100	15	7	54	26	276	13	62	537	1
Future Vol, veh/h	0	7	100	15	7	54	26	276	13	62	537	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	8	109	16	8	59	28	300	14	67	584	1
Number of Lanes	0	1	1	0	1	1	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	10.9	10.5	14.6	38.3
HCM LOS	B	B	B	E

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	0%	68%	0%	100%	0%
Vol Thru, %	0%	96%	100%	0%	32%	0%	0%	100%
Vol Right, %	0%	4%	0%	100%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	26	289	7	100	22	54	62	538
LT Vol	26	0	0	0	15	0	62	0
Through Vol	0	276	7	0	7	0	0	537
RT Vol	0	13	0	100	0	54	0	1
Lane Flow Rate	28	314	8	109	24	59	67	585
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.051	0.522	0.015	0.199	0.051	0.109	0.115	0.917
Departure Headway (Hd)	6.518	5.979	7.305	6.589	7.745	6.678	6.152	5.646
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	549	603	488	542	461	534	582	643
Service Time	4.269	3.73	5.075	4.358	5.52	4.452	3.892	3.386
HCM Lane V/C Ratio	0.051	0.521	0.016	0.201	0.052	0.11	0.115	0.91
HCM Control Delay	9.6	15.1	10.2	11	10.9	10.3	9.7	41.6
HCM Lane LOS	A	C	B	B	B	B	A	E
HCM 95th-tile Q	0.2	3	0	0.7	0.2	0.4	0.4	11.8

Intersection	
Intersection Delay, s/veh	69.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	111	16	111	41	26	5	206	603	11	4	336	63
Future Vol, veh/h	111	16	111	41	26	5	206	603	11	4	336	63
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	121	17	121	45	28	5	224	655	12	4	365	68
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	17.5	13.2	106.3	35.1
HCM LOS	C	B	F	E

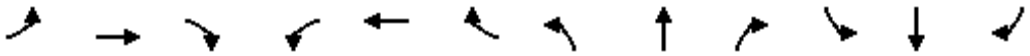
Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	47%	57%	100%	0%
Vol Thru, %	0%	98%	7%	36%	0%	84%
Vol Right, %	0%	2%	47%	7%	0%	16%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	206	614	238	72	4	399
LT Vol	206	0	111	41	4	0
Through Vol	0	603	16	26	0	336
RT Vol	0	11	111	5	0	63
Lane Flow Rate	224	667	259	78	4	434
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.442	1.219	0.501	0.173	0.009	0.823
Departure Headway (Hd)	7.099	6.575	7.349	8.47	7.823	7.195
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	504	547	494	427	460	507
Service Time	4.892	4.368	5.349	6.47	5.523	4.895
HCM Lane V/C Ratio	0.444	1.219	0.524	0.183	0.009	0.856
HCM Control Delay	15.5	136.7	17.5	13.2	10.6	35.3
HCM Lane LOS	C	F	C	B	B	E
HCM 95th-tile Q	2.2	24.8	2.8	0.6	0	8.1

Intersection	
Intersection Delay, s/veh	67.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	10	82	9	5	132	103	611	36	74	341	12
Future Vol, veh/h	3	10	82	9	5	132	103	611	36	74	341	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	11	89	10	5	143	112	664	39	80	371	13
Number of Lanes	0	1	1	0	1	1	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	11.9	12.9	112	20.7
HCM LOS	B	B	F	C

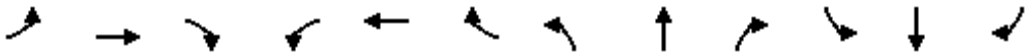
Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	23%	0%	64%	0%	100%	0%
Vol Thru, %	0%	94%	77%	0%	36%	0%	0%	97%
Vol Right, %	0%	6%	0%	100%	0%	100%	0%	3%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	103	647	13	82	14	132	74	353
LT Vol	103	0	3	0	9	0	74	0
Through Vol	0	611	10	0	5	0	0	341
RT Vol	0	36	0	82	0	132	0	12
Lane Flow Rate	112	703	14	89	15	143	80	384
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.208	1.202	0.031	0.178	0.034	0.28	0.155	0.684
Departure Headway (Hd)	6.699	6.152	8.506	7.661	8.516	7.459	7.247	6.712
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	535	591	423	471	423	485	498	541
Service Time	4.444	3.897	6.206	5.361	6.216	5.159	4.947	4.412
HCM Lane V/C Ratio	0.209	1.19	0.033	0.189	0.035	0.295	0.161	0.71
HCM Control Delay	11.2	128	11.5	12	11.5	13	11.3	22.7
HCM Lane LOS	B	F	B	B	B	B	B	C
HCM 95th-tile Q	0.8	25.1	0.1	0.6	0.1	1.1	0.5	5.2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	4	136	135	26	1	55	267	5	0	417	60
Future Volume (veh/h)	125	4	136	135	26	1	55	267	5	0	417	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	136	4	148	147	28	1	60	290	5	0	453	65
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	290	37	252	433	74	2	393	703	12	558	610	88
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.09	0.38	0.38	0.00	0.38	0.38
Sat Flow, veh/h	654	120	817	1046	239	7	1781	1833	32	1781	1600	230
Grp Volume(v), veh/h	288	0	0	176	0	0	60	0	295	0	0	518
Grp Sat Flow(s),veh/h/ln	1590	0	0	1292	0	0	1781	0	1865	1781	0	1829
Q Serve(g_s), s	1.7	0.0	0.0	0.0	0.0	0.0	1.1	0.0	7.0	0.0	0.0	14.7
Cycle Q Clear(g_c), s	8.4	0.0	0.0	6.6	0.0	0.0	1.1	0.0	7.0	0.0	0.0	14.7
Prop In Lane	0.47		0.51	0.84		0.01	1.00		0.02	1.00		0.13
Lane Grp Cap(c), veh/h	579	0	0	509	0	0	393	0	715	558	0	698
V/C Ratio(X)	0.50	0.00	0.00	0.35	0.00	0.00	0.15	0.00	0.41	0.00	0.00	0.74
Avail Cap(c_a), veh/h	579	0	0	509	0	0	393	0	715	558	0	698
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	17.2	0.0	0.0	16.6	0.0	0.0	10.8	0.0	13.6	0.0	0.0	16.0
Incr Delay (d2), s/veh	3.0	0.0	0.0	1.9	0.0	0.0	0.8	0.0	1.8	0.0	0.0	7.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	0.0	2.0	0.0	0.0	0.5	0.0	2.9	0.0	0.0	6.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.2	0.0	0.0	18.4	0.0	0.0	11.6	0.0	15.3	0.0	0.0	23.0
LnGrp LOS	C	A	A	B	A	A	B	A	B	A	A	C
Approach Vol, veh/h		288			176			355			518	
Approach Delay, s/veh		20.2			18.4			14.7			23.0	
Approach LOS		C			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.5	27.5		23.0	9.6	27.4		23.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	23.0		18.5	5.1	22.9		18.5				
Max Q Clear Time (g_c+I1), s	0.0	9.0		10.4	3.1	16.7		8.6				
Green Ext Time (p_c), s	0.0	1.4		1.1	0.0	1.8		0.7				

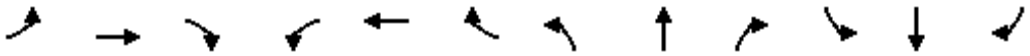
Intersection Summary												
HCM 6th Ctrl Delay			19.6									
HCM 6th LOS			B									



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	7	100	15	7	54	26	276	13	62	537	1
Future Volume (veh/h)	0	7	100	15	7	54	26	276	13	62	537	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	8	109	16	8	59	28	300	14	67	584	1
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	673	571	443	199	571	322	815	38	517	859	1
Arrive On Green	0.00	0.36	0.36	0.36	0.36	0.36	0.46	0.46	0.46	0.46	0.46	0.46
Sat Flow, veh/h	0	1870	1585	898	553	1585	830	1773	83	1066	1867	3
Grp Volume(v), veh/h	0	8	109	24	0	59	28	0	314	67	0	585
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1451	0	1585	830	0	1855	1066	0	1870
Q Serve(g_s), s	0.0	0.1	2.4	0.0	0.0	1.2	1.4	0.0	5.5	2.2	0.0	12.3
Cycle Q Clear(g_c), s	0.0	0.1	2.4	0.4	0.0	1.2	13.7	0.0	5.5	7.7	0.0	12.3
Prop In Lane	0.00		1.00	0.67		1.00	1.00		0.04	1.00		0.00
Lane Grp Cap(c), veh/h	0	673	571	642	0	571	322	0	854	517	0	860
V/C Ratio(X)	0.00	0.01	0.19	0.04	0.00	0.10	0.09	0.00	0.37	0.13	0.00	0.68
Avail Cap(c_a), veh/h	0	673	571	642	0	571	322	0	854	517	0	860
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	10.3	11.0	10.4	0.0	10.6	16.0	0.0	8.8	11.3	0.0	10.6
Incr Delay (d2), s/veh	0.0	0.0	0.7	0.1	0.0	0.4	0.5	0.0	1.2	0.5	0.0	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.8	0.2	0.0	0.4	0.3	0.0	2.0	0.5	0.0	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.3	11.7	10.5	0.0	11.0	16.5	0.0	10.0	11.8	0.0	14.9
LnGrp LOS	A	B	B	B	A	B	B	A	A	B	A	B
Approach Vol, veh/h		117			83			342			652	
Approach Delay, s/veh		11.6			10.8			10.5			14.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		27.5		22.5		27.5		22.5				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		23.0		18.0		23.0		18.0				
Max Q Clear Time (g_c+I1), s		15.7		4.4		14.3		3.2				
Green Ext Time (p_c), s		1.2		0.3		2.7		0.2				

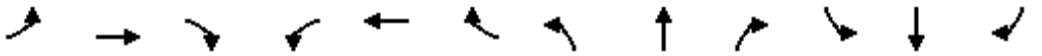
Intersection Summary												
HCM 6th Ctrl Delay			12.9									
HCM 6th LOS			B									



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	111	16	111	41	26	5	206	603	11	4	336	63
Future Volume (veh/h)	111	16	111	41	26	5	206	603	11	4	336	63
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	121	17	121	45	28	5	224	655	12	4	365	68
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	226	46	177	254	145	22	559	928	17	459	681	127
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.26	1.00	1.00	0.07	0.44	0.44
Sat Flow, veh/h	632	187	718	724	588	90	1781	1831	34	1781	1533	286
Grp Volume(v), veh/h	259	0	0	78	0	0	224	0	667	4	0	433
Grp Sat Flow(s),veh/h/ln	1536	0	0	1402	0	0	1781	0	1864	1781	0	1819
Q Serve(g_s), s	8.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	13.0
Cycle Q Clear(g_c), s	11.2	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	13.0
Prop In Lane	0.47		0.47	0.58		0.06	1.00		0.02	1.00		0.16
Lane Grp Cap(c), veh/h	449	0	0	421	0	0	559	0	945	459	0	808
V/C Ratio(X)	0.58	0.00	0.00	0.19	0.00	0.00	0.40	0.00	0.71	0.01	0.00	0.54
Avail Cap(c_a), veh/h	449	0	0	421	0	0	559	0	945	459	0	808
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.3	0.0	0.0	22.3	0.0	0.0	15.7	0.0	0.0	13.1	0.0	15.2
Incr Delay (d2), s/veh	5.3	0.0	0.0	1.0	0.0	0.0	2.1	0.0	4.4	0.0	0.0	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.0	0.0	1.2	0.0	0.0	2.8	0.0	1.2	0.0	0.0	5.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.7	0.0	0.0	23.3	0.0	0.0	17.8	0.0	4.4	13.1	0.0	17.8
LnGrp LOS	C	A	A	C	A	A	B	A	A	B	A	B
Approach Vol, veh/h		259			78			891			437	
Approach Delay, s/veh		30.7			23.3			7.8			17.7	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.5	42.5		23.0	14.2	37.8		23.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	38.0		18.5	9.7	33.3		18.5				
Max Q Clear Time (g_c+I1), s	2.1	2.0		13.2	2.0	15.0		4.9				
Green Ext Time (p_c), s	0.0	5.4		0.7	0.4	2.6		0.3				

Intersection Summary			
HCM 6th Ctrl Delay		14.7	
HCM 6th LOS		B	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	10	82	9	5	132	103	611	36	74	341	12
Future Volume (veh/h)	3	10	82	9	5	132	103	611	36	74	341	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	11	89	10	5	143	112	664	39	80	371	13
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	116	374	391	304	137	391	633	1108	65	400	1138	40
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.63	0.63	0.63	0.63	0.63	0.63
Sat Flow, veh/h	234	1518	1585	910	556	1585	999	1749	103	744	1796	63
Grp Volume(v), veh/h	14	0	89	15	0	143	112	0	703	80	0	384
Grp Sat Flow(s),veh/h/ln	1752	0	1585	1466	0	1585	999	0	1852	744	0	1859
Q Serve(g_s), s	0.0	0.0	3.4	0.0	0.0	5.6	4.4	0.0	16.8	5.3	0.0	7.2
Cycle Q Clear(g_c), s	0.4	0.0	3.4	0.5	0.0	5.6	11.5	0.0	16.8	22.2	0.0	7.2
Prop In Lane	0.21		1.00	0.67		1.00	1.00		0.06	1.00		0.03
Lane Grp Cap(c), veh/h	490	0	391	442	0	391	633	0	1173	400	0	1177
V/C Ratio(X)	0.03	0.00	0.23	0.03	0.00	0.37	0.18	0.00	0.60	0.20	0.00	0.33
Avail Cap(c_a), veh/h	490	0	391	442	0	391	633	0	1173	400	0	1177
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.4	0.0	22.5	21.5	0.0	23.4	9.0	0.0	8.1	14.7	0.0	6.4
Incr Delay (d2), s/veh	0.1	0.0	1.4	0.1	0.0	2.6	0.6	0.0	2.3	1.1	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	1.4	0.2	0.0	2.3	1.0	0.0	6.1	1.0	0.0	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.6	0.0	23.9	21.6	0.0	26.0	9.6	0.0	10.4	15.8	0.0	7.1
LnGrp LOS	C	A	C	C	A	C	A	A	B	B	A	A
Approach Vol, veh/h		103			158			815			464	
Approach Delay, s/veh		23.6			25.6			10.3			8.6	
Approach LOS		C			C			B			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		52.0		23.0		52.0		23.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		47.5		18.5		47.5		18.5				
Max Q Clear Time (g_c+I1), s		18.8		5.4		24.2		7.6				
Green Ext Time (p_c), s		6.3		0.2		3.0		0.3				

Intersection Summary												
HCM 6th Ctrl Delay			12.2									
HCM 6th LOS			B									

MOVEMENT SUMMARY

Site: 1 [2020 AM MAIN ST ROUNDABOUT]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: RoadName												
3	L2	60	3.0	0.308	6.0	LOS A	1.7	42.3	0.36	0.22	0.36	32.5
8	T1	290	3.0	0.308	6.0	LOS A	1.7	42.3	0.36	0.22	0.36	32.7
18	R2	5	3.0	0.308	6.0	LOS A	1.7	42.3	0.36	0.22	0.36	32.1
Approach		355	3.0	0.308	6.0	LOS A	1.7	42.3	0.36	0.22	0.36	32.7
East: RoadName												
1	L2	147	3.0	0.219	6.8	LOS A	0.9	24.2	0.57	0.53	0.57	31.1
6	T1	28	3.0	0.219	6.8	LOS A	0.9	24.2	0.57	0.53	0.57	31.3
16	R2	1	3.0	0.219	6.8	LOS A	0.9	24.2	0.57	0.53	0.57	30.7
Approach		176	3.0	0.219	6.8	LOS A	0.9	24.2	0.57	0.53	0.57	31.1
North: RoadName												
7	L2	1	3.0	0.496	9.3	LOS A	3.1	80.0	0.57	0.44	0.57	31.3
4	T1	453	3.0	0.496	9.3	LOS A	3.1	80.0	0.57	0.44	0.57	31.5
14	R2	65	3.0	0.496	9.3	LOS A	3.1	80.0	0.57	0.44	0.57	31.0
Approach		520	3.0	0.496	9.3	LOS A	3.1	80.0	0.57	0.44	0.57	31.5
West: RoadName												
5	L2	136	3.0	0.404	10.5	LOS B	2.2	55.4	0.69	0.74	0.84	30.1
2	T1	4	3.0	0.404	10.5	LOS B	2.2	55.4	0.69	0.74	0.84	30.3
12	R2	148	3.0	0.404	10.5	LOS B	2.2	55.4	0.69	0.74	0.84	29.8
Approach		288	3.0	0.404	10.5	LOS B	2.2	55.4	0.69	0.74	0.84	30.0
All Vehicles		1339	3.0	0.496	8.3	LOS A	3.1	80.0	0.54	0.46	0.57	31.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [2020 PM MAIN ST ROUNDABOUT]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: RoadName												
3	L2	224	3.0	0.773	16.7	LOS C	13.8	354.0	0.77	0.61	0.96	28.1
8	T1	655	3.0	0.773	16.7	LOS C	13.8	354.0	0.77	0.61	0.96	28.2
18	R2	12	3.0	0.773	16.7	LOS C	13.8	354.0	0.77	0.61	0.96	27.8
Approach		891	3.0	0.773	16.7	LOS C	13.8	354.0	0.77	0.61	0.96	28.2
East: RoadName												
1	L2	45	3.0	0.167	10.1	LOS B	0.6	15.7	0.69	0.69	0.69	30.1
6	T1	28	3.0	0.167	10.1	LOS B	0.6	15.7	0.69	0.69	0.69	30.3
16	R2	5	3.0	0.167	10.1	LOS B	0.6	15.7	0.69	0.69	0.69	29.8
Approach		78	3.0	0.167	10.1	LOS B	0.6	15.7	0.69	0.69	0.69	30.2
North: RoadName												
7	L2	4	3.0	0.447	8.8	LOS A	2.5	65.1	0.58	0.49	0.58	31.5
4	T1	365	3.0	0.447	8.8	LOS A	2.5	65.1	0.58	0.49	0.58	31.7
14	R2	68	3.0	0.447	8.8	LOS A	2.5	65.1	0.58	0.49	0.58	31.1
Approach		438	3.0	0.447	8.8	LOS A	2.5	65.1	0.58	0.49	0.58	31.6
West: RoadName												
5	L2	121	3.0	0.298	7.4	LOS A	1.4	35.9	0.57	0.52	0.57	31.4
2	T1	17	3.0	0.298	7.4	LOS A	1.4	35.9	0.57	0.52	0.57	31.6
12	R2	121	3.0	0.298	7.4	LOS A	1.4	35.9	0.57	0.52	0.57	31.1
Approach		259	3.0	0.298	7.4	LOS A	1.4	35.9	0.57	0.52	0.57	31.3
All Vehicles		1666	3.0	0.773	12.9	LOS B	13.8	354.0	0.68	0.56	0.79	29.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [2020 AM CSAH 34 ROUNDABOUT]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: RoadName												
3	L2	28	3.0	0.277	5.4	LOS A	1.5	38.0	0.25	0.12	0.25	34.8
8	T1	300	3.0	0.277	5.4	LOS A	1.5	38.0	0.25	0.12	0.25	34.8
18	R2	14	3.0	0.277	5.4	LOS A	1.5	38.0	0.25	0.12	0.25	33.8
Approach		342	3.0	0.277	5.4	LOS A	1.5	38.0	0.25	0.12	0.25	34.7
East: RoadName												
1	L2	16	3.0	0.087	4.6	LOS A	0.4	9.2	0.45	0.33	0.45	34.8
6	T1	8	3.0	0.087	4.6	LOS A	0.4	9.2	0.45	0.33	0.45	34.8
16	R2	59	3.0	0.087	4.6	LOS A	0.4	9.2	0.45	0.33	0.45	33.7
Approach		83	3.0	0.087	4.6	LOS A	0.4	9.2	0.45	0.33	0.45	34.1
North: RoadName												
7	L2	67	3.0	0.514	8.4	LOS A	3.9	100.9	0.29	0.13	0.29	33.3
4	T1	584	3.0	0.514	8.4	LOS A	3.9	100.9	0.29	0.13	0.29	33.2
14	R2	1	3.0	0.514	8.4	LOS A	3.9	100.9	0.29	0.13	0.29	32.3
Approach		652	3.0	0.514	8.4	LOS A	3.9	100.9	0.29	0.13	0.29	33.2
West: RoadName												
5	L2	1	3.0	0.177	7.5	LOS A	0.7	18.1	0.62	0.62	0.62	33.9
2	T1	8	3.0	0.177	7.5	LOS A	0.7	18.1	0.62	0.62	0.62	33.8
12	R2	109	3.0	0.177	7.5	LOS A	0.7	18.1	0.62	0.62	0.62	32.8
Approach		117	3.0	0.177	7.5	LOS A	0.7	18.1	0.62	0.62	0.62	32.9
All Vehicles		1195	3.0	0.514	7.2	LOS A	3.9	100.9	0.32	0.19	0.32	33.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [2020 PM CSAH 34 ROUNDABOUT]

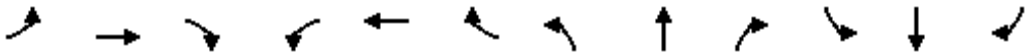
New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: RoadName												
3	L2	112	3.0	0.672	12.2	LOS B	6.6	168.8	0.53	0.30	0.53	31.4
8	T1	664	3.0	0.672	12.2	LOS B	6.6	168.8	0.53	0.30	0.53	31.4
18	R2	39	3.0	0.672	12.2	LOS B	6.6	168.8	0.53	0.30	0.53	30.6
Approach		815	3.0	0.672	12.2	LOS B	6.6	168.8	0.53	0.30	0.53	31.4
East: RoadName												
1	L2	10	3.0	0.269	9.7	LOS A	1.1	27.9	0.68	0.68	0.68	32.6
6	T1	5	3.0	0.269	9.7	LOS A	1.1	27.9	0.68	0.68	0.68	32.6
16	R2	143	3.0	0.269	9.7	LOS A	1.1	27.9	0.68	0.68	0.68	31.7
Approach		159	3.0	0.269	9.7	LOS A	1.1	27.9	0.68	0.68	0.68	31.8
North: RoadName												
7	L2	80	3.0	0.396	7.0	LOS A	2.4	61.0	0.38	0.23	0.38	33.7
4	T1	371	3.0	0.396	7.0	LOS A	2.4	61.0	0.38	0.23	0.38	33.7
14	R2	13	3.0	0.396	7.0	LOS A	2.4	61.0	0.38	0.23	0.38	32.7
Approach		464	3.0	0.396	7.0	LOS A	2.4	61.0	0.38	0.23	0.38	33.7
West: RoadName												
5	L2	3	3.0	0.125	5.6	LOS A	0.5	13.1	0.53	0.45	0.53	34.8
2	T1	11	3.0	0.125	5.6	LOS A	0.5	13.1	0.53	0.45	0.53	34.7
12	R2	89	3.0	0.125	5.6	LOS A	0.5	13.1	0.53	0.45	0.53	33.7
Approach		103	3.0	0.125	5.6	LOS A	0.5	13.1	0.53	0.45	0.53	33.8
All Vehicles		1541	3.0	0.672	9.9	LOS A	6.6	168.8	0.50	0.33	0.50	32.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX C

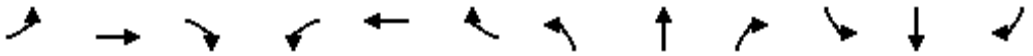
2040 Intersection Capacity Analysis Reports



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	4	136	135	26	1	55	267	5	0	417	60
Future Volume (veh/h)	125	4	136	135	26	1	55	267	5	0	417	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	166	5	180	179	34	1	73	354	7	0	553	80
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	301	29	254	411	69	2	315	701	14	508	610	88
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.09	0.38	0.38	0.00	0.38	0.38
Sat Flow, veh/h	688	94	823	974	224	6	1781	1828	36	1781	1598	231
Grp Volume(v), veh/h	351	0	0	214	0	0	73	0	361	0	0	633
Grp Sat Flow(s),veh/h/ln	1606	0	0	1204	0	0	1781	0	1864	1781	0	1829
Q Serve(g_s), s	1.5	0.0	0.0	0.0	0.0	0.0	1.4	0.0	8.9	0.0	0.0	19.6
Cycle Q Clear(g_c), s	10.8	0.0	0.0	9.4	0.0	0.0	1.4	0.0	8.9	0.0	0.0	19.6
Prop In Lane	0.47		0.51	0.84		0.00	1.00		0.02	1.00		0.13
Lane Grp Cap(c), veh/h	583	0	0	481	0	0	315	0	714	508	0	698
V/C Ratio(X)	0.60	0.00	0.00	0.44	0.00	0.00	0.23	0.00	0.51	0.00	0.00	0.91
Avail Cap(c_a), veh/h	583	0	0	481	0	0	315	0	714	508	0	698
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	18.0	0.0	0.0	17.5	0.0	0.0	12.4	0.0	14.1	0.0	0.0	17.5
Incr Delay (d2), s/veh	4.5	0.0	0.0	3.0	0.0	0.0	1.7	0.0	2.5	0.0	0.0	17.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	0.0	0.0	2.7	0.0	0.0	0.6	0.0	3.8	0.0	0.0	10.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.6	0.0	0.0	20.5	0.0	0.0	14.2	0.0	16.7	0.0	0.0	35.2
LnGrp LOS	C	A	A	C	A	A	B	A	B	A	A	D
Approach Vol, veh/h		351			214			434			633	
Approach Delay, s/veh		22.6			20.5			16.3			35.2	
Approach LOS		C			C			B			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.5	27.5		23.0	9.6	27.4		23.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	23.0		18.5	5.1	22.9		18.5				
Max Q Clear Time (g_c+I1), s	0.0	10.9		12.8	3.4	21.6		11.4				
Green Ext Time (p_c), s	0.0	1.7		1.1	0.0	0.6		0.7				

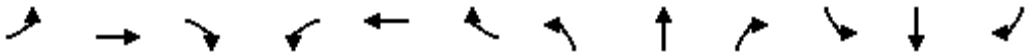
Intersection Summary												
HCM 6th Ctrl Delay			25.5									
HCM 6th LOS			C									



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	7	100	15	7	54	26	276	13	62	537	1
Future Volume (veh/h)	0	7	100	15	7	54	26	276	13	62	537	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	9	133	20	9	72	34	366	17	82	712	1
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	673	571	450	181	571	238	816	38	464	859	1
Arrive On Green	0.00	0.36	0.36	0.36	0.36	0.36	0.46	0.46	0.46	0.46	0.46	0.46
Sat Flow, veh/h	0	1870	1585	911	503	1585	737	1773	82	1000	1867	3
Grp Volume(v), veh/h	0	9	133	29	0	72	34	0	383	82	0	713
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1414	0	1585	737	0	1856	1000	0	1870
Q Serve(g_s), s	0.0	0.2	2.9	0.0	0.0	1.5	2.1	0.0	7.0	3.0	0.0	16.6
Cycle Q Clear(g_c), s	0.0	0.2	2.9	0.5	0.0	1.5	18.8	0.0	7.0	10.1	0.0	16.6
Prop In Lane	0.00		1.00	0.69		1.00	1.00		0.04	1.00		0.00
Lane Grp Cap(c), veh/h	0	673	571	631	0	571	238	0	854	464	0	860
V/C Ratio(X)	0.00	0.01	0.23	0.05	0.00	0.13	0.14	0.00	0.45	0.18	0.00	0.83
Avail Cap(c_a), veh/h	0	673	571	631	0	571	238	0	854	464	0	860
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	10.3	11.2	10.4	0.0	10.7	20.0	0.0	9.2	12.6	0.0	11.8
Incr Delay (d2), s/veh	0.0	0.0	1.0	0.1	0.0	0.5	1.3	0.0	1.7	0.8	0.0	9.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	1.0	0.2	0.0	0.5	0.4	0.0	2.6	0.7	0.0	7.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.3	12.1	10.5	0.0	11.2	21.2	0.0	10.9	13.4	0.0	20.9
LnGrp LOS	A	B	B	B	A	B	C	A	B	B	A	C
Approach Vol, veh/h		142			101			417			795	
Approach Delay, s/veh		12.0			11.0			11.7			20.1	
Approach LOS		B			B			B			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		27.5		22.5		27.5		22.5				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		23.0		18.0		23.0		18.0				
Max Q Clear Time (g_c+I1), s		20.8		4.9		18.6		3.5				
Green Ext Time (p_c), s		0.6		0.3		2.1		0.3				

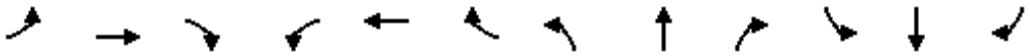
Intersection Summary												
HCM 6th Ctrl Delay			16.3									
HCM 6th LOS			B									



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	111	16	111	41	26	5	206	603	11	4	336	63
Future Volume (veh/h)	111	16	111	41	26	5	206	603	11	4	336	63
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	147	21	147	54	34	7	273	800	15	5	446	84
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	236	39	179	240	138	24	491	927	17	427	679	128
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.26	1.00	1.00	0.07	0.44	0.44
Sat Flow, veh/h	670	158	725	669	561	98	1781	1830	34	1781	1530	288
Grp Volume(v), veh/h	315	0	0	95	0	0	273	0	815	5	0	530
Grp Sat Flow(s),veh/h/ln	1553	0	0	1328	0	0	1781	0	1864	1781	0	1818
Q Serve(g_s), s	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	17.2
Cycle Q Clear(g_c), s	14.1	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	17.2
Prop In Lane	0.47		0.47	0.57		0.07	1.00		0.02	1.00		0.16
Lane Grp Cap(c), veh/h	454	0	0	403	0	0	491	0	945	427	0	807
V/C Ratio(X)	0.69	0.00	0.00	0.24	0.00	0.00	0.56	0.00	0.86	0.01	0.00	0.66
Avail Cap(c_a), veh/h	454	0	0	403	0	0	491	0	945	427	0	807
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.4	0.0	0.0	22.6	0.0	0.0	19.9	0.0	0.0	13.1	0.0	16.4
Incr Delay (d2), s/veh	8.5	0.0	0.0	1.4	0.0	0.0	4.5	0.0	10.3	0.0	0.0	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	0.0	0.0	1.4	0.0	0.0	4.2	0.0	2.7	0.1	0.0	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.9	0.0	0.0	24.0	0.0	0.0	24.4	0.0	10.3	13.1	0.0	20.5
LnGrp LOS	C	A	A	C	A	A	C	A	B	B	A	C
Approach Vol, veh/h		315			95			1088			535	
Approach Delay, s/veh		34.9			24.0			13.8			20.4	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.5	42.5		23.0	14.2	37.8		23.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	38.0		18.5	9.7	33.3		18.5				
Max Q Clear Time (g_c+I1), s	2.1	2.0		16.1	2.0	19.2		5.9				
Green Ext Time (p_c), s	0.0	7.4		0.4	0.5	3.0		0.3				

Intersection Summary												
HCM 6th Ctrl Delay			19.3									
HCM 6th LOS			B									



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	10	82	9	5	132	103	611	36	74	341	12
Future Volume (veh/h)	3	10	82	9	5	132	103	611	36	74	341	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	4	13	109	12	7	175	137	810	48	98	452	16
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	124	360	391	288	152	391	568	1107	66	300	1137	40
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.63	0.63	0.63	0.63	0.63	0.63
Sat Flow, veh/h	264	1460	1585	852	615	1585	925	1748	104	644	1795	64
Grp Volume(v), veh/h	17	0	109	19	0	175	137	0	858	98	0	468
Grp Sat Flow(s),veh/h/ln	1724	0	1585	1467	0	1585	925	0	1852	644	0	1859
Q Serve(g_s), s	0.0	0.0	4.2	0.0	0.0	7.0	6.4	0.0	23.7	9.2	0.0	9.3
Cycle Q Clear(g_c), s	0.5	0.0	4.2	0.6	0.0	7.0	15.6	0.0	23.7	32.9	0.0	9.3
Prop In Lane	0.24		1.00	0.63		1.00	1.00		0.06	1.00		0.03
Lane Grp Cap(c), veh/h	484	0	391	440	0	391	568	0	1173	300	0	1177
V/C Ratio(X)	0.04	0.00	0.28	0.04	0.00	0.45	0.24	0.00	0.73	0.33	0.00	0.40
Avail Cap(c_a), veh/h	484	0	391	440	0	391	568	0	1173	300	0	1177
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.5	0.0	22.9	21.5	0.0	23.9	10.6	0.0	9.4	20.7	0.0	6.7
Incr Delay (d2), s/veh	0.1	0.0	1.8	0.2	0.0	3.7	1.0	0.0	4.0	2.9	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	1.7	0.3	0.0	2.9	1.3	0.0	8.9	1.6	0.0	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.6	0.0	24.6	21.7	0.0	27.6	11.6	0.0	13.4	23.5	0.0	7.7
LnGrp LOS	C	A	C	C	A	C	B	A	B	C	A	A
Approach Vol, veh/h		126			194			995			566	
Approach Delay, s/veh		24.2			27.0			13.2			10.5	
Approach LOS		C			C			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		52.0		23.0		52.0		23.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		47.5		18.5		47.5		18.5				
Max Q Clear Time (g_c+I1), s		25.7		6.2		34.9		9.0				
Green Ext Time (p_c), s		7.8		0.3		3.1		0.4				

Intersection Summary												
HCM 6th Ctrl Delay			14.5									
HCM 6th LOS			B									

MOVEMENT SUMMARY

Site: 1 [2040 AM MAIN ST ROUNDABOUT]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: RoadName												
3	L2	73	3.0	0.388	7.2	LOS A	2.2	57.5	0.44	0.30	0.44	32.0
8	T1	354	3.0	0.388	7.2	LOS A	2.2	57.5	0.44	0.30	0.44	32.2
18	R2	7	3.0	0.388	7.2	LOS A	2.2	57.5	0.44	0.30	0.44	31.6
Approach		434	3.0	0.388	7.2	LOS A	2.2	57.5	0.44	0.30	0.44	32.2
East: RoadName												
1	L2	179	3.0	0.300	8.6	LOS A	1.3	33.7	0.64	0.64	0.64	30.3
6	T1	35	3.0	0.300	8.6	LOS A	1.3	33.7	0.64	0.64	0.64	30.5
16	R2	1	3.0	0.300	8.6	LOS A	1.3	33.7	0.64	0.64	0.64	30.0
Approach		215	3.0	0.300	8.6	LOS A	1.3	33.7	0.64	0.64	0.64	30.4
North: RoadName												
7	L2	1	3.0	0.639	13.0	LOS B	7.7	196.7	0.72	0.78	1.07	29.8
4	T1	553	3.0	0.639	13.0	LOS B	7.7	196.7	0.72	0.78	1.07	29.9
14	R2	79	3.0	0.639	13.0	LOS B	7.7	196.7	0.72	0.78	1.07	29.4
Approach		634	3.0	0.639	13.0	LOS B	7.7	196.7	0.72	0.78	1.07	29.9
West: RoadName												
5	L2	166	3.0	0.568	16.0	LOS C	3.9	100.3	0.79	0.95	1.29	28.0
2	T1	5	3.0	0.568	16.0	LOS C	3.9	100.3	0.79	0.95	1.29	28.2
12	R2	180	3.0	0.568	16.0	LOS C	3.9	100.3	0.79	0.95	1.29	27.7
Approach		352	3.0	0.568	16.0	LOS C	3.9	100.3	0.79	0.95	1.29	27.9
All Vehicles		1635	3.0	0.639	11.5	LOS B	7.7	196.7	0.65	0.67	0.90	30.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [2040 PM MAIN ST ROUNDABOUT]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: RoadName												
3	L2	273	3.0	0.974	40.3	LOS E	58.8	1504.6	1.00	1.55	2.66	21.7
8	T1	800	3.0	0.974	40.3	LOS E	58.8	1504.6	1.00	1.55	2.66	21.8
18	R2	14	3.0	0.974	40.3	LOS E	58.8	1504.6	1.00	1.55	2.66	21.5
Approach		1087	3.0	0.974	40.3	LOS E	58.8	1504.6	1.00	1.55	2.66	21.7
East: RoadName												
1	L2	54	3.0	0.257	14.3	LOS B	0.9	24.1	0.78	0.79	0.82	28.5
6	T1	35	3.0	0.257	14.3	LOS B	0.9	24.1	0.78	0.79	0.82	28.7
16	R2	7	3.0	0.257	14.3	LOS B	0.9	24.1	0.78	0.79	0.82	28.2
Approach		96	3.0	0.257	14.3	LOS B	0.9	24.1	0.78	0.79	0.82	28.6
North: RoadName												
7	L2	5	3.0	0.584	12.2	LOS B	5.6	142.4	0.72	0.79	1.04	30.1
4	T1	446	3.0	0.584	12.2	LOS B	5.6	142.4	0.72	0.79	1.04	30.3
14	R2	84	3.0	0.584	12.2	LOS B	5.6	142.4	0.72	0.79	1.04	29.7
Approach		535	3.0	0.584	12.2	LOS B	5.6	142.4	0.72	0.79	1.04	30.2
West: RoadName												
5	L2	147	3.0	0.400	9.6	LOS A	2.1	54.8	0.66	0.69	0.74	30.5
2	T1	22	3.0	0.400	9.6	LOS A	2.1	54.8	0.66	0.69	0.74	30.7
12	R2	147	3.0	0.400	9.6	LOS A	2.1	54.8	0.66	0.69	0.74	30.1
Approach		315	3.0	0.400	9.6	LOS A	2.1	54.8	0.66	0.69	0.74	30.3
All Vehicles		2033	3.0	0.974	26.9	LOS D	58.8	1504.6	0.86	1.18	1.85	24.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [2040 AM CSAH 34 ROUNDABOUT]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: RoadName												
3	L2	34	3.0	0.343	6.2	LOS A	2.0	50.6	0.31	0.16	0.31	34.4
8	T1	366	3.0	0.343	6.2	LOS A	2.0	50.6	0.31	0.16	0.31	34.4
18	R2	17	3.0	0.343	6.2	LOS A	2.0	50.6	0.31	0.16	0.31	33.4
Approach		417	3.0	0.343	6.2	LOS A	2.0	50.6	0.31	0.16	0.31	34.3
East: RoadName												
1	L2	20	3.0	0.114	5.2	LOS A	0.5	12.0	0.50	0.40	0.50	34.5
6	T1	9	3.0	0.114	5.2	LOS A	0.5	12.0	0.50	0.40	0.50	34.5
16	R2	72	3.0	0.114	5.2	LOS A	0.5	12.0	0.50	0.40	0.50	33.5
Approach		100	3.0	0.114	5.2	LOS A	0.5	12.0	0.50	0.40	0.50	33.7
North: RoadName												
7	L2	83	3.0	0.636	10.9	LOS B	6.1	155.7	0.40	0.19	0.40	32.1
4	T1	713	3.0	0.636	10.9	LOS B	6.1	155.7	0.40	0.19	0.40	32.0
14	R2	2	3.0	0.636	10.9	LOS B	6.1	155.7	0.40	0.19	0.40	31.2
Approach		798	3.0	0.636	10.9	LOS B	6.1	155.7	0.40	0.19	0.40	32.0
West: RoadName												
5	L2	1	3.0	0.250	9.7	LOS A	1.0	25.5	0.68	0.68	0.68	32.8
2	T1	9	3.0	0.250	9.7	LOS A	1.0	25.5	0.68	0.68	0.68	32.7
12	R2	133	3.0	0.250	9.7	LOS A	1.0	25.5	0.68	0.68	0.68	31.8
Approach		142	3.0	0.250	9.7	LOS A	1.0	25.5	0.68	0.68	0.68	31.8
All Vehicles		1458	3.0	0.636	9.0	LOS A	6.1	155.7	0.41	0.24	0.41	32.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [2040 PM CSAH 34 ROUNDABOUT]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: RoadName												
3	L2	137	3.0	0.839	20.6	LOS C	17.6	451.2	0.87	0.63	1.01	28.2
8	T1	811	3.0	0.839	20.6	LOS C	17.6	451.2	0.87	0.63	1.01	28.1
18	R2	48	3.0	0.839	20.6	LOS C	17.6	451.2	0.87	0.63	1.01	27.5
Approach		996	3.0	0.839	20.6	LOS C	17.6	451.2	0.87	0.63	1.01	28.1
East: RoadName												
1	L2	12	3.0	0.393	13.9	LOS B	1.8	46.8	0.74	0.81	0.98	30.7
6	T1	7	3.0	0.393	13.9	LOS B	1.8	46.8	0.74	0.81	0.98	30.7
16	R2	175	3.0	0.393	13.9	LOS B	1.8	46.8	0.74	0.81	0.98	29.9
Approach		193	3.0	0.393	13.9	LOS B	1.8	46.8	0.74	0.81	0.98	29.9
North: RoadName												
7	L2	98	3.0	0.499	8.8	LOS A	3.4	86.2	0.48	0.32	0.48	32.9
4	T1	453	3.0	0.499	8.8	LOS A	3.4	86.2	0.48	0.32	0.48	32.8
14	R2	16	3.0	0.499	8.8	LOS A	3.4	86.2	0.48	0.32	0.48	31.9
Approach		567	3.0	0.499	8.8	LOS A	3.4	86.2	0.48	0.32	0.48	32.8
West: RoadName												
5	L2	4	3.0	0.170	6.7	LOS A	0.7	17.8	0.59	0.55	0.59	34.2
2	T1	13	3.0	0.170	6.7	LOS A	0.7	17.8	0.59	0.55	0.59	34.1
12	R2	109	3.0	0.170	6.7	LOS A	0.7	17.8	0.59	0.55	0.59	33.1
Approach		126	3.0	0.170	6.7	LOS A	0.7	17.8	0.59	0.55	0.59	33.3
All Vehicles		1883	3.0	0.839	15.4	LOS C	17.6	451.2	0.72	0.55	0.82	29.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX D

Warrants

Mantorville & Main
2040 Traffic Volumes
Multi-Way Stop Warrants

MnDOT Warrants:

	Met	Not Met
A. Where traffic control signals are justified, the multiway stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.	✓	
B. Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and leftturn collisions as well as right-angle collisions.	✓	
C. Minimum volumes: 1 The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and	✓	
2 The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but	✓	
3 If the 85th-percentile approach speed of the major street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.		✓
D. Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.		✓

Mantorville & CSAH 34
2040 Traffic Volumes
Multi-Way Stop Warrants

MnDOT Warrants:

	Met	Not Met
A. Where traffic control signals are justified, the multiway stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.	✓	
B. Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and leftturn collisions as well as right-angle collisions.	✓	
C. Minimum volumes: 1 The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and	✓	
2 The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but		✓
3 If the 85th-percentile approach speed of the major street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.		✓
D. Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.		✓

Signal Warrants Analysis

File Name:	2020Warrants.xsw
Analyst:	WHKS
Agency:	WHKS
Date Performed:	4/21/2020
Time Analyzed:	2020
Jurisdiction:	
Analysis Year:	2020
Project Description:	MANTORVILLE / MAIN
Units:	U.S. Customary

General

Major Street Direction: North-South	Population <10,000: Yes
Starting Time Interval: 7	Coordinated Signal System: No
Median Type: Undivided	Crashes Per Year: 2
Major Street Speed (mi/h): 30	Adequate Trials of Crash Experience Alternatives: No
Nearest Signal (ft): 0	

School Crossing and Roadway Network

Number of Students in Highest Hour: 0	Two or More Major Routes: No
Number of Adequate Gaps in Period: 0	Weekend Count: No
Number of Minutes in Period: 0	5-year Growth Factor (%): 0

Railroad Crossing

Grade Crossing Approach: NB or EB	Rail Traffic (trains/day): 4
Highest Volume Hour with Trains: Unknown	High Occupancy Buses (%): 0
Distance to Stop Line (ft): 55	Tractor-Trailer Trucks (%): 10

Geometry and Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	1	1	0	1	1	0
Lane Usage		LTR			LTR		L	TR		L	TR	

Traffic Volumes (veh/h)

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Hour												
07 - 08	128	4	0	138	27	0	56	272	5	0	425	61
08 - 09	26	4	0	47	10	0	82	174	6	1	250	40
09 - 10	26	1	0	26	6	0	106	155	8	1	215	28
10 - 11	33	10	0	24	7	0	117	169	8	3	192	35
11 - 12	34	9	0	26	9	0	94	231	6	0	239	37
12 - 13	41	12	0	28	11	0	121	248	9	1	218	44
13 - 14	46	8	0	23	8	0	115	208	11	2	241	47
14 - 15	56	7	0	18	3	0	132	327	12	1	229	50
15 - 16	93	13	0	52	21	0	173	412	8	1	371	68
16 - 17	120	16	0	35	17	0	197	616	13	2	328	69
17 - 18	113	16	0	42	27	0	210	615	11	4	343	64
18 - 19	59	10	0	19	6	0	116	366	3	1	245	29

Pedestrian Volumes and Gaps (Per Hour)

	Eastbound		Westbound		Northbound		Southbound	
	Gaps	Volume	Gaps	Volume	Gaps	Volume	Gaps	Volume
Hour								
07 - 08	0	0	0	2	0	0	0	0
08 - 09	0	2	0	2	0	0	0	0
09 - 10	0	0	0	9	0	0	0	0
10 - 11	0	2	0	5	0	0	0	2
11 - 12	0	0	0	2	0	1	0	0
12 - 13	0	0	0	3	0	0	0	1
13 - 14	0	1	0	4	0	1	0	4
14 - 15	0	1	0	5	0	0	0	3
15 - 16	0	2	0	5	0	2	0	6
16 - 17	0	1	0	5	0	0	0	0
17 - 18	0	0	0	2	0	0	0	1
18 - 19	0	0	0	0	0	0	0	0

Delay

Hour	Eastbound secs/veh	Eastbound veh-hrs	Westbound secs/veh	Westbound veh-hrs	Northbound secs/veh	Northbound veh-hrs	Southbound secs/veh	Southbound veh-hrs
07 - 08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08 - 09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
09 - 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 - 11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 - 12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 - 13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13 - 14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14 - 15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15 - 16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16 - 17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17 - 18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18 - 19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Summary

Hour	Major Volume	Minor Volume	Total Volume	1A 70%	1A 56%	1B 70%	1B 56%	2 70%	3A 70%	3B 70%	4A 70%	4B 70%
07 - 08	819	165	1116	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
08 - 09	553	57	640	No	No	No	Yes	No	No	No	No	No
09 - 10	513	32	572	No	No	No	No	No	No	No	No	No
10 - 11	524	43	598	No	No	No	Yes	No	No	No	No	No
11 - 12	607	43	685	No	No	No	Yes	No	No	No	No	No
12 - 13	641	53	733	No	No	Yes	Yes	No	No	No	No	No
13 - 14	624	54	709	No	No	No	Yes	No	No	No	No	No
14 - 15	751	63	835	No	No	Yes	Yes	No	No	No	No	No
15 - 16	1033	106	1212	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
16 - 17	1225	136	1413	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
17 - 18	1247	129	1445	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
18 - 19	760	69	854	No	No	Yes	Yes	No	No	No	No	No
Total	9297	950	10812	4	4	7	11	4	0	4	0	0

Results

Warrant 1: Eight-Hour Vehicular Volume	[ ]
A. Minimum Vehicular Volumes	[ ]
B. Interruption of Continuous Traffic	[ ]
56% Vehicular --and-- Interruption Volumes	[ ]
Warrant 2: Four-Hour Vehicular Volume	[X]
Four-Hour Vehicular Volumes	[X]
Warrant 3: Peak Hour	[X]
A. Peak-Hour Conditions	[ ]
B. Peak-Hour Vehicular Volume Hours Met	[X]
Warrant 4: Pedestrian Volume	[ ]
A. Four Hour Volumes	[ ]
B. One-Hour Volumes	[ ]
Warrant 5: School Crossing	[ ]
Gaps Same Period	[ ]
Student Volumes	[ ]
Nearest Traffic Control Signal	[ ]
Warrant 6: Coordinated Signal System	[ ]
Degree of Platooning	[ ]
Warrant 7: Crash Experience	[ ]
A. Adequate Trials of Alternatives	[ ]
B. Reported Crashes	[ ]
C. 56% Volumes for Warrants 1A, 1B --or-- 4	[X]
Warrant 8: Roadway Network	[ ]
A. Weekday Volume	[ ]
B. Weekend Volume	[ ]

Warrant 9: Grade Crossing [ ]
   A. Grade Crossing within 140 ft --and-- [X]
   B. Peak-Hour Vehicular Volumes [ ]

This text report was created in HCS™ Signal Warrants Version 7.7 on 4/21/2020 9:19:28 AM

Signal Warrants Analysis

File Name:	2040Warrants.xsw
Analyst:	WHKS
Agency:	WHKS
Date Performed:	04/21/2020
Time Analyzed:	2040
Jurisdiction:	
Analysis Year:	2040
Project Description:	MANTORVILLE / MAIN
Units:	U.S. Customary

General

Major Street Direction: North-South	Population <10,000: Yes
Starting Time Interval: 7	Coordinated Signal System: No
Median Type: Undivided	Crashes Per Year: 2
Major Street Speed (mi/h): 30	Adequate Trials of Crash Experience Alternatives: No
Nearest Signal (ft): 0	

School Crossing and Roadway Network

Number of Students in Highest Hour: 0	Two or More Major Routes: No
Number of Adequate Gaps in Period: 0	Weekend Count: No
Number of Minutes in Period: 0	5-year Growth Factor (%): 0

Railroad Crossing

Grade Crossing Approach: NB or EB	Rail Traffic (trains/day): 4
Highest Volume Hour with Trains: Unknown	High Occupancy Buses (%): 0
Distance to Stop Line (ft): 55	Tractor-Trailer Trucks (%): 10

Geometry and Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	1	1	0	1	1	0
Lane Usage		LTR			LTR		L	TR		L	TR	

Traffic Volumes (veh/h)

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Hour												
07 - 08	156	5	0	168	32	0	68	332	6	0	519	75
08 - 09	31	5	0	57	12	0	100	213	7	1	305	49
09 - 10	31	1	0	31	7	0	129	189	10	1	263	34
10 - 11	40	12	0	30	9	0	143	207	10	4	234	42
11 - 12	41	11	0	31	11	0	115	281	7	0	291	45
12 - 13	50	15	0	34	14	0	148	302	11	1	266	54
13 - 14	56	10	0	29	10	0	141	254	14	2	294	57
14 - 15	68	9	0	22	4	0	161	400	15	1	279	61
15 - 16	113	16	0	63	26	0	212	503	10	1	453	83
16 - 17	147	20	0	42	21	0	240	752	16	2	401	85
17 - 18	138	20	0	51	32	0	256	751	14	5	418	78
18 - 19	72	12	0	24	7	0	142	447	4	1	299	35

Pedestrian Volumes and Gaps (Per Hour)

	Eastbound		Westbound		Northbound		Southbound	
	Gaps	Volume	Gaps	Volume	Gaps	Volume	Gaps	Volume
Hour								
07 - 08	0	0	0	2	0	0	0	0
08 - 09	0	2	0	2	0	0	0	0
09 - 10	0	0	0	9	0	0	0	0
10 - 11	0	2	0	5	0	0	0	2
11 - 12	0	0	0	2	0	1	0	0
12 - 13	0	0	0	3	0	0	0	1
13 - 14	0	1	0	4	0	1	0	4
14 - 15	0	1	0	5	0	0	0	3
15 - 16	0	2	0	5	0	2	0	6
16 - 17	0	1	0	5	0	0	0	0
17 - 18	0	0	0	2	0	0	0	1
18 - 19	0	0	0	0	0	0	0	0

Delay

Hour	Eastbound secs/veh	Eastbound veh-hrs	Westbound secs/veh	Westbound veh-hrs	Northbound secs/veh	Northbound veh-hrs	Southbound secs/veh	Southbound veh-hrs
07 - 08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08 - 09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
09 - 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 - 11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 - 12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 - 13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13 - 14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14 - 15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15 - 16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16 - 17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17 - 18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18 - 19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Summary

Hour	Major Volume	Minor Volume	Total Volume	1A 70%	1A 56%	1B 70%	1B 56%	2 70%	3A 70%	3B 70%	4A 70%	4B 70%
07 - 08	1000	200	1361	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
08 - 09	675	69	780	No	No	Yes	Yes	No	No	No	No	No
09 - 10	626	38	696	No	No	No	No	No	No	No	No	No
10 - 11	640	52	731	No	No	No	Yes	No	No	No	No	No
11 - 12	739	52	833	No	No	No	Yes	No	No	No	No	No
12 - 13	782	65	895	No	No	Yes	Yes	No	No	No	No	No
13 - 14	762	66	867	No	No	Yes	Yes	No	No	No	No	No
14 - 15	917	77	1020	No	No	Yes	Yes	Yes	No	No	No	No
15 - 16	1262	129	1480	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
16 - 17	1496	167	1726	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
17 - 18	1522	158	1763	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
18 - 19	928	84	1043	No	Yes	Yes	Yes	Yes	No	No	No	No
Total	11349	1157	13195	4	5	9	11	6	0	4	0	0

Results

Warrant 1: Eight-Hour Vehicular Volume	[X]
A. Minimum Vehicular Volumes	[ ]
B. Interruption of Continuous Traffic	[X]
56% Vehicular --and-- Interruption Volumes	[ ]
Warrant 2: Four-Hour Vehicular Volume	[X]
Four-Hour Vehicular Volumes	[X]
Warrant 3: Peak Hour	[X]
A. Peak-Hour Conditions	[ ]
B. Peak-Hour Vehicular Volume Hours Met	[X]
Warrant 4: Pedestrian Volume	[ ]
A. Four Hour Volumes	[ ]
B. One-Hour Volumes	[ ]
Warrant 5: School Crossing	[ ]
Gaps Same Period	[ ]
Student Volumes	[ ]
Nearest Traffic Control Signal	[ ]
Warrant 6: Coordinated Signal System	[ ]
Degree of Platooning	[ ]
Warrant 7: Crash Experience	[ ]
A. Adequate Trials of Alternatives	[ ]
B. Reported Crashes	[ ]
C. 56% Volumes for Warrants 1A, 1B --or-- 4	[X]
Warrant 8: Roadway Network	[ ]
A. Weekday Volume	[ ]
B. Weekend Volume	[ ]

Warrant 9: Grade Crossing [ ]
   A. Grade Crossing within 140 ft --and-- [X]
   B. Peak-Hour Vehicular Volumes [ ]

This text report was created in HCS™ Signal Warrants Version 7.7 on 4/21/2020 9:35:13 AM

Signal Warrants Analysis

File Name:	2020Warrants - CSAH34.xsw
Analyst:	WHKS
Agency:	WHKS
Date Performed:	4/21/2020
Time Analyzed:	2020
Jurisdiction:	
Analysis Year:	2020
Project Description:	MANTORVILLE / CSAH34
Units:	U.S. Customary

General

Major Street Direction: North-South	Population <10,000: Yes
Starting Time Interval: 7	Coordinated Signal System: No
Median Type: Undivided	Crashes Per Year: 2
Major Street Speed (mi/h): 30	Adequate Trials of Crash Experience Alternatives: No
Nearest Signal (ft): 0	

School Crossing and Roadway Network

Number of Students in Highest Hour: 0	Two or More Major Routes: No
Number of Adequate Gaps in Period: 0	Weekend Count: No
Number of Minutes in Period: 0	5-year Growth Factor (%): 0

Railroad Crossing

Grade Crossing Approach: NB or EB	Rail Traffic (trains/day): 4
Highest Volume Hour with Trains: Unknown	High Occupancy Buses (%): 0
Distance to Stop Line (ft): 300	Tractor-Trailer Trucks (%): 10

Geometry and Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	0	1	1	1	1	0	1	1	0
Lane Usage		LT	R		LT	R	L	TR		L	TR	

Traffic Volumes (veh/h)

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Hour												
07 - 08	0	2	7	1	0	3	1	19	2	4	55	0
08 - 09	0	6	42	12	7	22	20	187	10	58	547	3
09 - 10	0	5	43	13	6	20	17	206	10	50	431	2
10 - 11	0	2	12	7	3	13	10	82	8	15	105	3
11 - 12	0	0	0	0	0	0	0	0	0	0	0	0
12 - 13	0	0	0	0	0	0	0	0	0	0	0	0
13 - 14	0	0	0	0	0	0	0	0	0	0	0	0
14 - 15	0	6	30	14	10	49	37	398	15	80	345	11
15 - 16	3	8	39	17	6	65	94	537	22	68	334	15
16 - 17	1	7	43	7	5	60	94	588	30	63	350	11
17 - 18	2	2	15	12	4	22	28	191	9	25	142	4
18 - 19	0	0	4	1	1	7	7	71	3	9	48	0

Pedestrian Volumes and Gaps (Per Hour)

	Eastbound		Westbound		Northbound		Southbound	
	Gaps	Volume	Gaps	Volume	Gaps	Volume	Gaps	Volume
Hour								
07 - 08	0	0	0	2	0	0	0	0
08 - 09	0	2	0	2	0	0	0	0
09 - 10	0	0	0	9	0	0	0	0
10 - 11	0	2	0	5	0	0	0	2
11 - 12	0	0	0	2	0	1	0	0
12 - 13	0	0	0	3	0	0	0	1
13 - 14	0	1	0	4	0	1	0	4
14 - 15	0	1	0	5	0	0	0	3
15 - 16	0	2	0	5	0	2	0	6
16 - 17	0	1	0	5	0	0	0	0
17 - 18	0	0	0	2	0	0	0	1
18 - 19	0	0	0	0	0	0	0	0

Delay

Hour	Eastbound secs/veh	Eastbound veh-hrs	Westbound secs/veh	Westbound veh-hrs	Northbound secs/veh	Northbound veh-hrs	Southbound secs/veh	Southbound veh-hrs
07 - 08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08 - 09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
09 - 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 - 11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 - 12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 - 13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13 - 14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14 - 15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15 - 16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16 - 17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17 - 18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18 - 19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Summary

Hour	Major Volume	Minor Volume	Total Volume	1A 70%	1A 56%	1B 70%	1B 56%	2 70%	3A 70%	3B 70%	4A 70%	4B 70%
07 - 08	81	9	94	No	No	No	No	No	No	No	No	No
08 - 09	825	48	914	No	No	No	No	No	No	No	No	No
09 - 10	716	48	803	No	No	No	No	No	No	No	No	No
10 - 11	223	23	260	No	No	No	No	No	No	No	No	No
11 - 12	0	0	0	No	No	No	No	No	No	No	No	No
12 - 13	0	0	0	No	No	No	No	No	No	No	No	No
13 - 14	0	0	0	No	No	No	No	No	No	No	No	No
14 - 15	886	73	995	No	No	Yes	Yes	No	No	No	No	No
15 - 16	1070	88	1208	No	No	Yes	Yes	Yes	No	No	No	No
16 - 17	1136	72	1259	No	No	Yes	Yes	No	No	No	No	No
17 - 18	399	38	456	No	No	No	No	No	No	No	No	No
18 - 19	138	9	151	No	No	No	No	No	No	No	No	No
Total	5474	408	6140	0	0	3	3	1	0	0	0	0

Results

Warrant 1: Eight-Hour Vehicular Volume [ ]
- A. Minimum Vehicular Volumes [ ]
- B. Interruption of Continuous Traffic [ ]
- 56% Vehicular --and-- Interruption Volumes [ ]

Warrant 2: Four-Hour Vehicular Volume [ ]
- Four-Hour Vehicular Volumes [ ]

Warrant 3: Peak Hour [ ]
- A. Peak-Hour Conditions [ ]
- B. Peak-Hour Vehicular Volume Hours Met [ ]

Warrant 4: Pedestrian Volume [ ]
- A. Four Hour Volumes [ ]
- B. One-Hour Volumes [ ]

Warrant 5: School Crossing [ ]
- Gaps Same Period [ ]
- Student Volumes [ ]
- Nearest Traffic Control Signal [ ]

Warrant 6: Coordinated Signal System [ ]
- Degree of Platooning [ ]

Warrant 7: Crash Experience [ ]
- A. Adequate Trials of Alternatives [ ]
- B. Reported Crashes [ ]
- C. 56% Volumes for Warrants 1A, 1B --or-- 4 [ ]

Warrant 8: Roadway Network [ ]
- A. Weekday Volume [ ]
- B. Weekend Volume [ ]

Warrant 9: Grade Crossing [ ]
   A. Grade Crossing within 140 ft --and-- [ ]
   B. Peak-Hour Vehicular Volumes [ ]

This text report was created in HCS™ Signal Warrants Version 7.7 on 4/21/2020 2:39:06 PM

Signal Warrants Analysis

File Name:	2040Warrants - CSAH34.xsw
Analyst:	WHKS
Agency:	WHKS
Date Performed:	4/21/2020
Time Analyzed:	2040
Jurisdiction:	
Analysis Year:	2040
Project Description:	MANTORVILLE / CSAH34
Units:	U.S. Customary

General

Major Street Direction: North-South	Population <10,000: Yes
Starting Time Interval: 7	Coordinated Signal System: No
Median Type: Undivided	Crashes Per Year: 2
Major Street Speed (mi/h): 30	Adequate Trials of Crash Experience Alternatives: No
Nearest Signal (ft): 0	

School Crossing and Roadway Network

Number of Students in Highest Hour: 0	Two or More Major Routes: No
Number of Adequate Gaps in Period: 0	Weekend Count: No
Number of Minutes in Period: 0	5-year Growth Factor (%): 0

Railroad Crossing

Grade Crossing Approach: NB or EB	Rail Traffic (trains/day): 4
Highest Volume Hour with Trains: Unknown	High Occupancy Buses (%): 0
Distance to Stop Line (ft): 300	Tractor-Trailer Trucks (%): 10

Geometry and Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	0	1	1	1	1	0	1	1	0
Lane Usage		LT	R		LT	R	L	TR		L	TR	

Traffic Volumes (veh/h)

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Hour												
07 - 08	0	2	9	1	0	3	1	23	2	5	67	0
08 - 09	0	7	51	15	9	26	24	228	12	71	667	4
09 - 10	0	6	56	17	8	26	23	268	13	66	575	3
10 - 11	0	2	15	9	4	16	12	100	10	18	128	4
11 - 12	0	0	0	0	0	0	0	0	0	0	0	0
12 - 13	0	0	0	0	0	0	0	0	0	0	0	0
13 - 14	0	0	0	0	0	0	0	0	0	0	0	0
14 - 15	0	7	36	17	12	60	45	486	18	98	421	13
15 - 16	4	10	48	21	7	80	115	655	27	83	407	18
16 - 17	1	9	52	9	6	83	115	717	37	77	427	13
17 - 18	2	2	19	15	5	27	34	233	11	31	173	5
18 - 19	0	0	5	1	1	8	9	87	4	11	59	0

Pedestrian Volumes and Gaps (Per Hour)

	Eastbound		Westbound		Northbound		Southbound	
	Gaps	Volume	Gaps	Volume	Gaps	Volume	Gaps	Volume
Hour								
07 - 08	0	0	0	2	0	0	0	0
08 - 09	0	2	0	2	0	0	0	0
09 - 10	0	0	0	9	0	0	0	0
10 - 11	0	2	0	5	0	0	0	2
11 - 12	0	0	0	2	0	1	0	0
12 - 13	0	0	0	3	0	0	0	1
13 - 14	0	1	0	4	0	1	0	4
14 - 15	0	1	0	5	0	0	0	3
15 - 16	0	2	0	5	0	2	0	6
16 - 17	0	1	0	5	0	0	0	0
17 - 18	0	0	0	2	0	0	0	1
18 - 19	0	0	0	0	0	0	0	0

Delay

Hour	Eastbound secs/veh	Eastbound veh-hrs	Westbound secs/veh	Westbound veh-hrs	Northbound secs/veh	Northbound veh-hrs	Southbound secs/veh	Southbound veh-hrs
07 - 08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08 - 09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
09 - 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 - 11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 - 12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 - 13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13 - 14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14 - 15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15 - 16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16 - 17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17 - 18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18 - 19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Summary

Hour	Major Volume	Minor Volume	Total Volume	1A 70%	1A 56%	1B 70%	1B 56%	2 70%	3A 70%	3B 70%	4A 70%	4B 70%
07 - 08	98	11	113	No	No	No	No	No	No	No	No	No
08 - 09	1006	58	1114	No	No	No	Yes	No	No	No	No	No
09 - 10	948	62	1061	No	No	No	Yes	No	No	No	No	No
10 - 11	272	29	318	No	No	No	No	No	No	No	No	No
11 - 12	0	0	0	No	No	No	No	No	No	No	No	No
12 - 13	0	0	0	No	No	No	No	No	No	No	No	No
13 - 14	0	0	0	No	No	No	No	No	No	No	No	No
14 - 15	1081	89	1213	No	No	Yes	Yes	Yes	No	No	No	No
15 - 16	1305	108	1475	No	No	Yes	Yes	Yes	No	Yes	No	No
16 - 17	1386	98	1546	No	No	Yes	Yes	Yes	No	No	No	No
17 - 18	487	47	557	No	No	No	No	No	No	No	No	No
18 - 19	170	10	185	No	No	No	No	No	No	No	No	No
Total	6753	512	7582	0	0	3	5	3	0	1	0	0

Results

Warrant 1: Eight-Hour Vehicular Volume [ ]
- A. Minimum Vehicular Volumes [ ]
- B. Interruption of Continuous Traffic [ ]
- 56% Vehicular --and-- Interruption Volumes [ ]

Warrant 2: Four-Hour Vehicular Volume [ ]
- Four-Hour Vehicular Volumes [ ]

Warrant 3: Peak Hour [X]
- A. Peak-Hour Conditions [ ]
- B. Peak-Hour Vehicular Volume Hours Met [X]

Warrant 4: Pedestrian Volume [ ]
- A. Four Hour Volumes [ ]
- B. One-Hour Volumes [ ]

Warrant 5: School Crossing [ ]
- Gaps Same Period [ ]
- Student Volumes [ ]
- Nearest Traffic Control Signal [ ]

Warrant 6: Coordinated Signal System [ ]
- Degree of Platooning [ ]

Warrant 7: Crash Experience [ ]
- A. Adequate Trials of Alternatives [ ]
- B. Reported Crashes [ ]
- C. 56% Volumes for Warrants 1A, 1B --or-- 4 [ ]

Warrant 8: Roadway Network [ ]
- A. Weekday Volume [ ]
- B. Weekend Volume [ ]

Warrant 9: Grade Crossing [ ]
   A. Grade Crossing within 140 ft --and-- [ ]
   B. Peak-Hour Vehicular Volumes [ ]

This text report was created in HCS™ Signal Warrants Version 7.7 on 4/21/2020 2:50:06 PM

APPENDIX E

Crash Data

Crash Summary

Mantorville Ave / Main St

Report Version 1.0
February 2020

Crash Severity/Crash Year

Crash Severity	Total	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
K - Fatal	0	0	0	0	0	0	0	0	0	0	0
A - Serious Injury	0	0	0	0	0	0	0	0	0	0	0
B - Minor Injury	2	0	0	0	0	0	0	1	1	0	0
C - Possible Injury	2	1	0	0	0	0	1	0	0	0	0
N - Prop Dmg Only	19	1	2	1	0	1	2	5	1	2	4
U - Unkown	0	0	0	0	0	0	0	0	0	0	0
Total	23	2	2	1	0	1	3	6	2	2	4

Crash Severity/Number of Vehicles

Crash Severity	Total	0	1	2	3+
K - Fatal	0	0	0	0	0
A - Serious Injury	0	0	0	0	0
B - Minor Injury	2	0	2	0	0
C - Possible Injury	2	0	1	0	1
N - Prop Dmg Only	16	0	2	13	1
U - Unkown	0	0	0	0	0
Total	20	0	5	13	2

Basic Type Summary

Basic Type Summary	Total	%
Pedestrian	1	4.3
Bike	2	8.7
Single Vehicle Run Off Road	2	8.7
Single Vehicle Other	0	0.0
Sideswipe Same Direction	1	4.3
Sideswipe Opposing	0	0.0
Rear End	10	43.5
Head On	0	0.0
Left Turn	0	0.0
Angle	4	17.4
Other	3	13.0
Total	23	100.0

First Harmful Event Summary

First Harmful Event Summary	Total	%
Pedestrian	1	4.3
Bicyclist	2	8.7
Motor Vehicle In Transport	14	60.9
Parked Motor Vehicle	1	4.3
Train	0	0.0
Deer/Animal	0	0.0
Other - Non Fixed Object	0	0.0
Collision Fixed Object	2	8.7
Non-Collision Harmful Events	0	0.0
Non-Harmful Events	0	0.0
Other/Unknown	3	13.0
Total	23	100.0

Relationship to Intersection Summary

Relationship to Intersection Summary	Total	%
Not at Intersection/Interchange	1	4.3
Four-Way Intersection	15	65.2
T or Y Intersection	0	0.0
Five-Way Intersection or More	0	0.0
Roundabout	0	0.0
Intersection Related	3	13.0
Driveway Access Related	1	4.3
At School Crossing	0	0.0
Railway Grade Crossing	3	13.0
Shared Use Path or Trail	0	0.0
Interchange or Ramp	0	0.0
Crossover Related	0	0.0
Acceleration/Deceleration Lane	0	0.0
Other/Unknown	0	0.0
Total	23	100.0

Weather 1 Summary

Weather 1 Summary	Total	%
Clear	18	78.3
Cloudy	3	13.0
Rain	1	4.3
Snow	1	4.3
Sleet, Hail (Freezing Rain/Drizzle)	0	0.0
Fog/Smog/Smoke	0	0.0
Blowing Sand/Soil/Dirt/Snow	0	0.0
Severe Crosswinds	0	0.0
Other/Unknown	0	0.0
Total	23	100.0

Light Condition Summary

Light Condition Summary	Total	%
Daylight	21	91.3
Sunrise	0	0.0
Sunset	0	0.0
Dark (Str Lights On)	2	8.7
Dark (Str Lights Off)	0	0.0
Dark (No Str Lights)	0	0.0
Dark (Unknown Light)	0	0.0
Other/Unknown	0	0.0
Total	23	100.0

Crash Summary

Mantorville Ave / Main St

Report Version 1.0
February 2020

Time of Day/Day of Week

From To	00:00 01:59	02:00 03:59	04:00 05:59	06:00 07:59	08:00 09:59	10:00 11:59	12:00 13:59	14:00 15:59	16:00 17:59	18:00 19:59	20:00 21:59	22:00 23:59	Total	%
SUN	0	0	0	0	0	0	0	1	0	1	0	0	2	8.7
MON	0	0	0	0	2	0	0	1	2	0	0	0	5	21.7
TUE	0	0	0	0	2	0	0	2	1	0	0	0	5	21.7
WED	0	0	0	0	0	1	1	1	1	0	0	0	4	17.4
THU	0	0	0	1	0	0	0	0	1	1	0	0	3	13.0
FRI	0	0	0	0	1	0	0	0	1	0	0	0	2	8.7
SAT	0	0	0	0	0	2	0	0	0	0	0	0	2	8.7
Total	0	0	0	1	5	3	1	5	6	2	0	0	23	100.0
%	0.0	0.0	0.0	4.3	21.7	13.0	4.3	21.7	26.1	8.7	0.0	0.0	100.0	100.0

Driver & Non-Motorist Age/Gender Summary

Age	M	F	NR	No Value	Total	%
<14	1	0	0	0	1	2.2
14	1	0	0	0	1	2.2
15	0	0	0	0	0	0.0
16	0	0	0	0	0	0.0
17	1	0	0	0	1	2.2
18	0	0	0	0	0	0.0
19	1	0	0	0	1	2.2
20	1	0	0	0	1	2.2
21-24	2	2	0	0	4	8.7
25-29	1	2	0	0	3	6.5
30-34	4	1	0	0	5	10.9
35-39	5	0	0	0	5	10.9
40-44	0	4	0	0	4	8.7
45-49	2	1	0	0	3	6.5
50-54	3	1	0	0	4	8.7
55-59	1	2	0	0	3	6.5
60-64	1	2	0	0	3	6.5
65-69	0	1	0	0	1	2.2
70-74	3	1	0	0	4	8.7
75-79	1	0	0	0	1	2.2
80-84	0	0	0	0	0	0.0
85-89	0	0	0	0	0	0.0
90-94	0	0	0	0	0	0.0
95+	0	0	0	0	0	0.0
No Value	0	0	0	1	1	2.2
Total	28	17	0	1	46	100.0
%	60.9	37.0	0.0	2.2	100.0	100.0

Month Summary

Month Summary	Total	%
January	1	4.3
February	5	21.7
March	1	4.3
April	0	0.0
May	4	17.4
June	2	8.7
July	1	4.3
August	1	4.3
September	1	4.3
October	1	4.3
November	3	13.0
December	3	13.0
Total	23	100.0

Physical Condition Summary

Physical Condition Summary	Total	%
Apparently Normal (Including No Drugs/Alcohol)	39	84.8
Physical Disability (Short Term or Long Term)	1	2.2
Medical Issue (Ill, Sick or Fainted)	0	0.0
Emotional (Depression, Angry, Disturbed, etc.)	0	0.0
Asleep or Fatigued	1	2.2
Has Been Drinking Alcohol	2	4.3
Has Been Taking Illicit Drugs	0	0.0
Has Been Taking Medications	0	0.0
Other/Unknown	1	2.2
Not Applicable	2	4.3
Total	46	100.0

Selection Filter:

WORK AREA: County('659465') - SPATIAL FILTER APPLIED

Analyst:

Eric Tott

Notes:

Crash Summary

Mantorville Ave / CSAH 34

Report Version 1.0
February 2020

Crash Severity/Crash Year

Crash Severity	Total	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
K - Fatal	0	0	0	0	0	0	0	0	0	0	0
A - Serious Injury	0	0	0	0	0	0	0	0	0	0	0
B - Minor Injury	0	0	0	0	0	0	0	0	0	0	0
C - Possible Injury	4	1	0	0	1	0	2	0	0	0	0
N - Prop Dmg Only	21	4	2	2	0	4	4	3	1	0	1
U - Unkown	0	0	0	0	0	0	0	0	0	0	0
Total	25	5	2	2	1	4	6	3	1	0	1

Crash Severity/Number of Vehicles

Crash Severity	Total	0	1	2	3+
K - Fatal	0	0	0	0	0
A - Serious Injury	0	0	0	0	0
B - Minor Injury	0	0	0	0	0
C - Possible Injury	4	0	2	2	0
N - Prop Dmg Only	21	0	4	15	2
U - Unkown	0	0	0	0	0
Total	25	0	6	17	2

Basic Type Summary

	Total	%
Pedestrian	0	0.0
Bike	1	4.0
Single Vehicle Run Off Road	1	4.0
Single Vehicle Other	4	16.0
Sideswipe Same Direction	0	0.0
Sideswipe Opposing	0	0.0
Rear End	8	32.0
Head On	0	0.0
Left Turn	1	4.0
Angle	4	16.0
Other	6	24.0
Total	25	100.0

First Harmful Event Summary

	Total	%
Pedestrian	0	0.0
Bicyclist	1	4.0
Motor Vehicle In Transport	21	84.0
Parked Motor Vehicle	1	4.0
Train	1	4.0
Deer/Animal	0	0.0
Other - Non Fixed Object	0	0.0
Collision Fixed Object	1	4.0
Non-Collision Harmful Events	0	0.0
Non-Harmful Events	0	0.0
Other/Unknown	0	0.0
Total	25	100.0

Relationship to Intersection Summary

	Total	%
Not at Intersection/Interchange	4	16.0
Four-Way Intersection	18	72.0
T or Y Intersection	0	0.0
Five-Way Intersection or More	0	0.0
Roundabout	0	0.0
Intersection Related	2	8.0
Driveway Access Related	0	0.0
At School Crossing	0	0.0
Railway Grade Crossing	1	4.0
Shared Use Path or Trail	0	0.0
Interchange or Ramp	0	0.0
Crossover Related	0	0.0
Acceleration/Deceleration Lane	0	0.0
Other/Unknown	0	0.0
Total	25	100.0

Weather 1 Summary

	Total	%
Clear	15	60.0
Cloudy	6	24.0
Rain	3	12.0
Snow	1	4.0
Sleet, Hail (Freezing Rain/Drizzle)	0	0.0
Fog/Smog/Smoke	0	0.0
Blowing Sand/Soil/Dirt/Snow	0	0.0
Severe Crosswinds	0	0.0
Other/Unknown	0	0.0
Total	25	100.0

Light Condition Summary

	Total	%
Daylight	24	96.0
Sunrise	0	0.0
Sunset	1	4.0
Dark (Str Lights On)	0	0.0
Dark (Str Lights Off)	0	0.0
Dark (No Str Lights)	0	0.0
Dark (Unknown Light)	0	0.0
Other/Unknown	0	0.0
Total	25	100.0

Crash Summary

Mantorville Ave / CSAH 34

Report Version 1.0
February 2020

Time of Day/Day of Week

From To	00:00 01:59	02:00 03:59	04:00 05:59	06:00 07:59	08:00 09:59	10:00 11:59	12:00 13:59	14:00 15:59	16:00 17:59	18:00 19:59	20:00 21:59	22:00 23:59	Total	%
SUN	0	0	0	0	0	0	0	0	1	1	0	0	2	8.0
MON	0	0	0	0	0	2	0	0	1	0	0	0	3	12.0
TUE	0	0	0	0	0	1	0	0	2	0	0	0	3	12.0
WED	0	0	0	0	1	1	1	1	2	0	0	0	6	24.0
THU	0	0	0	1	1	0	0	0	2	0	0	0	4	16.0
FRI	0	0	0	0	0	1	0	1	2	2	0	0	6	24.0
SAT	0	0	0	0	0	0	0	0	1	0	0	0	1	4.0
Total	0	0	0	1	2	5	1	2	11	3	0	0	25	100.0
%	0.0	0.0	0.0	4.0	8.0	20.0	4.0	8.0	44.0	12.0	0.0	0.0	100.0	100.0

Driver & Non-Motorist Age/Gender Summary

Age	M	F	NR	No Value	Total	%
<14	1	0	0	0	1	2.0
14	0	0	0	0	0	0.0
15	0	0	0	0	0	0.0
16	1	1	0	0	2	4.0
17	0	1	0	0	1	2.0
18	2	2	0	0	4	8.0
19	0	0	0	0	0	0.0
20	0	0	0	0	0	0.0
21-24	2	2	0	0	4	8.0
25-29	1	4	0	0	5	10.0
30-34	5	0	0	0	5	10.0
35-39	2	4	0	0	6	12.0
40-44	0	2	0	0	2	4.0
45-49	3	0	0	0	3	6.0
50-54	1	2	0	0	3	6.0
55-59	0	1	0	0	1	2.0
60-64	0	4	0	0	4	8.0
65-69	3	1	0	0	4	8.0
70-74	1	0	0	0	1	2.0
75-79	1	0	0	0	1	2.0
80-84	0	1	0	0	1	2.0
85-89	0	1	0	0	1	2.0
90-94	0	0	0	0	0	0.0
95+	0	0	0	0	0	0.0
No Value	0	0	0	1	1	2.0
Total	23	26	0	1	50	100.0
%	46.0	52.0	0.0	2.0	100.0	100.0

Month Summary

Month Summary	Total	%
January	4	16.0
February	2	8.0
March	1	4.0
April	1	4.0
May	4	16.0
June	1	4.0
July	4	16.0
August	0	0.0
September	4	16.0
October	1	4.0
November	2	8.0
December	1	4.0
Total	25	100.0

Physical Condition Summary

Physical Condition Summary	Total	%
Apparently Normal (Including No Drugs/Alcohol)	49	100.0
Physical Disability (Short Term or Long Term)	0	0.0
Medical Issue (Ill, Sick or Fainted)	0	0.0
Emotional (Depression, Angry, Disturbed, etc.)	0	0.0
Asleep or Fatigued	0	0.0
Has Been Drinking Alcohol	0	0.0
Has Been Taking Illicit Drugs	0	0.0
Has Been Taking Medications	0	0.0
Other/Unknown	0	0.0
Not Applicable	0	0.0
Total	49	100.0

Selection Filter:

WORK AREA: County('659465') - SPATIAL FILTER APPLIED

Analyst:

Eric Tott

Notes: